

Comparative study on computer-implemented inventions / software- related inventions

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Introduction

The EPO and KIPO are long-standing partners whose co-operation efforts aim at improving the levels of service they provide to their stakeholders. In recent years, there have been rapid technological advances in the area of “computer-implemented” or “software-related” inventions¹ which have resulted in significant increases in such patent applications. This represents a challenge to patent offices and applicants alike, as does the increasing penetration of computer and software technologies into other areas of innovation. A further challenge for applicants is the fact that different patent offices operate under different legal codes and therefore apply different approaches to the examination of patent applications involving computers and software.

In response to these challenges, the EPO and KIPO have jointly conducted this study, with the aim of providing applicants and practitioners insights into their respective examination practices.

The study first outlines and compares the respective approaches to examining “computer-implemented”, or “software-related” inventions and then focuses on ten example cases which have been analysed in parallel by experts from the EPO and KIPO. These example cases were carefully chosen by both offices to reflect a relevant range of inventions typically filed by applicants, including Artificial Intelligence (AI), Graphical User Interfaces (GUIs), Speech Processing, E-commerce, and Telecommunications.²

In general, patents on “computer-implemented”, or “software-related” inventions are granted at both the EPO and KIPO. The laws applied by the EPO and KIPO impose broadly similar substantive requirements on obtaining patents for software-related inventions. In both jurisdictions, two requirements are of particular relevance, namely,

- (1) that the claimed invention must not be excluded from patentability and
- (2) that it must be novel and involve an inventive step (i.e. is non-obvious).

These legal requirements are assessed by the two offices with overlapping yet different sets of criteria, leading to overall outcomes which are broadly comparable, but not always aligned. The analysis of the example cases illustrates these differences: Out of the ten practical examples considered in this study, patentable subject-matter is acknowledged by the EPO in four cases and by KIPO in seven cases.

With this clear and detailed comparison of the EPO’s and KIPO’s CII practices, both offices aim to promote innovation for the benefit of their stakeholders and provide their users with a better understanding of what to expect when filing CII-related patent applications. It is hoped that a better and clearer understanding of EPO and KIPO legal requirements and working practices will support applicants in drafting their applications with a higher degree of confidence of achieving a positive outcome.

¹ The EPO uses the term “computer-implemented invention”, whereas KIPO uses the terms “computer-related invention” or “software-related invention”. All three terms are intended to cover claims which involve computers, computer networks or other programmable apparatus, whereby at least one feature is realised by means of a computer program.

² The first three cases provided by the EPO were taken from the Guidelines for Examination, G-VII, 5.4.2.

Glossary

EPO	European Patent Office
EPC	European Patent Convention
EPO Guidelines	Guidelines for Examination in the European Patent Office For example, “G-II, 3” means Part G, Chapter II, section 3.
KIPO	Korean Intellectual Property Office
KPA	Korean Patent Act
KGL	Patent Examination Guidelines in Korea
Software-related invention	Computer-implemented invention (EPO) Computer-related invention (KIPO)

2. Comparative study of laws, regulations and guidelines

A The requirement of “technical character”³/ technical effect

1. Non-excluded/eligible subject matter

The European Patent Convention (EPC) does not define what is meant by “invention”, but Article 52(2) EPC⁴ does contain a non-exhaustive list of things which are excluded from patentability and therefore not regarded as “inventions” if claimed as such (see also Article 52(3) EPC⁵ and EPO Guidelines G-II, 3). The items on this list are all either abstract (e.g. mental acts or mathematical methods) and/or non-technical (e.g. aesthetic creations or presentations of information). An “invention” within the meaning of Article 52 EPC⁶ must therefore be of both a concrete and a technical character. It may be in any field of technology.

In accordance with Article 2(1) Korean Patent Act (KPA), the term “invention” means the highly advanced creation of technical ideas utilising laws of nature. Accordingly, for an invention for which protection is sought to be an invention accepted as non-excluded/eligible under the KPA, it should satisfy the regulation, and the other case is rejected in accordance with the main paragraph of Article 29(1) KPA. As it is not easy to determine whether the subject-matter is non-excluded/eligible or not, the Patent Examination Guidelines in Korea (KGL) present types of inventions that are generally accepted as non-excluded/eligible to make it easy to understand whether the subject-matter falls within one of the categories of patent subject-matter prescribed by the KPA.

³ The EPO regards claimed subject-matter as having technical character if it involves the use of any technical means. Therefore, any computer-implemented method has technical character and is thus not excluded from patentability under Article 52(2) and (3) EPC. In the context of assessing inventive step, a feature is said to contribute to the technical character of an invention if it contributes to producing a technical effect.

⁴ Article 52(2) EPC reads:
The following in particular shall not be regarded as inventions within the meaning of paragraph 1:

(a) discoveries, scientific theories and mathematical methods;
(b) aesthetic creations;
(c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers;
(d) presentations of information.

⁵ Article 52(3) EPC reads:
Paragraph 2 shall exclude the patentability of the subject-matter or activities referred to therein only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such.

⁶ Article 52(1) EPC reads:
European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application.

The table below summarises the type of subject-matter relevant for the assessment of software-related inventions excluded from patentability at both patent offices.

Table 1:

EPO	KIPO
Under Article 52(2) and (3) EPC, the following are not regarded as “inventions” if claimed as such:	Under Article 1, Chapter 4, Part III KGL, the following are not regarded as “inventions” if claimed as such:
(a) discoveries, scientific theories and mathematical methods;	(1) laws of nature;
(b) aesthetic creations;	(2) not creation, but simple discovery;
(c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers;	(3) violation against laws of nature;
(d) presentations of information.	(4) not using laws of nature;
	(5) function;
	(6) presentations of information;
	(7) aesthetic creation;
	(8) computer program language itself, computer program itself;
	(9) not showing the same effect if repeated;
	(10) unfinished invention.

2. Claim formats

Under the EPC, the claims must be supported by the description and define the extent of patent protection sought in a clear and concise manner (Article 84 EPC). With regard to software-related inventions, different claim formulations are acceptable at the EPO in cases where all method steps can be fully implemented by generic data processing means. The following is a non-exhaustive list of exemplary claim formulations (see EPO Guidelines F-IV, 3.9.1):

(1) Method claim:⁷

A computer-implemented method comprising steps A, B...

A method carried out by a computer comprising steps A, B...

(2) Apparatus/device/system claim:

A data processing apparatus/device/system comprising means for carrying out [the steps of] the method of claim 1.

A data processing apparatus/device/system comprising means for carrying out step A, means for carrying out step B...

⁷ With regard to the EPO, see EPO Guidelines F-IV, 3.9.1, which stipulate: “A computer-implemented method ...” or “A method carried out by a computer ...”.

A data processing apparatus/device/system comprising a processor adapted to/configured to perform [the steps of] the method of claim 1.

(3) Computer program/product claim:

A computer program [product] comprising instructions which, when the program is executed by a computer, cause the computer to carry out [the steps of] the method of claim 1.

A computer program [product] comprising instructions which, when the program is executed by a computer, cause the computer to carry out steps A, B...

(4) Computer-readable storage medium/data carrier claim:

A computer-readable [storage] medium comprising instructions which, when executed by a computer, cause the computer to carry out [the steps of] the method of claim 1.

A computer-readable [storage] medium comprising instructions which, when executed by a computer, cause the computer to carry out steps A, B...

A computer-readable data carrier having stored thereon the computer program [product] of claim 3.

A data carrier signal carrying the computer program [product] of claim 3.

“A medium storing a data structure ...” or “an electromagnetic carrier wave carrying a data structure ...” are also acceptable claim formats. The patentability of such computer data structures is examined according to EPO Guidelines G-II, 3.6.3. These sections of the Guidelines reflect pertinent case law of the EPO boards of appeal.

As the claim set as a whole must be concise, Rule 43(2) EPC⁸ requires that there should only be one independent claim per category in the claim set. The claim categories are: product, process, apparatus and use.

This requirement is further described in F-IV, 3.2, of the EPO Guidelines. For software-related inventions, claims to a computer program or a computer program product are allowed alongside corresponding product claims, for example to an apparatus, a device or a system (see part F-IV, 3.2 (iv)).

At KIPO, a computer-related invention may be described in the scope of the claims as a method invention or a product invention.

(1) Claim for method invention

A computer-related invention may be claimed as a method invention by specifying a series of processes or operations connected in a time sequence, namely steps.

(2) Claim for product invention

As a computer-related invention can be expressed as a multiple of functions implementing an invention, the invention may be disclosed in the scope of the claims as a product (apparatus) invention specified for the function(s). Also, a computer-related invention may be categorised as a computer program readable medium, data readable medium and a computer program stored on a computer-usable medium.

[1] Claim directed to a computer program readable medium

A program recording medium, i.e. a computer-readable recording medium used to install, run or distribute a program, may be described in the scope of the claims as a product invention.

(Example 1) A computer-readable medium having a program recorded thereon, wherein the program makes the computer execute step A, step B, step C...

(Example 2) A computer-readable medium having a program recorded thereon, wherein the program makes the computer operate as means A, means B, means C...

(Example 3) A computer-readable medium having a program recorded thereon, wherein the program makes the computer implement function A, function B, function C...

Meanwhile, where the claimed subject-matter is a “computer-readable medium”, but it is determined, based on the description of the invention, that a “computer-readable medium” and “transmission medium” are both included as the inventions for which protection is sought in the same claim, the examiner must take note that the claimed invention is not clearly described, as the claimed invention is not specified as the only one to be patented. In this case, it is desirable to amend the description of the invention to make sure a computer-readable recording medium is the only claimed subject-matter by deleting description related to transmission media.

[2] Claim directed to a data readable medium

A data recording medium, i.e. a computer-readable medium that records data that has a structure that specifies what the computer processes are, can be described in the scope of the claims as a product invention.

⁸ Rule 43(2) EPC reads:

Without prejudice to Article 82, a European patent application may contain more than one independent claim in the same category (product, process, apparatus or use) only if the subject-matter of the application involves one of the following:

(a) a plurality of interrelated products,

(b) different uses of a product or apparatus,

(c) alternative solutions to a particular problem, where it is inappropriate to cover these alternatives by a single claim.

(Example) A computer-readable medium having data recorded thereon, wherein the data comprises structure A, structure B, structure C...

- [3] Claim directed to a “computer program recorded in a medium” to solve a specific problem in combination with hardware

(Example 1) A computer program recorded in a medium to make a computer execute step A, step B, step C...

- In this example, where “computer program” is replaced with a term compatible with a computer program, such as application, the claim is allowed.
- Meanwhile, a “computer program not recorded in a medium”, such as “a computer program executing step A, step B, step C... in the computer” is not allowed as it claims a computer program per se.

Where the end of the claim is described either as a “program product” or as “program achievements” or as “program results”, etc., as it is hard to specify any one of “program”, “computer-readable medium” and “programs-combined computer system”, it is hard to clearly understand the subject-matter of the invention. In addition, where the end of the claim is described either as “program signals” or as a “program signal sequence”, etc., as the invention cannot be specified as a “product” or as a “method”, the category of the invention cannot be defined.

3. Approach for assessing whether a software-related invention is an “invention” or excluded/ineligible subject-matter

The EPO’s approach for assessing whether a software-related invention is an “invention” within the meaning of Article 52(1), (2) and (3) EPC is described in the EPO Guidelines, G-II, 3, and its subsections.

Inventions involving programs for computers can be protected in different forms of a “computer-implemented invention”, an expression intended to cover claims which involve computers, computer networks or other programmable apparatus whereby prima facie one or more of the features of the claimed invention are realised by means of a program or programs.

The basic patentability considerations in respect of claims for computer programs are in principle the same as for other subject-matter. While “programs for computers” are included among the items listed in Article 52(2) EPC, if the claimed subject-matter has a technical character it is not excluded

from patentability by the provisions of Article 52(2) and (3) EPC.

Technical character should be assessed without regard to the prior art, i.e. the features which contribute to technical character may be known already (see T 1173/97, confirmed by G 3/08). Features of the computer program may potentially lend technical character to the claimed subject-matter, as explained below.

A claim to a computer program is not excluded from patentability if it is capable of bringing about, when running on a computer, a further technical effect going beyond the “normal” physical interactions between the program (software) and the computer (hardware) on which it is run (see T 1173/97 and G 3/08). The normal physical effects of the execution of a program, e.g. electrical currents, are not in themselves sufficient to lend a computer program technical character, and a further technical effect is needed.

A further technical effect which lends technical character to a computer program may be found, for instance, in the control of an industrial process or in the internal functioning of the computer itself or its interfaces under the influence of the program which could, for example, affect the efficiency or security of a process, the management of computer resources required or the rate of data transfer in a communication link. A computer program implementing a method that itself makes a technical contribution would also be considered to be capable of bringing about a further technical effect when it is run on a computer.

Assessing whether a computer program brings about a further technical effect does not involve a comparison with the prior art, i.e. the further technical effect may be known. The activity of programming, in the sense of writing code, is an intellectual, non-technical activity and therefore does not contribute to the production of a technical effect (see G 3/08 and T 1539/09).

Claims directed to a computer-implemented method, a computer-readable storage medium or a device cannot be objected to under Art. 52(2) and (3) as any method involving the use of technical means (e.g. a computer) and any technical means itself (e.g. a computer or a computer-readable storage medium) have technical character and thus represent inventions in the sense of Art. 52(1) (T258/03, T424/03, G3/08). This approach has also been called the “any-technical-means approach”. Such claims should not contain program listings, but should define all the features which assure the patentability of the process which the program is intended to carry out when it is run. Short excerpts from programs might be accepted in the description.

If claimed subject-matter relating to a computer program does not have technical character, it should be rejected under Article 52(2) and (3) EPC. If the subject-matter passes this test for technicality, the examiner then proceeds to the questions of novelty and inventive step.

Following the any-technical-means approach, a storage medium has technical character. Therefore, claims directed towards the following can be considered to be inventions within the meaning of Article 52(1) EPC:

- computer-implemented methods using data formats and/or structures;
- data formats and/or structures embodied on a medium or on an electromagnetic carrier wave.

Technical effects associated with data structures or formats when used during the operation of a computer system could give rise to, for example: efficient data processing, efficient data storage, data retrieval based on technical criteria, or enhanced security. On the other hand, features merely describing data collections on a logical level do not provide a technical effect, even if such a description might involve a particular modelling of the described data.

Therefore, when assessing inventive step of physically embodied data structures and data formats, their nature needs to be assessed. Functional data is used to control a device which processes the data and inherently comprises technical features of the controlled device. Cognitive data, on the other hand, is only relevant to human users. Functional data may form the basis of a technical effect whereas cognitive data does not.

In order to confirm that a claim is directed to functional data EPO examiners check whether the claimed data structures inherently comprise or reflect the technical features of the system or the steps of a corresponding method which forms the basis of the technical effect.

In case of KIPO, please refer to Section 2.1, Chapter 10, Part IX KGL to determine whether a computer-related invention is an “invention” as defined in Article 2(a) KPA.

If information processing by software is specifically realised by using hardware, the claimed invention comes under the creation of a technical idea using laws of nature.

A specific method of assessing whether a claimed invention is a computer-related one as defined in the KPA is as follows.

- (1) First, a claimed invention is understood based on the description of the claim.

- (2) It should be reviewed whether the claimed invention is directed to the “creation of technical ideas using laws of nature” in accordance with “Patent Eligibility of an Invention, Paragraph 4, Chapter 1, Part 3” KGL.

[1] As it should be determined whether the invention uses laws of nature based on the claim as a whole, even if laws of nature are used in some parts of the claim, where it is determined the claim as a whole does not use laws of nature, it will not be deemed to be directed to an invention as defined in the KPA.

[2] The examiner will determine whether the claimed invention does not come under the creation of technical ideas using laws of nature. Where the invention does not use the laws of nature, but applies (i) laws other than laws of nature, (ii) artificial determination, or belongs to (iii) mental activity of a human being or uses it, or (iv) suggests simple information, it is not directed to an invention, as it is not technical ideas using laws of nature.

[3] Then, the examiner will determine whether the claimed invention falls under the creation of technical ideas using laws of nature. Where the invention specifically (i) controls a device or implements necessary controlling process, or (ii) implements information processing based on the technical nature of an object, it is directed to an invention, as it is technical ideas using the law of nature.

- (3) Where the claimed invention is not directed to either [2] or [3] of the abovementioned step (2), it should be reviewed whether the invention belongs to the case where information processing by software is specifically implemented by means of hardware.

[1] Where information processing by software is specifically implemented by hardware, in other words, where a specific means or process in co-operation with software and hardware implements computing or processing of specific information in accordance with the purpose of use, and thereby a specific information processing apparatus (device) or its working process is disclosed in the claim, it is an invention, as it is the creation of technical ideas utilising laws of nature.

[2] Meanwhile, where information processing by software is not specifically implemented by means of hardware, it is not an invention, as it is not the creation of technical ideas using the law of nature.

B Novelty

At the EPO, an invention can only be patented if it is new. An invention is considered to be new if it does not form part of the state of the art. The first step in deciding whether an invention is new is to define the prior art, the relevant part of that art, and the content of that relevant art. The next is to compare the invention with the prior art thus defined, and see whether the invention differs from it. If it does, the invention is new. Further details on the examination of novelty can be found in EPO Guidelines G-VI.

At KIPO, when determining the novelty of a computer-related invention, the examiner will basically follow the criteria for novelty that are applied to a general invention described in Chapter 2, Part 3 KGL. Article 29(1) KPL defines the following inventions as excluded/ineligible for lack of novelty: (1) disclosed invention, (2) publicly implemented invention, (3) disclosed invention in a publication, (4) invention made available to the public through telecommunication lines at home and abroad before the filing.

The determination of novelty of a claimed invention is made by comparing the matter defining the claimed invention and the matter disclosed in the prior-art reference and extracting difference(s) between them. Where there is no difference between the matter defining a claimed invention and the matter disclosed in the prior-art reference, the claimed invention is not novel. Where there is a difference, the claimed invention is novel. The claimed invention is not novel when it is substantially or exactly identical to the disclosure of the prior-art reference.

“The substantially identical invention compared with prior arts” means that there is no newly produced effect because the difference in the concrete means for solving problems is caused by mere addition, conversion or deletion of well-known or commonly used art and the difference between the claimed invention and the prior-art reference does not practically affect the technical idea of the claimed invention.

C Inventive step

Software-related inventions often comprise a mix of technical and non-technical features.

To examine whether an inventive step is present for such mixed-type inventions, the EPO applies the problem-solution approach according to the COMVIK decision T 641/00, as was recently confirmed in the Enlarged Board of Appeal decision G 1/19. This entails ensuring that all the features which contribute to the technical character of the invention are taken into account. These also include the features which, when taken in isolation, are non-technical, but do, in the context of the invention, contribute to producing a technical effect serving a technical purpose. However, features which do not contribute to the technical character of the invention cannot support the presence of an inventive step. Such a situation may arise, for instance, if a feature contributes only to the solution of a non-technical problem, e.g. a problem in a field excluded from patentability.

To this end, non-technical features of a claim can be included in the problem formulation as a constraint to be met to the extent that these non-technical features do not interact with the claim’s technical features. This has the desirable effect that the non-technical aspects of the claimed invention, which generally relate to non-patentable desiderata, ideas and concepts and belong to the phase preceding any invention, are automatically cut out of the assessment of inventive step and cannot be mistaken for technical features positively contributing to inventive step.

The steps below outline in more detail the application of the problem-solution approach to mixed-type inventions (as set out in the EPO Guidelines G-VII, 5.4):

- (i) The features which contribute to the technical character of the invention are determined on the basis of the technical effects achieved in the context of the invention.
- (ii) Based on the features contributing to the technical character of the invention identified in step (i), the closest prior art is selected.

- (iii) The differences between the closest prior art and the claimed invention are identified. The technical effect(s) of these differences, in the context of the claim as a whole, is (are) determined in order to identify from these differences the features which make a technical contribution and those which do not.
- (a) If there are no differences (not even a non-technical difference), a novelty objection is raised (Article 54 EPC)
- (b) If the differences do not make any technical contribution, a lack-of-inventive-step objection is raised (Article 56 EPC). The reasoning for the objection should be that the subject-matter of a claim cannot be inventive if there is no technical contribution to the prior art.
- (c) If the differences include features making a technical contribution, the following applies:
- The objective technical problem is formulated on the basis of the technical effect(s) achieved by these features. In addition, if the differences include features making no technical contribution, these features, or any non-technical effect achieved by the invention, may be used in the formulation of the objective technical problem as part of what is “given” to the skilled person, in particular as a constraint that has to be met.
 - If the claimed technical solution to the objective technical problem is obvious to the person skilled in the art, a lack-of-inventive-step objection is raised (Article 56 EPC)
 - If the claimed technical solution to the objective technical problem is deemed not obvious to the person skilled in the art, the claim is considered to be inventive.

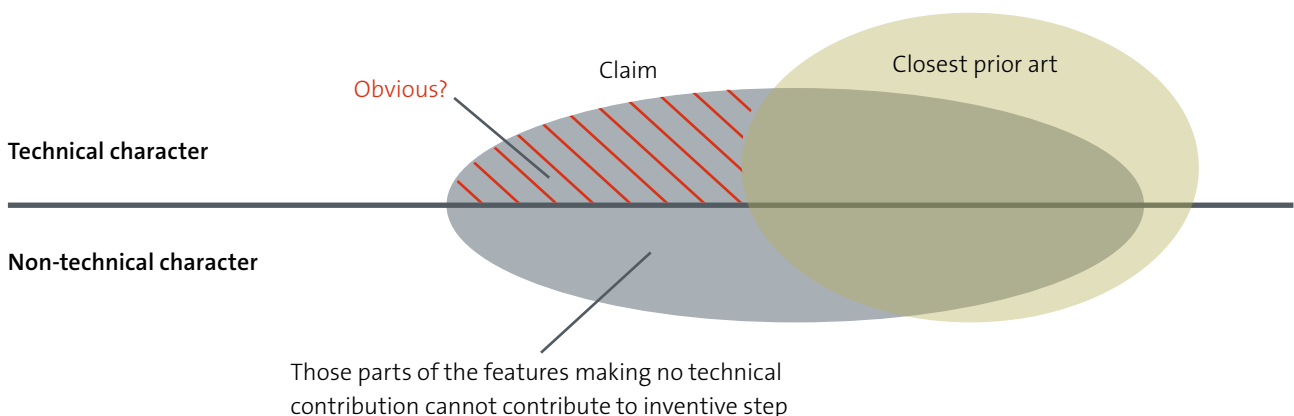
The determination of the features contributing to the technical character of the invention should be performed for all claim features in step (i) (see T 172/03 and T 154/04). However, in practice, due to the complexity of this task, the examiner can normally perform the determination in step (i) on a prima facie basis only and perform a complete and detailed analysis at the beginning of step (iii). In step (iii), the technical effects achieved by the differences over the selected closest prior art are determined. The extent to which the differences contribute to the technical character of the invention is analysed in relation to these technical effects. This analysis, limited to the differences, can be performed in a more detailed manner and on a more concrete basis than the one performed in step (i). It may therefore reveal that some features considered in step (i) prima facie to not contribute to the technical character of the invention do, on closer inspection, make such a contribution. The reverse situation is also possible. In such cases, the selection of the closest prior art in step (ii) might need to be revised.

When performing the analysis in steps (i) and (iii) above, care should be taken to avoid missing any features that might contribute to the technical character of the claimed subject-matter, in particular if the examiner reproduces their understanding of the subject-matter of the claim in their own words during the analysis (see T 756/06).

At KIPO, assessment of inventive step for a computer-related invention basically follows the criteria for inventive step defined in Chapter 3, Part 3 KGL, and additionally “matters to be considered for assessing an inventive step of a computer-related invention” described in Article 2.2, Chapter 10, Part 9 KGL should be considered.

Figure 1:

Summary of how inventive step for mixed-type inventions is assessed at the EPO



Assessment of inventive step under the KGL is to determine whether a person skilled in the art may easily arrive at “the claimed invention” based on the cited invention before its filing and should primarily adopt the so-called problem-and-solution approach comprising in general the following steps:

- (1) Specifying the claimed invention
- (2) Any cited inventions are specified from the viewpoint of a skilled person in the art on the premise that the cited inventions are common with the claimed invention in the technical field and the technical problems
- (3) The “closest prior art” to the claimed invention is chosen, and then convergence and differences are clarified after comparing both of them.
- (4) It must be determined whether it is easy for a skilled person in the art to arrive at the claimed invention from the closest prior art, despite the difference, after taking into consideration other prior art, common general technical knowledge at the time of filing and experiences.

As for the assessment of inventive step of a computer-related invention, it is significant for the examiner to understand the invention as an organically combined one, not disassembling artificial decisions and systemisation of transactions.

Also, the examiner will take into account the overall technology level at the time of the filing, the description and drawing(s) of the invention and comprehensively review the purpose of the claimed invention, technical features and its working effect by taking the responses submitted by the applicant into account, but comprehensively assess uniqueness of the purpose and outstanding effect from the viewpoint of the difficulty of technical composition.

Determination of the inventive step must be done in consideration of (3) whether, from the point of view of one of ordinary skill in the art, the claimed invention has any advantageous effects over a prior-art reference while mainly focusing on (1) whether the prior-art reference provides any motivation to a person skilled in the art to arrive at the subject-matter of the claimed invention or (2) whether the difference between the disclosure of the prior art and that of the subject-matter of the claimed invention can be considered to be a mere exercise of ordinary creativity.

In assessing inventive step of a computer-related invention filed in a certain field, a skilled person in the art is an imagined figure defined in the KPA, having “common general

technical knowledge in the specific field and computer software technology field (e.g. systematization technology)”, possessing the claimed invention as their own knowledge by obtaining everything at the technical level at the time of filing, in relation to the problem to be solved by the claimed invention, using general means so as to conduct R&D, including experiments, analysis, manufacturing, etc. and exercising general creative ability, such as design modification.

The exercise of ordinary creative ability expected of a person skilled in the art refers typically to the following six points:

- (1) Application to other fields
There are lots of cases in which steps or means for implementing the function used in computer-related inventions are often common in function or operation, regardless of the applied field to which the invention belongs. In such cases, it is within the ordinary creative activity expected of a person skilled in the art to apply such steps or means of computer-related inventions used in certain applied fields to other fields to implement the same function or operation.
- (2) Addition of a commonly known means or replacement with equivalent
It is the exercise of ordinary creativity expected of a person skilled in the art to add a commonly known means for systemisation as a constituent element, or to replace part of constituent elements of the system with a well-known means equivalent thereto.
- (3) Implementation by software of functions which are otherwise performed by hardware
It is within the exercise of ordinary creativity expected of a person skilled in the art to try to implement functions which have been so far performed by hardware, such as circuits, by means of software.
- (4) Systematisation of human transactions or a business method
In this case, the closest prior art discloses work or business methods that a human being carries out in the field of a certain art but does not disclose how to systematise said works or business methods. Even in such a situation, it is within the exercise of ordinary creativity expected of a person skilled in the art to systematise work or business methods that a human being carries out in the field of a certain art in order to achieve implementation on a computer, if the said systematisation can be implemented by a routine activity of usual system analysis methods and system design methods.

- (5) Reproduction of a known event in a computerised virtual space

It is within the exercise of ordinary creativity of a person skilled in the art to reproduce a known event in a computerised virtual space (e.g. virtual reality, augmented reality or mixed reality), provided that the reproduction would have been made by routine work by using usual system analysis and system design methods.

- (6) Design modification on the basis of well-known facts or practice

Where a design modification based on a well-known fact or practice is [1] a mere modification so that a skilled person in the art adopting the modification would consider it as well-known art or common general technical knowledge at the time of filing, and [2] thereby it is not acknowledged that the claimed invention has a better effect over the prior art, as long as there are not any special causes to prevent the design from being modified and said design modification is just that done by a skilled person in the art as necessary, it will be considered an exercise of ordinary creative ability by a skilled person in the art.

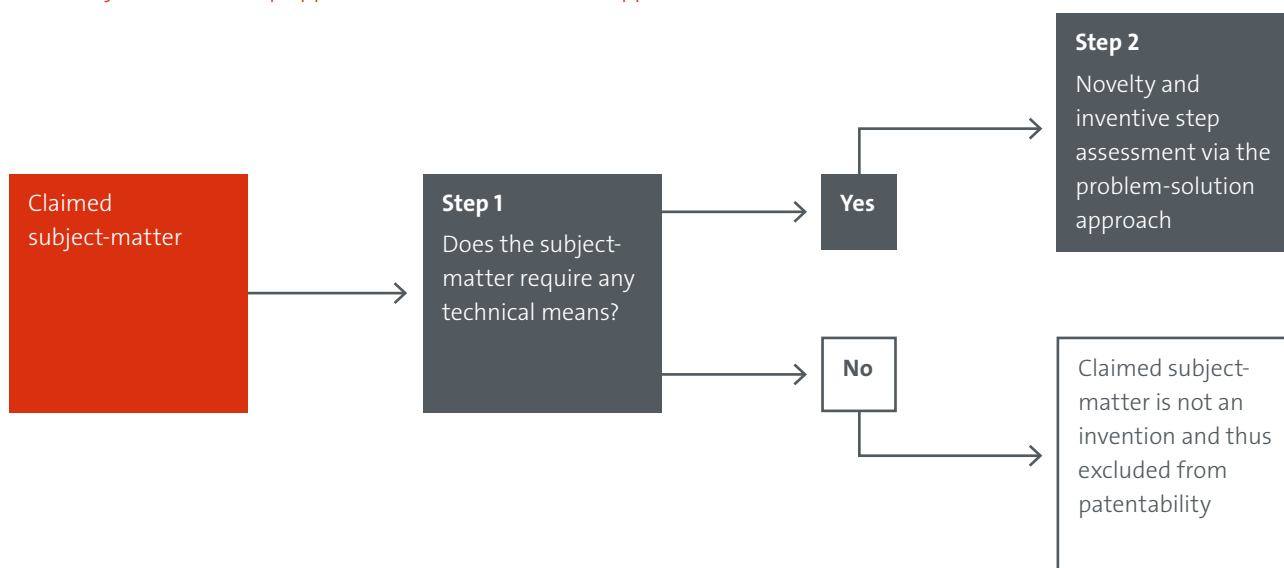
D Comparison of examination practices

In general, patents on software-related inventions are granted at both the EPO and KIPO. The laws applied by the EPO and KIPO impose similar substantive requirements on obtaining patents for software-related inventions, CIIs. In both jurisdictions, two requirements are of particular relevance, namely, on the one hand, the requirement that the claimed invention must not be excluded from patentability, and, on the other hand, the requirement that claimed subject-matter must be novel and non-obvious (or, equivalently, involve an inventive step).

The EPC does not give a positive definition of the terms “invention” and “technical”. However, having technical character is an implicit requirement for an invention within the meaning of Article 52 EPC. Since an invention is only excluded from patentability if it relates to the items listed in Article 52(2) EPC as such, the EPO follows the “any-technical-means approach”; accordingly, a claim to a method that requires the presence of technical means to be carried out, such as a computer, a network or the internet, is regarded as an “invention” within the meaning of Article 52 EPC. Similarly, devices are always regarded as “inventions” since, by definition, they require some form of technical means. A claim to a computer program only avoids an exclusion from patentability through the presence of a further technical effect, i.e. an effect that goes beyond the normal physical interactions between computer hardware and software, such as circulation of electrical currents in the computer. As a further consequence of the “any-technical-means approach”, claimed subject-matter is an invention irrespective of whether a claim comprises, in addition to any technical means, also non-technical features. The “any-technical-means approach” is the result of evolving case law of the EPO’s boards of appeal which has, over time, shifted the boundaries of what is regarded as excluded subject-matter. In effect, these shifts have made it easier to define an invention which is patentable in principle, and not excluded under Article 52(2) and (3) EPC. However, at the same time it has become harder to meet the requirement of non-obviousness, because the criteria that used to play a role when assessing whether claimed subject-matter is excluded from patentability now play a role when assessing inventive step (the overall patentability threshold for CIIs has remained substantially the same). Figure 2 illustrates the two-step approach of the EPO, the first step applying the “any-technical-means approach” to evaluate whether claimed subject-matter is excluded from patentability, and the second step applying the problem-solution approach to evaluate novelty and inventive step.

Figure 2:

Summary of the two-step approach for assessment of CII applications at the EPO



In contrast to the EPC, which lacks any definition for the term “invention”, Article 2(1) KPA defines an invention as “the highly advanced creation of technical ideas utilising laws of nature”. As a result of this positive definition of what constitutes an invention, the manner in which KIPO examines whether a claimed software-related invention satisfies this definition is more complex than at the EPO. In essence, whether a software-related invention is an invention within the meaning of Article 2(1) is assessed by KIPO by having regard to the claim as a whole.

First, if the claim as a whole does not use laws of nature, it is not an invention within the meaning of Article 2(1) KPA. KIPO’s assessment of the claim as a whole differs from the any-technical-means approach practised by the EPO, according to which an invention would not be excluded from patentability even if the claimed subject-matter emphasised non-technical aspects (e.g. a computer-implemented business method).

Second, KIPO examines whether the claimed subject-matter is the creation of a technical idea utilising the laws of nature. This is acknowledged, for example, when a software-related invention processes information based on either the control of another device, or based on the technical nature of an object. As in the first step, deciding whether the information processing is based on technical nature involves assessing the claimed invention as a whole, i.e. whether the focus of the claimed invention is on information processing of a technical, rather than non-technical, nature. If the outcome of the second step is positive, KIPO continues with the examination of novelty and inventive step.

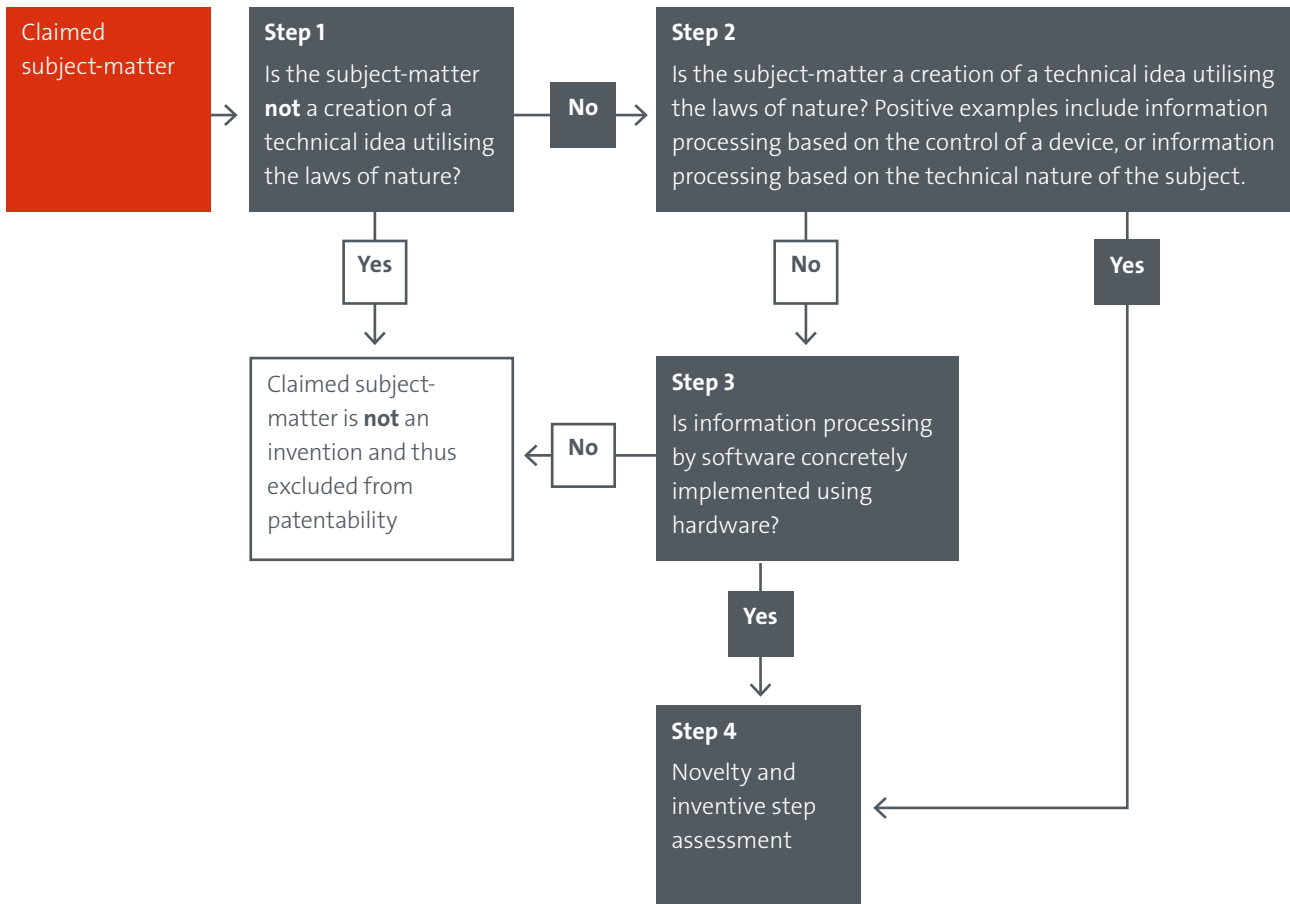
Third, even if an invention is not acknowledged at the second step, there can still be an invention within the meaning of Article 2(1) KPA as long as the claim defines information processing by software that is “concretely implemented using hardware” (i.e. if the “computer software criterion” is met). In other words, computing or processing of specific information must be implemented with specific means or a specific process wherein software and hardware co-operate in accordance with the purpose of use of the claimed subject-matter. Where it cannot be clearly identified which hardware resource specifically enables information processing for each function mentioned in the claim, KIPO may conclude that the claimed subject-matter does not constitute an invention, even if the claim explicitly refers to hardware resources, such as a “computer”. If the outcome of the (facultative) third step is positive, KIPO continues with the examination of novelty and inventive step.

When the two approaches of the EPO and KIPO are compared, it is evident that both offices apply different sets of criteria to examine an invention’s patentability. Notably, the technical character of an invention is evaluated by KIPO at the earliest possible stage when assessing whether claimed subject-matter constitutes an invention, whereas the EPO evaluates technical character principally during the assessment of inventive step.

The EPO’s approach to examining inventive step only takes those features into account which contribute to the technical character of the invention. Hence, features which are non-technical when viewed in isolation, but do, in the context of the claimed invention, contribute to producing a

Figure 3

The four-step approach of KIPO:



technical effect serving a technical purpose, need to be considered. However, features making no technical contribution may be used in the formulation of the objective technical problem as part of what is “given” to the skilled person, in particular as a constraint that has to be met. This approach has the effect that sometimes there is a finding of lack of inventive step in view of prior art which is no more than a simple general-purpose computer. Here, a typical example would be the straightforward implementation of a business method on a general-purpose computer. In this example, assuming the steps of the business method do not contribute to producing any technical effect, it is both permissible and adequate to use the business method, as it is claimed, in the problem formulation as part of the framework of the technical problem that is to be solved (as a constraint that has to be met).

KIPO’s approach, however, considers the claims as a whole, no matter whether the features disclosed in the claims contribute to the technical character of the invention. There

is no case law in Korea that has divided technical features and non-technical ones in assessing inventive step. Also, in accordance with KIPO examination guidelines, all the features described in the claims need to be compared with the ones in the prior art. In other words, a lack of an inventive step, in KIPO, is determined in a comparison between all the features described in the claims and the ones in the closest prior art. It is therefore difficult to use a general-purpose computer as prior art.

EPO case 2 (“brokering offers”) reflects this difference: when applying the EPO approach, the claimed subject-matter is found to lack inventive step. However, when applying KIPO’s holistic approach considering all features in the claim, technical and non-technical, in its assessment, an inventive step can be acknowledged.

In spite of the different approaches adopted by the EPO and KIPO, there are some notable parallels between the respective criteria applied by the two offices. As outlined

above, when KIPO examines whether there is an invention within the meaning of Article 2(1) KPA, it assesses whether a software-related invention processes information based on either the control of another device, or on the technical nature of an object. Similarly, at the EPO, information processing which is performed for a technical purpose makes a contribution to a claimed invention's technical character. An example is a mathematical method which is excluded from patentability when viewed in isolation, but which makes a technical contribution when applied for a technical purpose, such as speech recognition or the control of a technical device. Note that making such a contribution is only possible when the claim is functionally limited to the technical purpose. (See also the Guidelines for Examination in the EPO, G-II, 3.3, on mathematical methods and in particular the exemplary list of technical purposes given under the heading "Technical applications".)

In a similar manner to the (facultative) third step of KIPO's approach, i.e. information processing by software that is concretely implemented using hardware, the EPO recognises that features which are the result of technical implementation choices which go beyond merely automating non-technical method steps contribute to the technical character and thus have to be duly taken into account when assessing inventive step. According to KIPO's approach, computing or processing of specific information must be implemented with specific means or a specific process wherein software and hardware co-operate in accordance with the purpose of use of the claimed subject-matter. According to KIPO's approach, in principle, computation of specific information or its processing needs to be implemented in co-operation between hardware and software, but the hardware does not have to be limited to any specific device for information processing. A general-purpose computer may be sufficient as hardware. In particular, a computer can be acknowledged as a specific device for information processing that is sufficient to address the problem, if it can carry out computation of specific information or its processing. The point is that the problem can be solved not only by using hardware, but by a software function implemented on a general-purpose computer. Thus, if co-operation between software and hardware is concretely described in the claim, or a person skilled in the art can clearly understand the relationship based on it, KIPO acknowledges the subject-matter as an invention.

Once KIPO and the EPO have determined that an invention is not excluded from patentability, both offices proceed to examine novelty and inventive step. Notably, at KIPO, once an invention within the meaning of Article 2(1) KPA is acknowledged, no distinction is made between features which are technical and those which are not. Therefore, all

features will be taken into account when assessing inventive step. The EPO's approach, as summarised above, may have a different outcome as a consequence of treating non-technical features which do not contribute to technical character (and thus to bringing about a technical effect) differently.

In summary, KIPO's requirements for determining whether claimed subject-matter is not excluded from patentability are harder to fulfil than the EPO's requirements, since the EPO follows the any-technical-means approach which does usually not pose a high burden on applicants. As concerns inventive step, whereas the EPO distinguishes between technical and non-technical features, KIPO does not, with the effect that the EPO considers a claimed invention to be obvious more easily.

In relation to inventions that concern the automation of business methods, or the automation or virtualisation of other non-technical activities which are typically carried out by human beings, the examination practice of KIPO and the EPO are similar. Neither office acknowledges an inventive step for straightforward implementations which can be considered routine workshop measures of a skilled person. In such cases KIPO may notify the applicant of a reason for refusal by making it clear that it is within the ability of a person skilled in the art to automate the business method on the basis of the cited invention that presents the business method. At the EPO, it may not even be necessary to cite prior art in the form of documentary evidence in relation to the computer-implemented business method, because the business method as such does not contribute towards the claimed invention's technical character, and thus the technical teaching does not go beyond a general-purpose computer. It should be noted, though, that the examiners at the EPO are encouraged to search as many features of a claimed invention as possible and, in any case, the search should cover all features that are found to contribute to the technical character. Another notable similarity between both offices is the fact that physically embodied data structures are not excluded from patentability. However, at the EPO, only "functional data" can make a contribution to technical character and inventive step. In order to establish the presence of functional data, the examiner needs to check whether the data structure as claimed inherently comprises or reflects the technical features of the system or the steps of a corresponding method which forms the basis of the technical effect.

For example, a record carrier for use in a picture retrieval system stores coded pictures together with a data structure defined in terms of line numbers and addresses which instruct the system how to decode and access the picture

from the record carrier. This data structure is functional data defined in terms which inherently comprise the technical features of the picture retrieval system, namely the record carrier and a reading device for retrieving pictures therefrom in which the record carrier is operative. It thus contributes to the technical character of the record carrier, whereas the cognitive content of the stored pictures (e.g. photograph of a person or landscape) does not. In addition, the data must have a physical embodiment, i.e. it must be embodied on a medium or as an electromagnetic carrier wave.

This approach is very similar to KIPO's treatment of "structural data". If the subject-matter is characterised only by the content of information presented, it is not acknowledged as an invention in KIPO. What is accepted as a computer-related invention at KIPO is not data itself, but a "computer readable medium recording structural data" that shows structurally what a computer performs. Even in this case, where the data only shows a unique character, as with a machine operating manual, a CD characterised by recorded music, etc., it is just presentation of information, and thus the subject-matter does not constitute an invention. Therefore, it should be noted that the patent eligibility of data is assessed based on whether a data structure is stored on a computer-readable medium and whether data enables a computer to perform specific functions.

The in-depth comparison of the example cases annexed to this study also demonstrates a further difference in examination practice, namely that claimed subject-matter is not always construed identically by the two offices. Here, the EPO tends towards a broader claim interpretation as compared to KIPO. For example, the EPO examiner finds in KIPO case 2 ("emotion recognition method") that the feature "string of characters" anticipates "voice signal". In contrast, since the cited invention does not explicitly refer to "voice signal", a KIPO examiner would not interpret a "string of characters" expansively as a "voice signal". In addition, whereas the EPO examiner more often finds implicit disclosure (implicit features) in a cited document, KIPO examiner rather applies an explicit approach. As an example, the KIPO examiner identifies "time information" in EPO case 2 ("brokering offers") as an additional distinguishing feature, for this feature is not explicitly mentioned in the prior art. However, while these differences in examination practice might explain some of the different outcomes for the example cases, the topics of claim construction and the interpretation of prior art are not directly related to software-related inventions and, as such, beyond the scope of this study.

Regarding the EPO, as general guidance to applicants it can be said that applicants cannot rely on those features in a

claim that do not contribute to producing a technical effect in order to support inventive step (see T 641/00). Both in EPO case 2 ("brokering offers") and EPO case 5 ("training a neural network") the principles set out in T 641/00 result in a finding of lack of inventive step – in contrast to KIPO's acknowledgment of inventive step. It can therefore also be said that applicants to the EPO should include enough technical detail in the description and/or dependent claims as a fall-back position, such that additional features can be added to a claim which, in combination with the existing technical and non-technical features of the claim, would support the presence of an inventive step (EPO Guidelines G-VII, 5.4).

The applicant who intends to file a computer-related invention with KIPO is recommended to explicitly disclose hardware resources (e.g. computer, server, etc.) in the claim to satisfy the criteria for subject-matter eligibility. This is required for passing the third step of the general test for patent eligibility in KIPO. Otherwise, since the subject-matter does not come under the case where "information processing by the software is concretely realised by using hardware resources", the rejection of the claimed subject-matter can be raised on the grounds that the subject-matter does not constitute an invention and the claim is not concretely described.

Also, since KIPO considers all the features disclosed in the claim, including non-technical features, when assessing inventive step – in contrast to the EPO's examination practice – the applicant is recommended to further specifically describe the scope of claims, especially focusing on features that can support the inventive step and then sufficiently adding other surrounding features, all the way down to the presentation of the unique character of the invention. However, even in this case, as reviewed in cases for business method inventions, since non-technical features of generally well-known business methods or the process can be denied by well-known and commonly used prior art or systemisation technology, etc., it is more preferable to add features having technical character.

3. Comparative study of example cases

The following table gives an overview of the results of comparing the EPO's and KIPO's CII examination practice

by way of having analysed ten example cases. Each office has contributed five examples in the area of software-related inventions. In the table "O" stands for fulfilling a legal requirement and "X" for not fulfilling a legal requirement:

Table 2:

Comparison of Examination practices – 10 cases are examined by each office

Case	Title	Eligibility		Inventive Step		
		KIPO	EPO	KIPO	EPO	
EPO	1	Facilitating shopping (BM)	○	○	×	×
	2	Brokering offers (BM)	○	○	○	×
	3	Transmission of a broadcast media channel (BM)	○	○	○	×
	4	Remotely controlling an electronic device (GUI)	○	○	○	○
	5	Training a neural network ("Drop-out") (AI)	○	○	○	×
KIPO	1	An urban traffic speed prediction system (AI)	○	○	○	○
	2	An emotion recognition method using voice (Natural Language processing)	○	○	×	×
	3	A control method of digital home appliances based on parking and leaving of a vehicle (IoT)	○	○	○	○
	4	A method for comprehensively managing household waste (BM)	×	○	○	×
	5	Verifying personal information for an e-commerce process (BM)	○	○	×	×

EPO case 1: Facilitating shopping

1. Claim

Method of facilitating shopping on a mobile device wherein:

- (a) *the user selects two or more products to be purchased*
- (b) *the mobile device transmits the selected products' data and the device location to a server;*
- (c) *the server accesses a database of vendors to identify vendors offering at least one of the selected products;*
- (d) *the server determines, on the basis of the device location and the identified vendors, an optimal shopping tour for purchasing the selected products by accessing a cache memory in which optimal shopping tours determined for previous requests are stored; and*
- (e) *the server transmits the optimal shopping tour to the mobile device for displaying.*

2. EPO analysis

Application of the problem-solution approach according to EPO Guidelines G-VII, 5.4:

Step (i): The features contributing to the technical character are at first glance a distributed system comprising a mobile device connected to a server computer which has a cache memory and is connected to a database.

Step (ii): Document D1, which discloses a method for facilitating shopping on a mobile device wherein the user selects a single product and the server determines from a database the vendor selling the selected product nearest to the user and transmits this information to the mobile device, is selected as the closest prior art.

Step (iii): The differences between the subject-matter of claim 1 and D1 are:

The user can select two or more products to purchase (instead of a single product only).

An “optimal shopping tour” for purchasing the two or more products is provided to the user.

The optimal shopping tour is determined by the server by accessing a cache memory in which optimal shopping tours determined for previous requests are stored.

Differences (1) and (2) represent modifications of the underlying business concept, since they define producing an ordered list of shops to visit which sell these products. No technical purpose is served, and no technical effects can be identified from these differences. Hence, these features make no technical contribution over D1. On the other hand, difference (3) makes a technical contribution as it relates to the technical implementation of differences (1) and (2) and has the technical effect of enabling rapid determination of the optimal shopping tour by accessing previous requests which are stored in a cache memory.

Step (iii)(c): The objective technical problem is to be formulated from the perspective of the person skilled in the art as an expert in a technical field (EPO Guidelines GVII, 3). Such a person is not deemed to have any expertise in business-related matters. In the present case, they can be defined as an expert in information technology who gains knowledge of the business-related features (1) and (2) as part of the formulation of the technical problem to be solved, as would be the case in a realistic situation in the form of a requirement specification. The objective technical problem is thus formulated as how to modify the method of D1 to implement in a technically efficient manner the non-technical business concept defined by the differences (1) and (2), which is given as a constraint to be met.

Obviousness: Concerning requirement (1), it would have been a matter of routine for the skilled person to adapt the mobile device used in D1 so as to enable the user to select two or more products instead of a single one. It would also have been obvious to assign the task of determining the optimal shopping tour (arising from requirement (2)) to the server, by analogy with the server likewise determining the nearest vendor in D1. Since the objective technical problem further requires a technically efficient implementation, the skilled person would have looked for efficient technical implementations of the determination of a tour. A second document, D2, discloses a travel planning system for determining travel trips, listing a set of places to visit, and addresses this technical problem: the system of D2 accesses for this purpose a cache memory storing results of previous queries. The skilled person would thus have considered the teaching of D2 and adapted the server in D1 to access and use a cache memory as suggested in D2 so as to provide a technically efficient im-

plementation of the determination of the optimal shopping tour, i.e. difference (3). Hence, no inventive step is involved within the meaning of Articles 52(1) and 56 EPC.

3. KIPO analysis

Application of the problem-solution approach according to the KIPO guidelines:

Step 1. Since the claimed invention is directed to a process for facilitating shopping on a mobile device, it is not an example of clearly non-statutory inventions (e.g. the ones not utilising the laws of nature, artificial decision, things that do not rely on the laws of nature, for example, mental activities of a human being or their application, simple presentation of information).

Step 2. It does not fall into either of the following cases: (i) specifically carrying out the controlling process of an apparatus or the process necessitated for controlling an apparatus or (ii) performing information processing based on the technical character of a subject.

Step 3. As each step of the information processing for setting optimal shopping tours is clearly implemented either on the mobile device or the server, by relying on vendor information and the selected products' data and the mobile device location in the claimed invention, it is a case where “information processing by software is concretely realised using hardware”.

Therefore, the claimed invention is patentable subject-matter as defined by the KPA.

Inventive step is analysed as follows:

Document D1, which discloses a method for facilitating shopping on a mobile device wherein the user selects a single product and the server determines from a database the vendor selling the selected product nearest to the user and transmits this information to the mobile device, is selected as the closest prior art.

The differences between the subject-matter of the claimed invention and D1 are:

- (1) The user can select two or more products to purchase (instead of a single product only).
- (2) An “optimal shopping tour” for purchasing the two or more products is provided to the user.

(3) The optimal shopping tour is determined by the server by accessing a cache memory in which optimal shopping tours determined for previous requests are stored.

With respect to differences 1 and 2, one or more products can be selected optionally by the user and it cannot be considered to be special technical character to limit the number of products to be selected by a user. Also, there would have been no technical difficulty for a person skilled in the art to implement the design modification so as to make it related to a plurality of products by expanding the concept of determining the vendor selling the selected product nearest to the user and transmitting this information to the mobile device as in D1. Accordingly, they may easily arrive at the feature of providing the user with optimal shopping tours for two or more products.

When it comes to difference 3, since D2 is directed to a tour planning system for determining shopping tours and enumerating the number of places visited and includes a feature of accessing a cache memory storing the results of previous queries, a person skilled in the art may easily arrive at difference 3 based on D2.

Since D1 and D2 come under the same technical field in that they provide information related to a product (service) to a user, there would have been no technical difficulty for a person skilled in the art to combine D1 and D2. Also, as D1 serves the intention of providing information of the vendor easily approached and nearest to the user, there exists a technical motivation for applying the technical characteristics connecting a cache memory storing the results of previous queries of D2 so as to provide the user with information as quickly as possible.

Hence, the claimed invention is not allowable under Article 29(2) of the KPA, as it can be easily invented by a person skilled in the art combining D1 and D2.

EPO case 2: Brokering offers

1. Claim

A computer-implemented method for brokering offers and demands in the field of transporting freight, comprising the following steps:

a) receiving transportation offers/demands from users, including location and time data;

b) receiving current location information of the users from GPS terminals with which the users are equipped;

c) after receiving a new offer/demand request, verifying if there are previous offers/demands not yet satisfied that can respond to the new request;

d) if so, selecting the one for which the current locations of both users are closest; and

e) otherwise storing the new request.

2. EPO analysis

Application of the steps of the problem-solution approach according to EPO Guidelines GVII, 5.4:

Step (i): Underlying the claimed method is the following business method:

A method for brokering offers and demands in the field of freight transportation, comprising:

— receiving transportation offers/demands from users, including location and time data;

— receiving information regarding the current location of the users;

— after receiving a new offer/demand request, verifying if there are previous offers/demands not yet satisfied that can respond to the new request;

— if so, selecting the one for which the current locations of both users are closest; and

— otherwise storing the new request.

Such a business method is per se non-technical and excluded under Article 52(2)(c) and (3) EPC. Brokering offers and demands is a typical business activity. Using the geographical location of users is the kind of criterion which a transportation broker could specify as part of a business method based on non-technical, business considerations only. This business method does not serve any technical purpose in the context of the invention and thus does not contribute to its technical character.

Therefore, only the features related to the technical implementation of this business method can be identified as the features contributing to the technical character of the invention:

- The business method steps are carried out by a computer.
- The current location information is received from GPS terminals.

Step (ii): As a suitable starting point, document D1, which discloses a method of order management in which a server computer receives location information from GPS terminals, is selected as the closest prior art.

Step (iii): The difference between the subject-matter of claim 1 and D1 is thus the computer implementation of the steps of the business method defined above.

The technical effect of this difference is merely the automation of the business method underlying claim 1. The conclusion reached in step (i) holds, since the only distinguishing feature making a technical contribution is the technical implementation of this business method.

Step (iii)(c): The objective technical problem is formulated as how to adapt the method of D1 so as to implement the business method of brokering offers and demands according to the user's current location. The person skilled in the art is considered to be a software project team and is given the knowledge of the business method in the form of a requirement specification.

Obviousness: Adapting the method of D1 to execute the business method steps is straightforward and requires routine programming only. Therefore, no inventive step is involved within the meaning of Articles 52(1) and 56 EPC.

3. KIPO analysis

Patent eligibility

Step 1. The claimed invention is directed to a computer-related invention for collecting location and time data and brokering offers and demands in consideration of the handling status. It is not an example of clearly non-statutory inventions.

Step 2. Since the claimed invention is considered neither to carry out the controlling process of a specific apparatus nor to perform information processing based on the technical character, such as the physical, electronic or chemical nature, of the subject, it is not a case of creation of a technical idea utilising a law of nature.

Step 3. The claimed invention is not subject to either step 1 or step 2, however, since it is clear that the information processing for brokering offers and demands in the field of transporting freight based on users' location and time data is concretely realised using a computer. It is a case where "information processing by software is concretely realised using hardware".

Accordingly, the claimed invention is patentable subject-matter as defined by the KPA.

Inventive step

D1, which is selected as the closest prior art to the subject-matter of the claimed invention, discloses an order management process where a server computer receives location information from a GPS terminal.

What is presented as common ground between the subject-matter of the claimed invention and D1 is as follows:

- A step of carrying out information processing based on the received location and order information.

The difference between the subject-matter of the claimed invention and D1 is as follows:

- -The claimed invention is directed to additionally using time information (difference 1) and selecting the one for which the current locations of both users are closest if there are previous offers/demands not yet satisfied and otherwise storing the new request (difference 2).

Difference 1

The present invention and D1 are directed to an order management process, but time information is newly applied to the present invention for efficiently managing orders. It is, however, just a general business method that would have been easily applied by a person skilled in the art and the only distinguishing feature – time information – is neither deemed to make a remarkable technical contribution nor to bring any difficulties to the technical feature. Accordingly, the subject-matter of the claimed invention does not create an inventive step over D1 just in view of difference 1.

Difference 2

The cited invention D1 discloses receiving location information and managing the order, but does not describe a string of specific steps corresponding to the ones disclosed in the claimed invention: receiving a new offer/demand request

and verifying if there are previous offers/demands not yet satisfied that can respond to the new request and, if so, selecting the one for which the current locations of both users are closest and otherwise storing the new request. Accordingly, it is determined that a person skilled in the art would not have arrived at the technical feature of verifying the offers'/demands' status and taking a different action in response to the status verification from D1.

Hence, the claimed invention cannot be denied an inventive step based on D1.

EPO case 3: Transmission of a broadcast media channel

1. Claim

A system for the transmission of a broadcast media channel to a remote client over a data connection, said system including:

- (a) means for storing an identifier of the remote client and an indication of an available data rate of the data connection to the remote client, said available data rate being lower than the maximum data rate for the data connection to the remote client;*
- (b) means for determining a rate at which data is to be transmitted based on the indication of the available data rate of the data connection; and*
- (c) means for transmitting data at the determined rate to said remote client.*

2. EPO analysis

Application of the steps of the problem-solution approach according to EPO Guidelines G-VII, 5.4:

Step (i): At first glance, all the features appear to contribute to the technical character of the invention.

Step (ii): Document D1, which discloses a system for broadcasting video over an xDSL connection to the set-top boxes of subscribers, is selected as the closest prior art. The system comprises a database storing identifiers of subscribers' computers and, in association with them, an indication of the maximum data rate for the data connection to each subscriber's computer. The system further comprises means

for transmitting the video to a subscriber's computer at the maximum data rate stored for said computer.

Step (iii): The differences between the subject-matter of claim 1 and D1 are:

- (1) Storing an indication of an available data rate of the data connection to the remote client, said available data rate being lower than the maximum data rate for the data connection to the remote client.
- (2) Using said available data rate to determine the rate at which the data is transmitted to the remote client (instead of transmitting the data at the maximum data rate stored for said remote client as in D1).

The purpose served by using an "available data rate" which is lower than a maximum data rate for the data connection to the remote client is not apparent from the claim. Therefore, the relevant disclosure in the description is taken into account. In the description, it is explained that a pricing model is provided which allows a customer to choose from several service levels, each service level corresponding to an available data-rate option having a different price. A user may select an available data rate lower than the maximum data rate possible with their connection in order to pay less. Hence, using an available data rate which is lower than the maximum data rate for the connection to the remote client addresses the aim of allowing a customer to choose a data-rate service level according to that pricing model. This is not a technical aim, but an aim of a financial, administrative or commercial nature and thus falls under the exclusion applying to schemes, rules and methods for doing business in Article 52(2)(c) EPC. It may thus be included in the formulation of the objective technical problem as a constraint to be met.

The features of storing the available data rate and of using it to determine the rate at which the data is transmitted have the technical effect of implementing this non-technical aim.

Step (iii)(c): The objective technical problem is therefore formulated as how to implement in the system of D1 a pricing model which allows the customer to choose a data-rate service level (i.e. to pay a lower amount to receive broadcast media channels at a quality of service lower than the highest possible quality of service). The pricing model is considered to be provided to the skilled person as part of the objective technical problem.

Obviousness: Given the task of implementing this choice of data-rate service level in accordance with the pricing model,

it would be obvious to the skilled person that the data rate purchased by a subscriber (i.e. the “available data rate” of claim 1), which can only be lower or equal to the maximum data rate of the data connection to the subscriber’s computer (i.e. the “remote client” of claim 1), would have to be stored for each subscriber and used by the system to determine the rate at which data is to be transmitted to a subscriber. Therefore, no inventive step is involved within the meaning of Articles 52(1) and 56 EPC.

3. KIPO analysis

Patent eligibility

Step 1. The claimed invention is not considered to be an example of clearly non-statutory inventions (e.g. the ones not utilising the laws of nature, artificial decision, things that do not rely on a law of nature, for example, mental activities of a human being or their application, simple presentation of information).

Step 2. The claimed invention is directed to a system including means for storing an indication of an available data rate of the data connection to the remote client, means for determining a rate at which data is to be transmitted and means for transmitting data and thus does not come under either of the following cases: (i) specifically carrying out the controlling process of an apparatus or the process necessitated for controlling an apparatus or (ii) specifically carrying out information processing based on the technical character of the subject.

Step 3. As it, however, specifies specific means (means for storing, means for determining the data rate and means for transmitting data) for realising the calculation or the processing of certain information in accordance with the purpose of transmitting the channel of broadcast media to the remote customer, it is patentable subject-matter.

The subject-matter of the claimed invention constitutes an invention as defined by the KPA.

Novelty and inventive step

Common ground

The claimed invention is directed to a system for determining an available data rate of the data connection to the remote client and transmitting data at the determined rate to the remote client and D1 to a system for transmitting the video at the maximum data rate for the data connection to each subscriber’s computer. Accordingly, the subject-matter

of the claimed invention and D1 have a common technical feature: a system for transmitting data at a certain rate to the remote customer.

Difference

The difference between the subject-matter of the claimed invention and D1 is as follows:

The subject-matter of the claimed invention discloses a process for determining the data rate of the remote client based on an indication of an available data rate lower than the maximum data rate for the data connection to the remote client and transmitting data at the determined data rate. D1 describes a process for transmitting the video at the maximum data rate for the data connection to each subscriber’s computer.

Analysis of the difference

Here we specifically review the technical feature for determining the data rate for the data connection to the remote customer based on an indication of an available data rate lower than the maximum data rate for the data connection to the remote customer. From the description of the invention, it can be understood that the remote customer is able to select a data rate lower than the maximum possible one from the pricing model, whereby they pay less for the lower data rate, but more for the higher data rate.

On the other hand, D1 just discloses the technical feature for transmitting data at the maximum data rate corresponding to the customers stored in the storing device, but does describe either the feature for determining the data rate chosen by the customer or a different pricing model in accordance with the service level. The feature for determining the data rate and the price paid by the customer in accordance with the pricing model as in the claimed invention and the working effect cannot be easily predicted based on the subject-matter of D1. Accordingly, the subject-matter of the claimed invention cannot be easily invented from D1.

Hence the subject-matter of the claimed invention cannot be denied an inventive step based on D1.

If other prior art, however, is discovered that describes the feature of differentially determining the service level furnished to the customer corresponding to the price paid by the customer, the subject-matter of the claimed invention can be denied an inventive step based on the combination of D1 and the newly discovered prior art.

EPO case 4: Remotely controlling an electronic device

1. Claim

A computer-implemented method for remotely controlling an electronic device, comprising the following steps:

receiving touch input data at a remotely controlled device from a remote controller, the remote controller having a touch screen displaying a first graphical user interface (GUI), the touch input data comprising gestural input parameters describing a gesture trajectory, input by a user to a specifically assigned input area;

displaying, by the remotely controlled device, a second GUI;

interpreting the received touch input data to determine a command appropriate for the current application context of the second GUI;

wherein the current context is one of a first or a second context depending on whether the electronic device is executing one of a first or a second application, and the touch input data are mapped to a first of a plurality of potential commands in a first context and to a second of the plurality of potential commands in a second context; and

updating the first and second GUI in response to the command, wherein the first GUI provides feedback which command has been performed by the electronic device.

2. EPO analysis

As the method according to the claim is computer-implemented, it involves technical means and therefore has technical character; hence the claimed method constitutes an invention within the meaning of Article 52 EPC.

Hence, the claimed subject-matter must be examined with respect to novelty and inventive step. The examination of inventive step requires an assessment of which features contribute to the technical character of the invention (EPO Guidelines G-VII, 5.4).

Application of the steps of the problem-solution approach according to Guidelines G-VII, 5.4:

Step (i): In this first step of the problem-solution approach, the features which contribute to the technical character of

the invention are determined on the basis of the technical effects achieved in the context of the invention. All features which contribute to the technical character need to be taken into account.

The present example concerns two inter-related graphical user interfaces, one on a remotely controlled electronic device, the other on the remote controller. The two GUIs are coupled to a context-sensitive input mechanism. As pointed out in Guidelines G-II, 3.7.1, on the one hand, graphical user interfaces comprise features of presenting information, and, on the other hand, receiving input as part of a human-computer interaction. The latter type of feature is more likely to have a technical character than those solely concerning data output and display. In particular, features which specify a mechanism enabling user input, such as entering text, making a selection or submitting a command, are normally considered to make a technical contribution.

Nevertheless, it is noted that the method of claim 1 comprises some features which are non-technical when viewed in isolation. Consequently, it needs to be ascertained whether these features contribute to the technical character of the method.

The first of these features is the touch input data comprising gestural input parameters. The plain and ordinary meaning of the term “gesture” is a movement of an object, usually made or caused by a human being. Therefore, a “gesture” viewed in isolation lacks technical character. Moreover, gestural input parameters are not functional data, since they are determined by their content, e.g. by their movement trajectory. In particular, the fact that a given set of touch-key inputs and a given set of gestural inputs can be represented by the same numerical values clearly demonstrates that no technical contribution can be derived from this feature. (Note that here the content of the input parameter is of a cognitive nature, unlike functional data which has the potential to contribute to an invention’s technical character. For further information on functional data, see Guidelines G-II, 3.6.3, “Data retrieval, formats and structures”.)

The second of the features which is non-technical when viewed in isolation is the current context of the second GUI. Clearly, the “context” of a GUI is not technical; it can, for instance, be a business or game context, depending on the application that is being executed. However, according to the claim, the first and second GUIs are updated in response to a command that is determined by interpreting the received touch input data in the current application context of the second GUI. Thereby, the user input can be mapped to different commands (irrespective of what the concrete user input is), in a context-sensitive manner. For example, a left-swipe

on the first touch screen could trigger a page turn when the second GUI is used to display a book, whereas a left-swipe moves a game character to the left when the second GUI is used to display a game. As such, the current context interacts with the interpreting and updating steps. (Note that this interaction takes place only to the extent that the touch input data is mapped to a command that is appropriate for that context, whereas the concrete content of the GUI is irrelevant.) Hence, this feature contributes to the method's technical character and needs to be taken into account. A corresponding analysis thus needs to be performed in more detail in step (iii) of the problem-solution approach when the prior art is taken into account.

Step (ii): In the next step of the problem-solution approach, a suitable starting point in the prior art is selected as the closest prior art with a focus on the features contributing to the technical character of the invention identified in step (i). In this example the closest prior art is defined by:

Document D1, disclosing a method for remotely controlling a device, comprising:

receiving touch input data at a remotely controlled device from a remote controller comprising a touch screen displaying a virtual keyboard and a processing unit, the touch input data comprising information including key input parameters, wherein the touch input data is interpreted by the remotely controlled device as one of a plurality of potential GUI commands, and updating the GUI in response to the command.

Furthermore, it is assumed that the skilled person is also aware of document D2, which discloses a dynamically variable virtual keyboard, the key-to-command assignment (i.e. "command mapping") depending on a variable mode, which is to be set by user input.

Step (iii): In this third step of the problem-solution approach, the differences from the closest prior art are identified. The differences of the subject-matter of claim 1 over D1 are:

- (1) the touch input data comprises gestural input parameters describing a gesture trajectory, input by a user to a specifically assigned input area (instead of key input parameters);
- (2) the touch input data is mapped to a first of a plurality of potential commands in a first context and to a second of the plurality of potential commands in a second context, wherein the current context depends on whether the electronic device is executing one of a first or a second application;
- (3) updating both GUIs upon determination of the appropriate command.

Sub-step iii (a): In sub-step (a), an objection of lack of novelty is raised if there are no differences with respect to the prior art (not even a non-technical difference). However, since the subject-matter of claim 1 is novel over the prior art, the distinguishing features will be considered in the next sub-step.

Sub-step iii (b): In sub-step (b), an objection of lack of inventive step is raised if the differences do not make any technical contribution. However, since the distinguishing features identified above are not of a purely non-technical nature, they will be considered in the next sub-step.

Sub-step iii (c): In this sub-step, the objective technical problem is formulated on the basis of the technical effects achieved by the distinguishing features. In addition, if the differences include features making no technical contribution, these features, or any non-technical effect achieved by the invention, may be used in the formulation of the objective technical problem as part of what is "given" to the skilled person, in particular as a constraint that has to be met.

The gestural input methodology according to distinguishing feature 1) has no interaction or synergetic effect with the context-sensitive "command mapping" defined by the other distinguishing features. Hence, distinguishing feature 1) on the one hand, and distinguishing features 2) and 3) on the other hand, address partial problems; see Guidelines G-VII, 5.2, last paragraph – partial problems can be assessed independently from each other.

First partial problem – derived from distinguishing feature 1)

A gesture trajectory input does not result in an objectively more reliable – or otherwise technically improved – input over the tapping of a virtual key. Rather, whether to use a more or less refined "gesture" or a "tap" on a virtual key reflects mere convention, i.e. a subjective user preference. (It should be noted here that a simple "tap" on a virtual key does not input a gesture trajectory.) The first distinguishing feature thus poses the non-technical constraint of allowing gesture trajectory inputs, as distinguished from tap inputs on a virtual keyboard. The corresponding objective technical problem to be solved may be framed as how to modify D1 to allow a gesture trajectory input instead of a key input. Given that D1 discloses a touch screen, i.e. technical means capable of accepting any gestural input, including a trajectory, only obvious (software) modifications are needed to solve this problem. Distinguishing feature 1) can therefore not contribute to the presence of inventive step.

Second partial problem – derived from distinguishing features 2) and 3)

Distinguishing features 2) and 3) jointly map touch input data to a command in a context-sensitive manner and adapt both the GUI of the remotely controlled device and the GUI of the remote control accordingly. As mentioned earlier, GUIs can comprise features of presenting information, on the one hand, and receiving input as part of a human-computer interaction, on the other hand. The context-sensitive mapping of commands is part of an input mechanism, whereas the joint updating of the two GUIs also concerns the manner in which information is presented. According to Guidelines G-II, 3.7, if the manner of presentation credibly assists the user in performing a technical task by means of a continued and/or guided human-machine interaction process, it produces a technical effect. This criterion is met: thanks to the display of a GUI on the remote controller, a user can provide inputs without needing to view the GUI on the remotely controlled device and yet still achieve the desired response from said remotely controlled device. Therefore, the user is credibly assisted in controlling a remotely controlled device which supports a plurality of applications. Hence, all the effects provided by distinguishing features 2) and 3) need to be taken into account when formulating the objective technical problem to be solved.

A corresponding objective technical problem, which avoids pointers to the solution, can be formulated as how to efficiently control a remotely controlled device which supports a plurality of applications.

When starting from D1, the skilled person, in search of a solution, is prompted to consider document D2. Since document D2 teaches a dynamic virtual keyboard with a key-to-command assignment that is variable according to a user-selectable mode, it would be obvious for the skilled person to map the key-input parameters of D1 to a first out of a plurality of potential commands appropriate for a first application context and to a second out of a plurality of potential commands appropriate for a second application context (wherein the application context varies according to the application that is being executed on the remotely controlled device). However, since neither D1 nor D2 teaches or hints at a combined GUI adaptation, let alone a combined GUI adaptation based on a single touch input that is interpreted in a context-dependent manner, the claimed subject-matter appears inventive.

Remark: In the hypothetical example case of distinguishing feature 3) being absent, the resulting subject-matter would be obvious, i.e. would lack inventive step, over a combination of D1 and D2.

3. KIPO analysis

Patent eligibility

Step 1. The claimed invention is directed to a “method for remotely controlling an electronic device”. The subject-matter is not an example of clearly non-statutory inventions (e.g. the ones not utilising the laws of nature, artificial decision, things that do not rely on the law of nature, for example, mental activities of a human being or their application, simple presentation of information).

Step 2. Since the subject-matter of the claimed invention is directed to a computer-implemented method for remotely controlling an electronic device and it specifically implements processes necessitated for controlling an electronic device, the claimed method is an invention.

Hence the claimed invention is patentable subject-matter as defined by the KPA.

Inventive step

Here we figure out common ground and differences between the present invention and D1 (the closest prior art).

Common ground

The subject-matter of the claimed invention and D1 have in common that they both receive the touch-input data, updating the user’s interface and remotely controlling an electronic device.

Also, the objective technical problem to be solved in both inventions commonly represents remotely controlling an electronic device by the touch input.

Differences

Difference 1 in touch input data: The subject-matter of the claimed invention describes the touch input data as a “gestural trajectory”, while D1 presents the touch input data as a key-input parameter on a virtual keyboard.

Difference 2 in a different reaction in accordance with the input: The subject-matter of the claimed invention interprets the touch input data to determine a command appropriate to the context of the current application. D1 interprets it as one of the potential GUI commands.

Analysis of difference 1

It is within the scope of ordinary creation to receive the gestural trajectory or the key input of a virtual keyboard by touch input, from the perspective of a person skilled in the art. Since it is obvious that various touches, including a gesture (slide), keyboard input, tapping and pinching, are en-

abled by touch input, neither an outstanding working effect different from D1, induced by the distinguishing feature, or a difficulty in reaching the technical feature is recognised.

Analysis of difference 2

It is determined that even if D1 and D2 combined present a key-to-command assignment, it is not easy to reach the feature of the subject-matter of the claimed invention for “interpreting a command appropriate to the context of the current application”. D1 and D2 neither hint at nor teach this process in the claimed invention, and even the combination between D1 and D2 would not have induced the subject-matter of the claimed invention. As the “identical touch input” in the claimed invention leads to the implementation of a different reaction depending on the context, an improvement in user convenience and the working effect of an intuitive GUI are determined to be represented.

Conclusion

The claimed subject-matter cannot be denied an inventive step based on D1 and D2.

EPO case 5: Training a neural network (“Drop-out”)

1. Claim

1. A computer-implemented method of training a neural network including neurons, each neuron being associated with weights and a respective probability of being disabled, wherein the method comprises:

obtaining a plurality of training inputs;

for each training input, repeatedly performing the following steps:

- selecting one or more neurons based on their respective probability;
- disabling the selected neurons;
- processing the training input with the neural network to generate a predicted output;
- adjusting the weights based on the basis of comparing the predicted output with a reference value.

2. Description

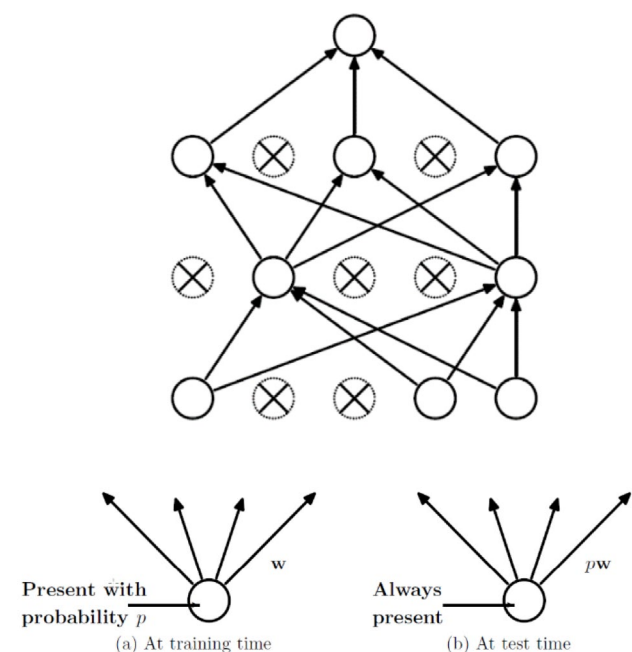
“Drop-out” is a simple training method that prevents neural networks from “over-fitting”, a notorious problem in machine learning (i.e. when a model loses its generalisation

power, specialising too much on a given data set). Neurons are probabilistically silenced during training, and the “mean” network is used for inference. This is computationally inexpensive and has resulted in big improvements on most benchmark tasks. “Drop-out” was a breakthrough in deep learning that established a new standard in most scientific papers and many AI-related patent applications.

According to the description, neurons are selectively disabled during training with a probability of 0.5 (that is, on average, each neuron will be enabled for half of the training inputs and disabled for the other half of training inputs). In another embodiment, neurons are selectively disabled with a probability of 0.2 (that is, on average, each neuron will be enabled for 80% of the training inputs and disabled for 20% of the training inputs).

After training the neural network, every neuron is enabled and its outgoing weights are reduced by multiplying them with the respective probability. This “normalisation” reduces the outgoing weights of each neuron by multiplying them by the probability that the neuron was not disabled. In an example, if the neurons of each hidden layer were selectively disabled with a probability of 0.5 in the training stage, the outgoing weights are halved for the entire test case since approximately twice as many neurons will be enabled. A similar approach is applied to the input layers. The test set may then be processed by the neural network. The approach is illustrated in the figures below.

3. Figures



4. Prior art

The prior art is a general-purpose computer.

5. EPO analysis

As the method according to claim 1 is computer-implemented, it involves technical means and therefore has technical character; hence the claimed method constitutes an invention within the meaning of Article 52 EPC.

As such, the method of claim 1 has to be examined with respect to novelty and inventive step by following the problem-solution approach set out in Guidelines G-VII, 5.4.

Application of the steps of the problem-solution approach according to Guidelines G-VII, 5.4

Step (i): In this first step of the problem-solution approach, the features which contribute to the technical character of the invention are determined on the basis of the technical effects achieved in the context of the invention. All features which contribute to the technical character need to be taken into account.

According to Guidelines G-II, 3.3.1, the term “neural network” (with neurons, weights) may, depending on the context, merely refer to abstract models or algorithms and does not, on its own, necessarily imply the use of any technical means. Therefore, without the reference to a computer implementation, the subject-matter of claim 1 would constitute a mathematical method as such, which is excluded from patentability for lack of technical character (Article 52(2)(a) and 52(3) EPC). This principle applies irrespective of whether such algorithms can be “trained” based on training data.

According to Guidelines G-II, 3.3 a mathematical method can contribute to producing a technical effect either by its application to a field of technology or by being adapted to a specific technical implementation. In the case of claim 1, neither of these two criteria is applicable, since the claim is directed to the workings of a neural network without serving a technical purpose or by being implemented in a specific manner which takes into account the internal functioning of a computer. Rather, all that the claims specify is the computer implementation of mathematical method steps. In such a case, it is not sufficient that the mathematical method is algorithmically more efficient than prior-art mathematical methods to establish a technical effect (see also Guidelines G-II, 3.6). Indeed, in the case of claim 1, it is not evident that the mathematical steps of the method interact with the

technical features of the claim beyond a straightforward implementation on a general-purpose computer. Therefore, it is only the implementation of a general-purpose computer which needs to be taken into account.

Step (ii): In the next step of the problem-solution approach, a suitable starting point in the prior art is selected as the closest prior art with a focus on the features contributing to the technical character of the invention identified in step (i).

In view of the fact that the mathematical method does not contribute to the claim’s technical character, the closest prior art is a general-purpose computer.

If the method made a technical contribution, on the other hand, it would not be sufficient to rely on a general-purpose computer as prior art. In that case, the search would need to take into account the steps of the mathematical method.

Step (iii): In this third step of the problem-solution approach, the differences from the closest prior art are identified.

The differences of the subject-matter of claim 1 over a general-purpose computer are simply the claim’s method steps.

Sub-step iii (a): In sub-step (a), an objection of lack novelty is raised if there are no differences with respect to the prior art (not even a non-technical difference).

Since the method of claim 1 is novel over the prior art, the distinguishing features will be considered in the next sub-step.

Sub-step iii (b): In sub-step (b), an objection of lack of inventive step is raised if the differences do not make any technical contribution.

Since, as outlined above, the distinguishing method steps defined in claim 1 do not contribute to the technical character of the claimed subject-matter, they cannot form the basis for an inventive step. Consequently, an objection is raised under Article 56 EPC.

If the claim functionally limited the mathematical method to serve a technical purpose, then the mathematical method would contribute to producing a technical effect and could be taken into account when assessing inventive step. In that case, the steps of generating the training set and training the classifier may also contribute to the technical character of the invention if they support achieving that technical purpose (See Guidelines G-II, 3.3.1, and T 598/07). This principle is applicable even if the distinguishing features bring about

benefits in terms of computational efficiency. A functional link between the technical purpose and the mathematical method steps can be established, for example, by specifying how the input and the output of the sequence of mathematical steps relate to the technical purpose so that the mathematical method is causally linked to a technical effect. As an example, see KIPO case 1, where a neural network adapted to avoid over-fitting serves the purpose of urban traffic speed prediction, and is thus considered to make a technical contribution.

6. KIPO analysis

Patent eligibility

Step 1. The subject-matter of the claimed invention is related to a computer-implemented process for training a neural network including neurons and thereby is not an example of clearly non-statutory inventions (e.g. the ones not utilising the laws of nature, artificial decision, things that do not rely on a law of nature, for example, mental activities of a human being or their application, simple presentation of information).

Step 2. The subject-matter of the claimed invention is not directed to specifically carrying out the controlling process of an apparatus or the process necessitated for controlling an apparatus. Accordingly, it is necessary to determine whether the subject-matter satisfies the patent eligibility of a computer-related invention.

Step 3. The subject-matter of the claimed invention is a case where “information processing by software is concretely realised using hardware”, since the subject-matter suggests a technical solution of dropping out parts of neural networks to solve over-fitting problems arising in the process of training a neural network on the computer.

Therefore, claim 1 is an invention as defined by the KPA.

Novelty and Inventive step

The inventive step of the claimed invention is analysed in consideration of unique features inherent to a computer-related invention within the meaning of 2.2, Chapter 10, Part 9 KGL.

Comparing a general-purpose computer, which is suggested as the closest prior art to the subject-matter of claim 1, common ground and a difference are found as follows.

Common ground

The subject-matter of claim 1 and the cited invention are both implemented on a computer.

Difference 1

The subject-matter of claim 1 discloses a feature for adjusting weights to drop-out parts of a neural network in the process of training a neural network on a computer. The cited invention does not clearly disclose whether it implements a function for training a neural network, or whether it is only a general-purpose computer. In this sense, the two inventions show a difference.

Assessment of difference 1

The cited invention is only a general-purpose computer and does not clearly disclose whether the general-purpose computer implements a function of information processing for training a neural network.

So, the person skilled in the art cannot easily reach the feature for selecting only parts of neurons or adjusting weights of a neural network in the machine learning process as in claim 1 from a general-purpose computer as in the cited invention.

From the viewpoint of the working effects, it is acknowledged that, if parts of a neural network drop out, the training efficiency and computational speed of machine learning would improve.

Accordingly, the subject-matter of claim 1 cannot be easily implemented by the person skilled in the art from the cited invention.

Therefore, it is acknowledged that the subject-matter of claim 1 involves an inventive step over the cited invention.

KIPO case 1: An urban traffic speed prediction system (AI)

1. Claim

An urban traffic speed prediction system comprising:

an information extraction unit for extracting historical records with respect to geographic information, weather information, construction information and the changes in traffic volume by time of day;

a training model unit for implementing an artificial neural network (ANN) training algorithm to find a function between the road pattern and average speed by section after a road pattern is generated in accordance with the extracted historical records;

a traffic prediction unit (TPU) for predicting average speed by section by using a local ANN corresponding to the member cluster of an input pattern vector corresponding to current traffic conditions for prediction;

wherein the said training model unit is composing of an input pattern vector generation unit for generating input pattern vectors by combining the extracted historical records and detection information for the road concerned; a data partitioning unit for clustering data having similar patterns by applying clustering input pattern vectors and generating a corresponding set of clusters; an ANN learning unit for separately implementing an ANN learning to input pattern vectors within each of the said estimated clusters;

a model structure database (DB) for storing the estimated set of clusters that are generated in the said data partitioning unit and the said learned ANN to input pattern vectors within each of the said estimated clusters in the said ANN learning unit.

2. Overview of the description

Problems to be solved

The purpose is to provide an urban traffic speed prediction system that additionally considers environment variables affecting a traffic tie-up and detection variables of an intelligent traffic system to exactly predict road traffic speed.

Means for solving the problem

The invention of claim 1 comprises an information extraction unit for extracting historical records with respect to

geographic information, weather information, construction information and the changes in traffic volume by time of day that are provided by an intelligent traffic system, a geographic information system and a weather information system, a training model unit for implementing an artificial neural network (ANN) training algorithm to find a function between the road pattern and average speed by section after a road pattern is generated in accordance with the extracted historical records after generating an input pattern vector by standardising data values in accordance with historical records extracted from the information extraction unit and a traffic prediction unit for predicting average speed by section by using a local ANN corresponding to the member cluster of an input pattern vector for prediction through the same pre-processing with the said training model unit.

The training model unit comprises an input pattern vector generation unit for generating an input pattern vector on the basis of detection information of the road concerned through standardisation of data values in accordance with historical records extracted from the information extraction unit, a data partitioning unit for estimating a lattice-structured cluster by clustering data in similar patterns by applying clustering to data sets on input pattern vectors and generating the estimated range of cluster, an ANN learning unit for separately implementing ANN learning to an input pattern vector within each of the said estimated clusters generated in the data partitioning unit and a model structure database (DB) for storing the estimated range of clusters that are generated in the said data partitioning unit and the said learned ANN to an input pattern vector within each of the said estimated clusters in the said ANN learning unit.

A training data is clustered by time for each road and by similarity characteristics for each road. In this case, if each ANN training is implemented for data as a whole and the result is used for prediction, high-quality predictive performance may not be expected. This is because the different characteristics of each cluster are treated as minor errors and then being standardised.. Of course, even if the pattern of clusters of data may be closed reflected by adjusting parameters, it may cause an over-fitting problem.

Accordingly, the present invention implements ANN learning separately to an input pattern vector within each of the generated clusters. The range of the generated cluster and the trained ANN are each stored in a model structure database (DB).

As the next step, traffic speed by section is predicted by utilising a local ANN corresponding to the member cluster of an

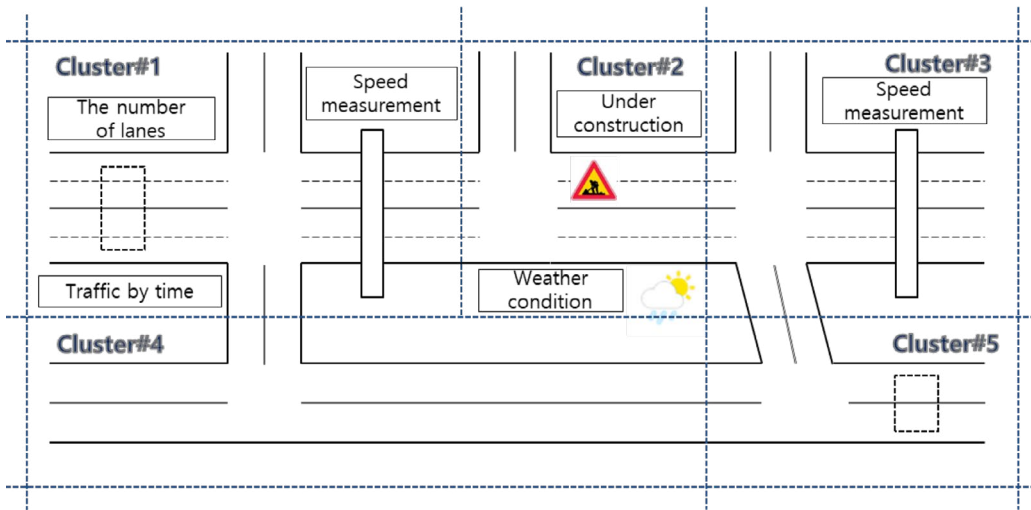


Figure 1: Concept of clustering according to an embodiment

input pattern vector for prediction that is identified through the same pre-processing with the said pre-processing. In the prediction process, an input pattern vector for prediction is generated through the same pre-processing for new data and the member cluster of the said generated input pattern vector for prediction is identified. Then an average speed by section is predicted by using a local ANN corresponding to the member cluster of the said identified member cluster.

A specific training method for predicting an average speed by section by relying on a local ANN is described hereafter.

3. Information for analysis

Cited invention = closest prior art

The cited invention relates to a traffic prediction method on the basis of multi-layer perceptron (MLP) for predicting congestion of the downtown areas of a city by relying on a neural network, taking into account time-related factors affecting congestion, i.e. day information, time information, precipitation, share, traffic volume, incoming and outgoing traffic of the lanes, the number of intersections, crosswalks, bus stop information, construction information, etc., in heavy-traffic downtown areas and various factors depending on the environment of a road section.

The cited invention consists of a multi-layer perceptron structure. It selects various factors affecting traffic congestion for predicting an average speed by hour as input variables and uses traffic volume as output variables. Input data, including at least one among day characteristic, time characteristic, traffic volume, share, construction area and

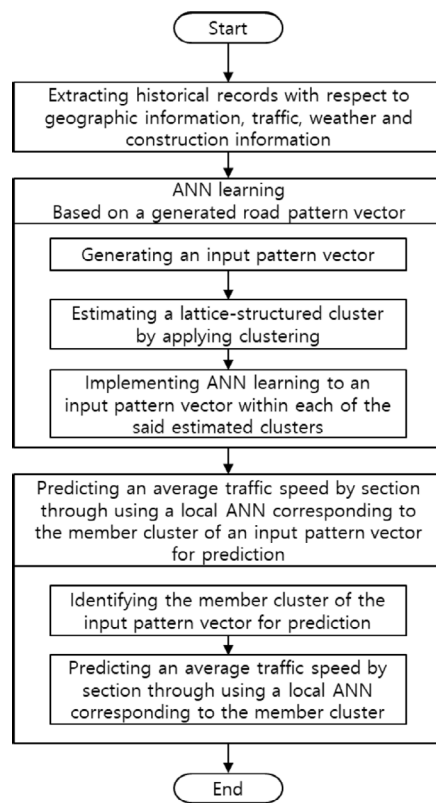


Figure 2: Operation method of an urban traffic speed prediction system

precipitation, is collected and pre-processing is implemented on the basis of the collected data. Training and training completion conditions are determined for the pre-processed data. The pre-processing step is implemented to delete unnecessary information and to standardise input variables related to traffic volume before neural network algorithms

are constructed. Initial weights of the multi-layer perceptron are randomly set and the final weights are confirmed in accordance with a back propagation algorithm and then used for training.

Well-known Art = common general knowledge

The artificial neuron network (ANN) and multi-layer perceptron (MLP) are substantially the same as each other and only different in the terms used.

4. KIPO analysis

It is assessed whether the claimed invention falls into the categories of patentable subject-matter according to 2.1 Chapter 10, Part 9 KGL.

Step 1. The claimed invention is directed to a system for training an artificial neural network (ANN) using input information including geographic information, weather information, construction information and the changes in traffic volume by time of day and predicting an average speed by section. Thus, it is not considered to be an example of a clearly non-statutory invention (e.g. the ones not utilising the laws of nature, artificial decision, things that do not rely on a law of nature, for example, mental activities of a human being or their application, simple presentation of information).

Step 2. Since the claimed invention is considered neither to carry out the controlling process of a specific apparatus nor to perform information processing based on the technical character, such as the physical, electronic or chemical nature, of the subject, it does not come under the case of creation of a technical idea utilising a law of nature (e.g. specifically carrying out the controlling process of an apparatus or the process necessitated for controlling an apparatus, performing information processing based on the technical character of an object, etc.).

Step 3. The claimed invention is not subject to either step 1 or step 2, however, since it is clear that a series of information processing that predicts an average speed in a specific section through an ANN (machine learning) using training data, such as traffic, geography, weather information, etc. is realised in an urban traffic speed prediction system. It is a case where “information processing by software is concretely realised using hardware resources”.

Therefore, claim 1 is patentable subject-matter.

Inventive step is analysed in consideration of the unique characteristics of a computer-related invention as provided in 2.2 Chapter 10, Part 9 KGL.

The comparison between claim 1 and the closest prior art is as follows:

Common ground

The subject-matters described in claim 1 and the cited invention have something in common with respect to the purpose of the inventions in that the both inventions predict traffic information in an urban area using various information related to the road conditions. Since training data used for machine training for the purpose of predicting traffic information includes traffic volume by time of day, geographical information, weather information and construction information, they are substantially the same.

Difference 1

Since claim 1 is directed to clustering data presenting similar patterns by applying clustering to training data, carrying out local ANN training separately in the input pattern vector within each cluster and predicting an average speed by section, it shows a difference from the cited invention in that the training data is pre-processed as well as in the manner of ANN deployment.

Determination on the difference

The cited invention discloses prediction of traffic volume using a training model based on a multi-layer perceptron, but does not describe the feature of training a local ANN for each cluster or clustering up the input pattern data.

Accordingly, it is determined that a person skilled in the art may not easily arrive at the technical feature of training a local ANN for each cluster by clustering the input pattern data of claim 1 from the process of carrying out pre-processing for standardising input variables and removing unnecessary information of the cited invention.

From the viewpoint of the working effect, it is recognised that an average speed in a specific section can be more exactly predicted through a local ANN corresponding to its cluster.

Accordingly, it is determined that a person skilled in the art cannot easily implement the invention disclosed in claim 1 based on the cited invention.

Therefore, it is determined that claim 1 is non-obvious over the cited invention.

5. EPO analysis

The subject-matter of claim 1 is a system comprising technical means. Therefore, following the any-technical-means approach, the subject-matter of claim 1 is regarded as having technical character, i.e. to represent an invention within the meaning of Article 52(1) EPC.

Hence, the claimed subject-matter must be examined with respect to clarity, novelty and inventive step. The examination of inventive step, in turn, requires an assessment of which features contribute to the technical character of the invention (Guidelines for Examination G-VII, 5.4).

Application of the steps of the problem-solution approach according to Guidelines G-VII, 5.4:

Step (i): In this first step of the problem-solution approach, the features which contribute to the technical character of the invention are determined on the basis of the technical effects achieved in the context of the invention. All features which contribute to the technical character need to be taken into account in the assessment of inventive step.

The system of claim 1 is concerned with the prediction of road traffic speed on the basis of a number of input variables, such as geographic information, weather information, construction information and the changes in traffic volume by time of day. These input parameters are fed into a traffic prediction unit that comprises local artificial neural networks. As pointed out in Guidelines G-II, 3.3.1, artificial neural networks are considered to be mathematical algorithms, which, when viewed in isolation, do not contribute to the technical character of an invention. However, a mathematical method can contribute to the technical character of an invention if it serves a technical purpose. In this regard, pertinent case law has held that the generation of technical data based on actual measurements of a technical system fulfils that condition. See, for example, board of appeal decision T 1670/07, where it was held in point 13 of the Reasons that a technical effect may arise from the provision of data about a technical process, irrespective of its subsequent use. Here, it is considered that urban traffic is a technical process, and the claimed system provides data about that process in the form of average speed. Since all features of claim 1, including the artificial neural networks, serve a technical purpose and contribute to producing a technical effect, the entire claimed subject-matter needs to be considered when assessing novelty and inventive step.

Step (ii): In the next step of the problem-solution approach, a suitable starting point in the prior art is selected as the

closest prior art with a focus on the features contributing to the technical character of the invention identified in step (i). In this example the closest prior art mentioned under point 3 also relates to a traffic prediction method on the basis of an artificial neural network.⁹

Step (iii): In this third step of the problem-solution approach, the differences from the closest prior art are identified. The essential differences of the subject-matter of claim 1 over D1 are:

- (1) The average speed is predicted by road section by using a local artificial neural network, wherein the network is selected from a cluster of networks. In contrast, D1 only discloses the use of a single artificial neural network for the purpose of making a prediction.
- (2) Input pattern vectors based on historical data are clustered according to similarity to generate a range of clusters, and the artificial neural network of each cluster learns from the input pattern vectors which correspond to it.

Sub-step iii (a): In sub-step (a), an objection of lack of novelty is raised if there are no differences with respect to the prior art (not even a non-technical difference). However, since the subject-matter of claim 1 is novel over the prior art, the distinguishing features will be considered in the next sub-step.

Sub-step iii (b): In sub-step (b), an objection of lack of an inventive step is raised if the differences do not make any technical contribution. However, since the distinguishing features identified above are not of a purely non-technical nature, they will be considered in the next sub-step.

Sub-step iii (c): In this sub-step, the objective technical problem is formulated on the basis of the technical effects achieved by the distinguishing features. If the claimed technical solution to the objective technical problem is obvious to the person skilled in the art, an objection under Article 56 EPC is raised.

Generally, if the differences include features making no technical contribution, these features, or any non-technical effect achieved by the invention, may be used in the formulation of the objective technical problem as part of what is “given” to the skilled person, in particular as a constraint that has to be met. Here, however, all distinguishing features contribute

⁹ What constitutes the closest prior art is summarised in Guidelines G-VII, 5.1, “Determination of the closest prior art”. Essentially the closest prior art is the document which is the most promising starting point to convincingly argue that the invention is obvious.

to producing the technical effect of predicting an average speed of a road section within an urban traffic process. Hence, none of the features can appear in the problem formulation without relying on hindsight.

As pointed out in the description of the invention, the clustering addresses the problem of over-fitting that can occur when a single neural network predictor is used for traffic speed prediction. Over-fitting is the result of the large degrees of freedom of neural networks as compared to the underlying physical model and results in reduced prediction performance (in terms of prediction error). Consequently, the objective technical problem to be solved may be formulated as how to increase the prediction performance of the traffic speed predictor of document D1.

In the absence of any additional prior art, and on the assumption that clustering as a solution to increase prediction performance was not common general knowledge at the priority date, the claimed solution is considered to be non-obvious. Therefore, an inventive step within the meaning of Article 56 EPC can be acknowledged.

KIPO case 2: An emotion recognition method using voice (natural language processing)

1. Claim

Claim 1

An emotion recognition method through an emotion recognition device comprising:

a feature extraction step for extracting a characteristic parameter by spectral analysis of an input voice signal;

a comparison step for comparing a plurality of reference keywords comprised by an emotion word corpus with the extracted characteristic parameter; and

a step for determining a speaker's emotion based on a reference keyword that shows a similarity with the extracted characteristic parameter above a threshold

Claim 2

The emotion recognition method described in claim 1 is further limited to having both a spectrum slope and a metrical parameter in the characteristic parameter described in claim 1.

2. Overview of the description

Background art

Since interface technology between a user and a machine is gaining ever more attention, technologies making it possible to recognise a human being's emotion based on biodata, including voice, facial expressions, etc., are being actively studied. Specifically, emotion recognition through voice, which is a means of information transmission as well as of communication between human beings, has been given much attention recently.

There was already an emotion recognition method based on nonverbal vocal information, such as laughing or sighing. Laughter or crying, however, should additionally be accompanied by information processing as each speaker shows very diverse forms of expression and secondary signal processing needs to be carried out for voice signals. Moreover, if a speaker does not show a nonverbal emotional expression, emotion cannot be exactly recognised. Therefore, a measure for exactly recognising a speaker's emotion needs to be sought.

Problem to be solved

As opposed to the existing technology using nonverbal voice signals, emotion is recognised by extracting a characteristic parameter from a user's voice.

Means for solving the problem

A speaker's emotion is determined by extracting a characteristic parameter from input sounds uttered; comparing an emotion word corpus with the extracted characteristic parameter; and extracting a keyword showing a similarity with the emotion word corpus above the threshold.

Various types of characteristic parameters, including mel-frequency cepstrum, linear prediction coding coefficient, etc., can be utilised. According to a preferred embodiment, a spectrum slope is measured by extracting a formant and size from sounds of utterance to use the result as a characteristic parameter. A formant and the corresponding frequency bandwidth are extracted by using the following mathematical formula.

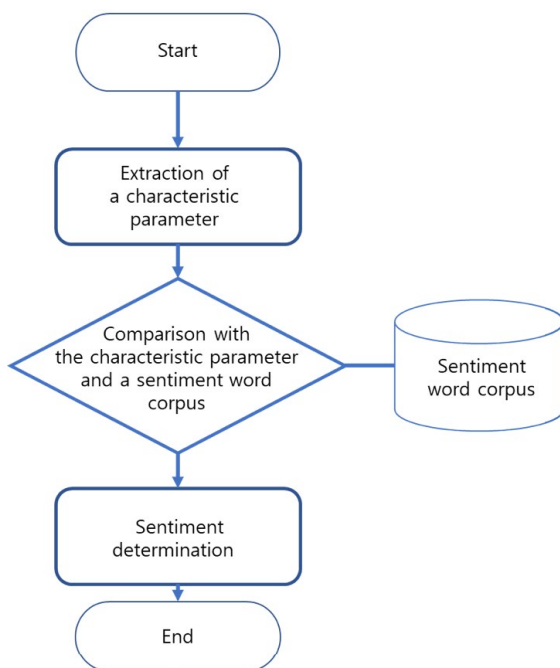
$$\text{Formant_bandwidth} = \frac{1}{\pi} \times f_s \times \log|\text{root}|$$

Here, f_s is related to a sampling frequency and root to a root of a linear prediction coefficient. A frequency bandwidth can be measured by aggregating a multiple number of formants, in combination of such formants or based on the said each formant. For example, it can be presented as aggregation values of frequency bandwidths of the first, second, third and fourth formants.

A spectrum slope can be extracted based on the ratio of the sizes by properly combining the sizes of each formant. For example, taking the sizes of the first formant (F1), the second formant (F2), the third formant (F3) and the fourth formant (F4) as A1, A2, A3 and A4 each, $(A1-A2)/(F1-F2)$ and $(A2-A3)/(F2-F3)$ can be extracted as a spectrum slope.

According to embodiment 2, metrical parameters are extracted from the sounds of utterance and the extraction is used as characteristic parameters. The metrical parameters include the size of a pitch, of an accent and of sound.

Figure



3. Information for analysis

Cited invention = closest prior art

A method for determining a user's emotion based on an emotion determination device comprising:

- classifying an input character string into a syllable unit and generating a comparison phoneme group of the syllable unit that comprises the syllable of the said character string;
- measuring a similarity between the said comparison phoneme group and a reference phoneme group of a syllable unit that comprises the syllable of a reference word stored in an emotion database;

- selecting a reference word of the reference phoneme group showing a similarity above the pre-set threshold as a mapping reference that is mapped to the said character string; and
- determining a user's emotion for the said character string based on an emotion database identifier containing the said mapping reference.

The cited invention determines a user's emotion based on an emotion database identifier containing a mapping reference by analysing an input character string; comparing the result with a reference word stored in an emotion database; selecting a reference word having a similarity above a certain threshold.

Well-known Art = common general knowledge

It falls into the well-known art of this art field to extract a characteristic parameter from an input voice and to characterise this extraction.

4. KIPO analysis

It is assessed whether the claimed invention falls into the categories of patentable subject-matter according to 2.1 Chapter 10, Part 9 KGL.

Step 1. Since the claimed invention is directed to an emotion recognition method in analysis of the input voice, it is construed as a creation of a technical idea utilising a law of nature. Thus, it is not considered to be an example of clearly non-statutory inventions (e.g. the ones not utilising the laws of nature, artificial decision, things that do not rely on the law of nature, for example, mental activities of a human being or their application, simple presentation of information).

Step 2. The claimed invention is directed to information processing (emotion recognition) based on the "technical character (characteristic parameters referring to the physical properties of voice signals)" and, therefore, does constitute a creation of a technical idea utilising a law of nature (e.g. specifically carrying out the controlling process of an apparatus or performing information processing based on the technical character of a subject, etc.).

Accordingly, claims 1 and 2 are patentable subject-matter.

Inventive step is analysed in consideration of the unique characteristics of a computer-related invention as provided in 2.2 Chapter 10, Part 9 KGL.

The comparison between claim 1 and the closest prior art is as follows:

Common ground in a problem to be solved

The two inventions have something in common with respect to a problem to be solved in that they intend to extract a user's emotional information from the information (voice or a string of characters) input by a user.

Indeed, claim 1 and the cited invention have also something in common with respect to the solving principle of a posed problem in that the two analyse the input data ("voice" or "a string of characters"), select keywords (or reference words) presenting a certain level of similarity by analysing the data stored in the pre-set database for emotions (emotional word corpus) and thereafter determine a user's emotion.

Comparison of technical features

The claimed invention and the cited one share the core features of analysing the input data, selecting keywords (reference words) presenting a certain level of similarity by analysing the data stored in the pre-set database for emotions (corpus) and thereafter recognising the emotion by determining a user's emotion.

The two inventions, however, show a difference in that claim 1 uses a characteristic parameter obtained in analysis of a voice signal to recognise a user's emotion, while the cited invention is directed to recognising a user's emotion by relying on a string of "input characters".

Determination on the difference

It is determined that claim 1 and the cited invention are different only in the input data, since claim 1 uses voice signals as the input data, while the cited one does a string of characters, and it is a well-known art in the technical field to extract a string of characters by analysing voice signals. Plus, there is no technical difficulty in applying the well-known art of extracting a string of characters from voice signals to the cited invention that comes under the same technical field. Accordingly, a person skilled in the art may easily arrive at simply connecting the cited invention and the well-known art, analysing voice signals, extracting key words in comparison with a corpus for emotion detection and thereafter recognising a user's emotion.

Therefore, it is determined that claim 1 does not involve an inventive step compared with the cited invention.

Determination of claim 2

The invention disclosed in claim 2 additionally limits the characteristic parameter with the slope of spectrum and

the metrical parameter. Since the slope of spectrum and the metrical parameter are inherent to voice signals, it cannot be deemed that emotion word corpus matches with a string of characters one by one. Accordingly, since the invention disclosed in claim 2 uses characteristics inherent to voice signals different from a string of characters, those cannot be considered to be "simple differences in data" from a string of characters of the cited invention.

Therefore, the invention disclosed in claim 2 involves an inventive step over the cited invention.

5. EPO analysis

The subject-matter of claim 1 is "an emotion recognition method through an emotion recognition device". Since the claim requires carrying out the method with a device, the claimed method involves technical means. Moreover, the claimed method comprises the step of extracting a characteristic parameter from input voice, the method being the processing of a sampled voice "through an emotion recognition device". Therefore, claim 1 has technical character and constitutes an invention within the meaning of Article 52 EPC.

Hence, the method must be examined with respect to sufficiency, clarity, novelty and inventive step. The examination of inventive step requires an assessment of which features contribute to the technical character of the invention (Guidelines for Examination G-VII, 5.4). It is noted that, without the limitation to an "emotion recognition device", the method steps themselves do not necessarily imply a technical implementation. Hence, if this limitation was absent, the claim would be excluded from patentability as a mental act under Article 52(2)(c) and (3) EPC.

Application of the steps of the problem-solution approach according to Guidelines G-VII, 5.4

Step (i): In this first step of the problem-solution approach, the features which contribute to the technical character of the invention are determined on the basis of the technical effects achieved in the context of the invention. All features which contribute to the technical character need to be taken into account.

The system of claim 1 is concerned with the computer-implemented recognition of emotion by processing a voice signal. Carrying out the method steps involves extracting a parameter from a signal, comparing the extracted signal with a plurality of reference values and determining the similarity between parameters (in the claim the set of reference

keywords is called an “emotion word corpus”). When viewed in isolation, these features would be no more than abstract mathematical steps. However, as pointed out in Guidelines G-II, 3.3, mathematical method steps can contribute to the technical character of an invention if they serve a technical purpose. In this regard, it is noted that this section of the Guidelines indicates that speech recognition is considered to be a technical purpose. By analogy, the processing of a speech signal by technical means to determine a user’s emotion can also be considered to serve a technical purpose. Therefore, all steps, including the mathematical sub-steps, can be considered to contribute to producing technical effects. Therefore, all features of claim 1 need to be considered when assessing novelty and an inventive step.

Step (ii): In the next step of the problem-solution approach, a suitable starting point in the prior art is selected as the closest prior art with a focus on the features contributing to the technical character of the invention identified in step (i). In this example the closest prior art mentioned under point 3 also relates to a method for determining an emotion carried by a speech signal by technical means.¹⁰

Step (iii): In this third step of the problem-solution approach, the differences from the closest prior art are identified.

In detail, the document discloses, according to the features of claim 1,

An emotion recognition method through an emotion recognition device comprising:

a feature extraction step for extracting a characteristic parameter by spectral analysis of an input voice signal (The prior art discloses generating a comparison phoneme group from an input character string. The comparison phoneme group can be considered to be a characteristic parameter that is extracted from the input character string. Moreover, a phoneme is a unit of sound that distinguishes one word from another in a particular language. Therefore, the input character string is considered to comprise input voice. What the prior art fails to disclose is a spectral analysis of the input voice signal);

a comparison step for comparing a plurality of reference keywords comprised by an emotion word corpus with the extracted characteristic parameter (In respect of this feature, the prior art discloses measuring the similarity between the comparison phoneme group, i.e. the extracted characteris-

tic parameter, and a reference phoneme group, i.e. a set of reference keywords. Moreover, measuring similarity involves by definition a comparison. Therefore, the prior art also discloses the comparison step.); and

a step for determining a speaker’s emotion based on a reference keyword that shows a similarity with the extracted characteristic parameter above a threshold (This feature is also disclosed by the prior art. In particular, the prior art teaches selecting a reference word, i.e. a keyword indicative of an emotion, that shows a similarity with the comparison phoneme group above a threshold.).

In relation to the above, the description stresses that the invention is applicable to verbal voice input whereas the prior art known to the applicant only considered non-verbal voice input such as laughter and crying. This difference, however, cannot be attributed to the claimed subject-matter, since limitations which exclude non-verbal voice input are lacking. Therefore, the claimed method differs from the prior art only in that the characteristic parameter is extracted by spectral analysis.

Sub-step iii (a): In sub-step (a), an objection of lack of novelty is raised if there are no differences with respect to the prior art (not even a non-technical difference). However, since the subject-matter of claim 1 is novel over the prior art, the distinguishing features will be considered in the next sub-step.

Sub-step iii (b): In sub-step (b), an objection of lack of inventive step is raised if the differences do not make any technical contribution. However, since the distinguishing features identified above are not of a purely non-technical nature, they will be considered in the next sub-step.

Sub-step iii (c): In this sub-step, the objective technical problem is formulated on the basis of the technical effects achieved by the distinguishing features. If the claimed technical solution to the objective technical problem is obvious to the person skilled in the art, an objection under Article 56 EPC is raised.

Generally, if the differences include features making no technical contribution, these features, or any non-technical effect achieved by the invention, may be used in the formulation of the objective technical problem as part of what is “given” to the skilled person, in particular as a constraint that has to be met. Here, however, all distinguishing features contribute to producing the technical effect of recognising an emotion by processing a voice signal. Hence, none of the features can appear in the problem formulation without relying on hindsight.

¹⁰ Ibid.

In relation to the distinguishing features of claim 1, the prior art discloses recognising an emotion by analysing phonemes associated with syllables, i.e. comparing word pronunciations to reference phonemes in a database. In particular, the prior art (1) generates a comparison phoneme group from a syllable, (2) selects a reference phoneme group that is closest to the classified phoneme group and (3) infers the emotion from the selected reference phoneme group. How the generation of the comparison phoneme group is performed in detail is not disclosed. In contrast, the method of claim 1 provides more detail in that a spectral analysis is involved. Therefore, the objective technical problem to be solved may be regarded as how to implement the generation of a comparison phoneme group.

Concerning this technical problem, it is generally obvious to the skilled person that any signal processing tasks can be performed equivalently in the time domain or in the frequency domain. Indeed, the time-frequency duality is so fundamental in signal processing that this knowledge can be considered to be notorious common general knowledge of the skilled person which does not require any evidence. Therefore, it is obvious to generate a comparison phoneme group by analysing the spectrum of syllables.

Therefore, the method of claim 1 is not patentable for lack of an inventive step (Article 56 EPC).

Since the additional features of the method of dependent claim 2 are not disclosed by the prior art, sub-step iii (c) can be repeated on the basis of additional distinguishing features:

In relation to the distinguishing features of claim 2, the prior art discloses recognising an emotion by analysing phonemes associated with syllables, i.e. comparing word pronunciations to reference phonemes in a database. However, how the comparison is performed in detail is not disclosed. In contrast, the subject-matter of claim 2 provides more detail in that the use of a spectrum slope implies that the comparison is performed, at least partially, in the frequency domain. Therefore, the objective technical problem to be solved may be regarded as how to implement the comparison between an input phoneme group and a reference phoneme group.

As outlined above, it is generally obvious to the skilled person that any signal processing tasks can be performed equivalently in the time domain or in the frequency domain. Therefore, it is obvious to measure similarity either between time-domain representations of voice signals or, equivalently, between its frequency-domain representations.

However, the subject-matter of claim 2 goes beyond a mere comparison in the frequency domain. Rather, instead of computing a straightforward similarity measure on the basis of frequency-domain components, a “spectrum slope” and a “metrical parameter” are used. In the absence of any prior art which teaches a frequency-domain representation in terms of slopes and metrical parameters, the subject-matter of claim 2 appears to be non-obvious. Therefore, an inventive step within the meaning of Article 56 EPC can be acknowledged.

KIPO case 3: A control method of digital home appliances based on parking and leaving of a vehicle (IoT)

1. Claim

A method of controlling digital home appliances by a home server that is connected with a recognition module of a vehicle's parking and leaving comprising:

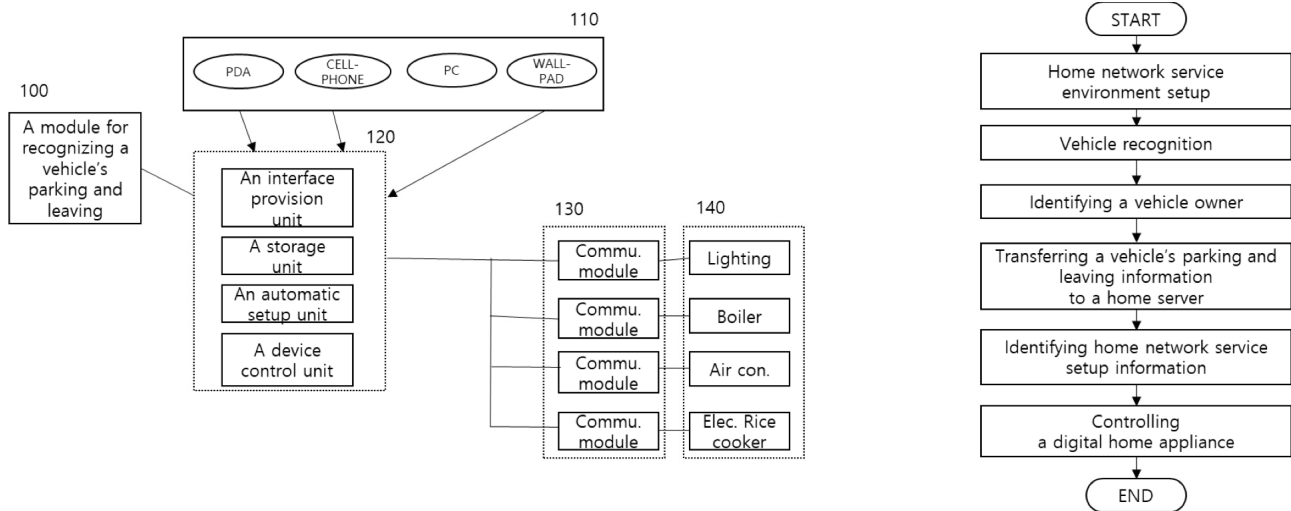
- (i) providing an interface, in which a home network service environment can be set up according to a vehicle's parking and leaving, to a user's control terminal;*
- (ii) extracting a user's using pattern by analysing control commands of a digital home appliance taken by a user at home subsequently to a vehicle's parking or prior to a vehicle's leaving and generating a pattern-based home network service environment based on the analysis;*
- (iii) storing said home network service environment set up through said interface and the pattern-based home network service environment at a storage unit;*
- (iv) controlling a digital home appliance based on said home network service environment stored at said storage unit, once a vehicle's parking or leaving information of a user is received from a module that recognizes a vehicle's parking or leaving.*

2. Overview of the description

Background art

Even though a recognising function for a vehicle's parking or leaving is provided at home or an apartment, as a home network service being connected with a home network is not provided, a user has to separately control any digital home appliances indoors after parking a vehicle at a parking lot.

Figures



110: control terminal, 120: home server, 130: communication module, 140: digital home appliance

Problems to be solved by the invention

To control any digital home appliances within a home network service environment through a network system, after generating a home network environment by analysing a control pattern of any digital home appliances taken by a user based on a vehicle's parking or leaving information

Means for solving the problem

According to the invention of claim 1, a digital home appliance control system is provided, wherein a home network service environment is automatically set up in response to a vehicle's parking or leaving by analysing a user's using pattern after storing a digital home appliance control command taken by a user at home in response to a vehicle's parking or leaving.

3. Information for analysis

Cited invention

A method of controlling a digital home appliance by a home server connected with a module of recognising a vehicle's parking or leaving based on a vehicle's parking or leaving comprising:

a step in which a user directly sets up a home network service environment in response to a vehicle's parking or leaving by utilising a control terminal;

a step in which said user is asked whether to work a digital home appliance, once a vehicle's parking or leaving information of said user is received from said module of recognising a vehicle's parking or leaving information;

a step in which once a working command of said digital home appliance is received from said user, a digital home appliance is controlled based on a home network service environment set up in accordance with said working command.

Well-known art

Technology to provide an interface screen to enable the control of any devices connected to a network

4. KIPO analysis

It is assessed whether the claimed invention falls into the categories of patentable subject-matter according to 2.1 Chapter 10, Part 9 KGL.

Step 1. The claimed invention is directed to a control method of digital home appliances through a home server interlocked with a recognition module for the parking or the leaving of a vehicle. It is construed as a creation of a technical idea utilising a law of nature and thus not considered to be an example of clearly non-statutory inventions (e.g. the ones not utilising the laws of nature, artificial decision, things that do not rely on a law of nature, for example, mental activities of a human being or their application, simple presentation of information).

Step 2. The claimed invention is patentable subject-matter, since a home server interlocked with a recognition module for the parking or the leaving of a vehicle specifically implements a process needed for controlling digital home appliances, or controls digital home appliances in response to the parking or the leaving of a vehicle.

Novelty and inventive step are analysed in consideration of the unique characteristics of computer-related inventions as provided in 2.2 Chapter 10, Part 9 KGL.

The comparison between claim 1 and the closest prior art is as follows:

Claim 1 is directed to controlling digital home appliances within a home network in accordance with a controlling pattern of a user for any digital home appliances in response to a user's commuting and the cited invention is to controlling the operation of home appliances by identifying the parking or leaving of a vehicle. Accordingly, the invention disclosed in claim 1 and the cited one have something in common in that home appliances are operated according to the parking or leaving of a vehicle.

A difference is, however, presented in problems to be solved between claim 1 and the cited invention, since claim 1 is directed to generating a home network service environment based on the using pattern of a user.

Difference 1

The invention disclosed in claim 1 is directed to providing an interface for creating a home network service environment, while the cited invention does not explicitly disclose the feature.

Determination on the difference 1

It is a well-known art in the home network technological field to provide an interface for setting up a device controlling information connected to a network, and there is no technical difficulty in applying this feature to the cited invention that comes under the same technical field. Accordingly, a person skilled in the art may easily arrive at providing an interface for setting up a home network service environment in the process of creating a home network environment according to the parking or leaving of a vehicle through a control terminal of a user by simply connecting the well-known art to the cited invention.

Difference 2

There is a difference between the invention disclosed in claim 1 and the cited one in that claim 1 is directed to automatically setting up a home network service environment by analysing a user's using pattern based on a control command of any digital home appliances taken by a user according to the parking or leaving of a vehicle, while the cited invention is to setting up a home network service environment in accordance with the response from a user after the parking or leaving of a vehicle.

Determination on the difference 2

Claim 1 has an advantageous effect that can hardly be predicted by a person skilled in the art over the cited invention in that the invention disclosed in claim 1 makes it possible to block unnecessary home appliances as well as to control the operation of a specific home appliance without a user's direct interference in accordance with the control pattern of digital home appliances operated in response to a user's commuting.

Accordingly, difference 2 is not construed as a general design modification accompanied by specific application of any concerned technology to solve a problem. In other words, there is a difference in that an object (home appliance) uses information (a using pattern of home appliances) obtained in connection with the network and thereafter an advantageous effect is recognised.

Therefore, the invention disclosed in claim 1 is determined to involve an inventive step over the cited invention.

5. EPO analysis

Patentability (Article 52(1) EPC, Article 54 EPC, Article 56 EPC)

It is noted that the claimed method relates to a method for remotely controlling home appliances, based upon a user's vehicle parking and leaving data.

Such method clearly requires technical means and is thus understood to have technical character. As a result, the subject-matter of the claim constitutes an invention within the meaning of Article 52 EPC.

Hence, the method must be examined with respect to novelty and an inventive step. The examination of inventive step requires an assessment of which features contribute to the technical character of the invention (Guidelines G-VII, 5.4).

Application of the steps of the problem-solution approach according to Guidelines GVII, 5.4:

Step (i): In this first step of the problem-solution approach, the features which contribute to the technical character of the invention are determined on the basis of the technical effects achieved in the context of the invention. All features which contribute to the technical character need to be taken into account.

All the claimed method steps involve technical means; hence they all contribute to the technical character of the claimed subject-matter.

All steps can therefore be considered to contribute to producing a technical effect. As a consequence, all the features of the claimed method need to be considered when assessing novelty and inventive step.

Step (ii): In the next step of the problem-solution approach, a suitable starting point in the prior art is selected as the closest prior art with a focus on all the features that contribute to the technical character of the invention (here: all features). In this example the closest prior art mentioned under point 3 also specifies a method of controlling a digital home appliance by a home server connected with a module for recognition of a vehicle's parking or leaving status.¹¹

In more detail, the closest prior art discloses the first step of the claimed method, namely *“providing an interface, in which a home network service environment can be set up according to a vehicle's parking and leaving, to a user's control terminal”* in that it specifies a method step *“in which a user directly sets up a home network service environment in response to a vehicle's parking or leaving by utilising a control terminal”*.

The closest prior art also discloses the fourth and last step of the claimed method, namely *“controlling a digital home appliance based on said home network service environment stored at said storage unit, once a vehicle's parking or leaving information of a user is received from a module that recognizes a vehicle's parking or leaving”* in that it specifies *“once a vehicle's parking or leaving information of said user is received from said module of recognising a vehicle's parking or leaving information; a step in which once a working order of said digital home appliance is received from said user, a digital home appliance is controlled based on a home network service environment set up in accordance with said working order.”*

In addition, the third step, the first alternative, of *“storing said home network service environment set up through said interface”* is considered to be implicitly disclosed by the closest prior art. Without storing the user's control instructions (or, in the language of the closest prior art, the “working orders”), no automated control of home appliances would be in fact feasible.

Step (iii): In this third step of the problem-solution approach, the differences from the closest prior art are identified. The method of the claimed subject-matter additionally comprises, as compared to the closest prior art, the following features, referring to the second and third steps of the claimed method:

- *extracting a user's using pattern by analysing control commands of a digital home appliance taken by a user at home subsequently to a vehicle's parking or prior to a vehicle's leaving and generating a pattern-based home network service environment based on the analysis;*
- *storing said home network service environment set up through said interface and the pattern-based home network service environment at a storage unit;*

These additional limitations are not disclosed by the prior art.

Sub-step iii (a): In sub-step (a), an objection of lack of novelty is raised if there are no differences with respect to the prior art (not even a non-technical difference). However, since the subject-matter of claim 1 is novel over the prior art, the distinguishing features will be considered in the next sub-step.

Sub-step iii (b): In sub-step (b), an objection of lack of an inventive step is raised if the differences do not make any technical contribution. However, since the distinguishing features identified above are not of a purely non-technical nature, it will be considered in the next sub-step.

Sub-step iii (c): In this sub-step, the objective technical problem is formulated on the basis of the technical effects achieved by the distinguishing features. If the claimed technical solution to the objective technical problem is obvious to the person skilled in the art, an objection under Article 56 EPC is raised.

In combination with the controlling step, the above two features bring about the technical effect of at least partially automating the control of home appliances, based on the generated user patterns. Therefore, the objective technical problem derived from this effect could be understood as how to improve the home network service environment of the closest prior art to further automate the control of digital home appliances.

Under the assumption that neither the closest prior art nor the common general knowledge of the skilled person discloses or suggests an analysis of user control commands for generating patterns in relation to the parking or leaving, such patterns being used for automatically setting up a network of home appliances, the claimed subject-matter is considered to involve an inventive step in the sense of Article 56 EPC.

¹¹ Ibid.

KIPO case 4: A method for comprehensively managing household waste recycling (BM)

1. Claim

A method for comprehensively managing household waste recycling comprising:

distributing a bar code sticker with a waster's personal information and a calendar marked for said thrown garbage by the competent authority to said each waster;

discharging the waste accurately separated by the prescribed regulations by placing it in a regulated garbage bag, and attaching a bar code sticker with a waster's personal information;

collecting said discharged garbage on a daily basis and carrying it to the loading dock to classify it into waste to be recycled or to be landfilled or to be incinerated by a garbage collector;

comprehensively managing household wastes, based on statistics on data accumulated for each process by instructing said waster to correct it, by reading bar codes attached to the front of each garbage bag that is misclassified.

2. KIPO analysis

The KPA does not define the mental activity of a human being or an offline activity as a statutory invention.

It is assessed whether the claimed invention comes under the categories of patentable subject-matter in accordance with 2.1 Chapter 10, Part 9 KGL.

Whether a law of nature is used in the claimed invention should be assessed based on the scope of the claims as a whole. Even though parts of the invention disclosed in the claim use a law of nature, as it is assessed that the claims as a whole do not use a law of nature, the invention at issue is not an invention as defined by the KPA.

Step 1: Claim 1 is directed to a method for comprehensively managing household waste by reading bar codes attached to the front of garbage bag. However, this is simply done on the basis of artificial human decision-making through the rules under the relevant statutes, the competent authorities, the promises between the dischargers and the collectors, etc., and therefore does not constitute a creation of technical idea using a law of nature.

Even though part of said invention includes hardware and software, namely reading a bar code by comprehensively utilising a bar code sticker, calendar, garbage bag, computer, etc., it cannot be said that a law of nature is used, as said invention is just a mental activity of a human being utilising said means as just tools, and as each step of said invention is processed offline, not online, said invention as a whole does not fall under invention.

2. EPO analysis

Patentability (Article 52(1) EPC, Article 54 EPC, Article 56 EPC)

The claimed method relates to a method for comprehensively managing household waste. For this purpose, the claimed method distributes bar code stickers, to be attached to garbage bags by the user ("waster"). A sticker essentially allows user identification. The method performs a statistical analysis of misclassified garbage bags by reading the bar code sticker.

In the absence of any related feature in the claim under examination, it is understood that the decision whether or not a garbage bag is misclassified is taken by a human operator. Moreover, bar code reading is understood to be triggered by such human operator. Therefore, the substance of the claimed method is considered to be of an administrative or organisational nature. According to Guidelines G-II, 3.5, "*subject-matter or activities which are of a financial, commercial, administrative or organisational nature fall within the scope of schemes, rules and methods for doing business, which are as such excluded from patentability under Art. 52(2)(c) and (3) [and] any such subject-matter or activities will be subsumed under the term 'business method'*".

As concerns business methods, the Guidelines further point out that the features which contribute to the technical character of a claim are, in most cases, limited to those specifying a particular technical implementation of the business method, whereas the business method itself does not make a technical contribution.

Beyond the feature of a "garbage bag", which can reasonably be understood as a well-known means for waste disposal, the only technical feature that relates to a technical implementation of the business method is the attachable "bar code sticker", by definition readable by computer-implemented reading and identification means.

The claimed subject-matter is therefore directed to a method comprising technical means. Therefore, following

the EPO's "any-technical-means approach", the claimed subject-matter is regarded as having technical character, i.e. to represent an invention within the meaning of Article 52(1) EPC.

Hence, the claimed subject-matter must be examined with respect to novelty and inventive step. The examination of inventive step, in turn, requires an assessment of which features contribute to the technical character of the invention (Guidelines G-VII, 5.4). Here, particular attention will need to be paid to the features of the claimed method which relate to a technical implementation of the claimed method.

Step (i): In this first step of the problem-solution approach, the features which contribute to the technical character of the invention are determined on the basis of the technical effects achieved in the context of the invention. All features which contribute to the technical character need to be taken into account.

The technical features of the claimed method are a garbage bag; with an attached bar code sticker for user identification. These two technical features interact with the steps of the claimed method to bring about a technical effect, namely automate the identification of a "waster". This technical effect needs to be taken into account in the subsequent steps of the problem-solution approach.

Step (ii): In the next step of the problem-solution approach, a suitable starting point in the prior art is selected as the closest prior art with a focus on the features contributing to the technical character of the invention identified in step (i). In this example the closest prior art assumed is a well-known method for waste management, which is discharging, collecting and disposing garbage bags.

Step (iii): In this third step of the problem-solution approach, the differences from the closest prior art are identified. The differences of the claimed subject-matter over said prior art method are assumed to consist in setting up *statistics by reading bar codes attached to misclassified garbage bags and using the statistics to manage household wastes*.

Sub-step iii (a): In sub-step (a), an objection of lack of novelty is raised if there are no differences with respect to the prior art (not even a non-technical difference). However, since the subject-matter of claim 1 is novel over the prior art, the distinguishing features will be considered in the next sub-step.

Sub-step iii (b): In sub-step (b), an objection of lack of an inventive step is raised if the differences do not make any technical contribution. However, since the distinguishing

features identified above are not of a purely non-technical nature, they will be considered in the next sub-step.

Sub-step iii (c): In this sub-step, the objective technical problem is formulated on the basis of the technical effects achieved by the distinguishing features. If the claimed technical solution to the objective technical problem is obvious to the person skilled in the art, an objection under Article 56 EPC is raised.

Here, the distinguishing feature of "bar codes attached to garbage bags" provides the technical effect of automated identification of a user ("waster"). It must be emphasised that the per se non-technical features of "personal" identification information and "setting up statistics" represent a technical constraint that would have to be considered for formulating the objective technical problem. In fact, it requires (generic) computing means capable of reading and decoding information content, and further being capable of performing statistical analysis.

The objective technical problem would hence be to automate the identification of a user.

The provision of bar code stickers is hereby one of many well-known alternatives (e.g. QR code, RFID, etc.), from which the skilled person would choose, according to the individual circumstances and/or subjective preference.

No inventive step within the meaning of Article 56 EPC can therefore be acknowledged.

KIPO case 5: Verifying personal information for an e-commerce process

1. Claim

An e-commerce process comprising:

storing IP addresses of registered members and identities (ID) and passwords of the registered members at a server;

connecting the server through a communication network from a user's terminal;

detecting an IP address of the terminal that requests the said connection;

verifying whether the said detected IP address is the IP address

of the said registered member;

transmitting a start-up screen corresponding to the member having the said verified IP address to the said user's terminal and displaying it;

purchasing in an environment where the said user can do e-commerce;

inputting the identity (ID) and password of the said user;

verifying whether the said input identification (ID) and password are for the registered member; and

establishing the said e-transaction if the verification process is successful.

2. Overview of the description

Background art

According to an e-commerce process, an identity and a password of a user are registered and an e-transaction is es-

tablished with a user accordingly. Anyone can be registered as a user under the system; however, it cannot be verified whether the personal information of the registered user is correct or their credit standing has no problem.

Problems to be solved by the invention

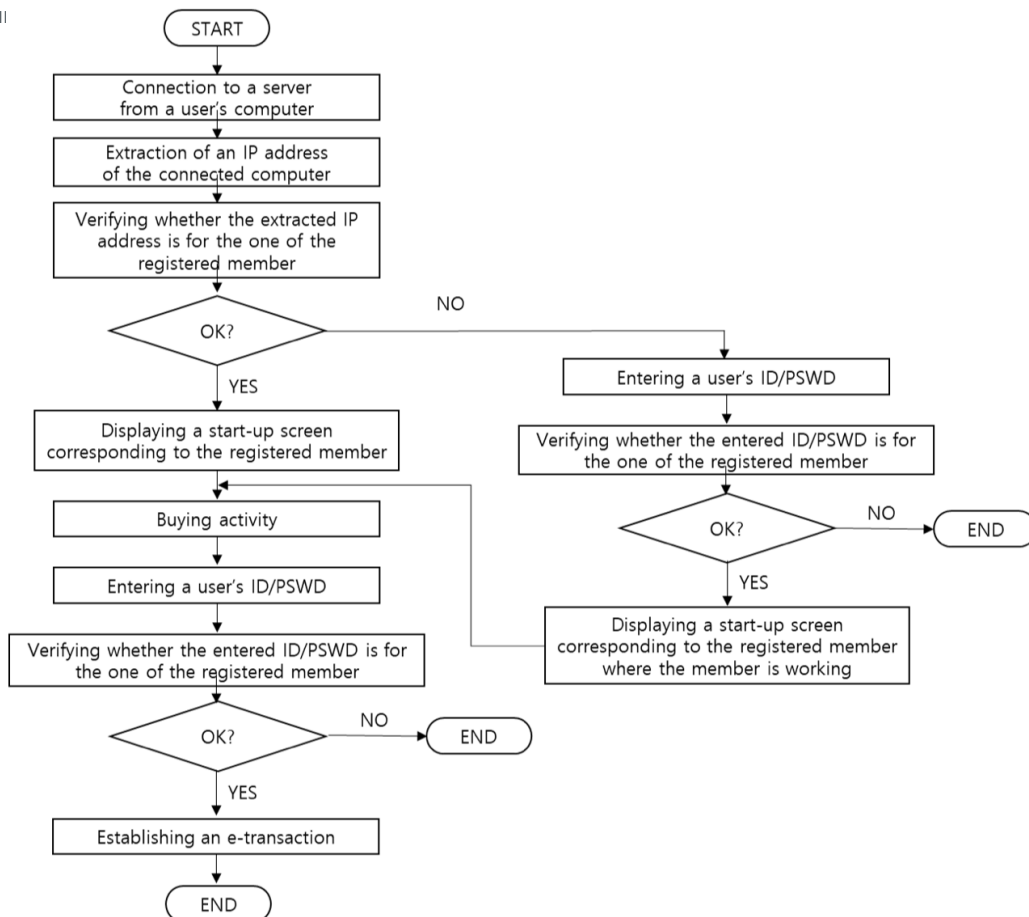
To provide an e-commerce process for making an e-transaction through an authentication process for a user, by relying on an IP address transmitted from a user connected to a server, so as to provide an e-commerce service only to members who are in a specific group.

Means for solving the problem

Verifying a user by using an IP address transmitted from a user's terminal connected to a server.

The present invention is related to an e-commerce process comprising: preliminarily registering member companies that satisfy qualification requirements and staff members of the registered member companies as members; preliminarily storing IP addresses of each member company and identities (ID) and passwords of the staff members at a server; authenticating whether an IP address that connects to an

Figure 1



e-shopping mall is identical to the one of the preliminarily registered member company and whether the IP address is for the registered member based on the identification and password, by using a computer and an internet connection network, an authentication technology using an identity (ID) and password and a technology that detects the address of a terminal that connects to a server and uses it for authentication; and establishing the said e-transaction if the verification process is successful.

3. Information for analysis

Cited invention

The cited invention is related to a security system for e-transactions, comprising: a step where a user connects to the internet by inputting an identity and a password; a step where an authentication server searches a database table based on the input identification and password to authenticate the user and transmits an authentication message to the POP; a step where the POP dynamically assigns a framed IP address to the user's terminal and transmits the assigned IP address to an authentication server; a step where an e-transaction server transmits the framed IP address received from the user's terminal once the user later makes an e-transaction; a step where the authentication server confirms whether the framed IP that is provided by the e-transaction server exists among the framed IP addresses retained after they are received from the POP; and a step where the authentication server transmits a user's confidential information corresponding to the said framed IP address to an e-transaction server

Well-known art

The cited invention is related to a business method comprising: a step where member companies are grouped; a step where membership is only limited to the group; a step where an e-transaction is only allowed for a registered member. The said business method is commonly used offline and well known as a membership method.

4. KIPO analysis

It is assessed whether the claimed invention comes under the categories of patentable subject-matter according to 2.1, Chapter 10, Part 9 KGL.

Step 1. The claimed invention is directed to an e-commerce process comprising verifying whether an IP address of a computer terminal connecting to an e-shopping mall belongs to an already registered member, verifying whether

the input identification (ID) and password are for the registered member and initiating an e-transaction. It is construed as a creation of a technical idea utilising a law of nature and thus not considered to be an example of clearly non-statutory inventions (e.g. the ones not utilising the laws of nature, artificial decision, things that do not rely on a law of nature, for example, mental activities of a human being or their application, simple presentation of information).

Step 2. The claimed invention does not come under either of the following cases: (i) specifically carrying out the controlling process of an apparatus or the process necessitated for controlling an apparatus or (ii) specifically carrying out information processing based on the technical character of the subject.

Step 3. The claimed invention does not come under either step 1 or step 2, however; it includes a process of verifying a user by using an IP address transmitted from the user's terminal connected to a server. Since this process represents verification of a user through a server or an apparatus concerned or the establishment of an e-transaction, it is a case where "information processing by software is concretely realised using hardware resources".

Therefore, claim 1 constitutes eligible subject-matter as defined by KPA.

Inventive step is analysed considering the unique characteristics of computer-related inventions as provided in 2.2, Chapter 10, Part 9, KGL.

The comparison between claim 1 and the closest prior art is as follows:

Common ground

The claimed invention and the cited one have something in common with respect to the purpose of the inventions and the problems to be solved in that a user is verified based on the IP address transmitted from a terminal in the e-transaction.

As for technical features, claim 1 discloses processes of detecting an IP address of a user's terminal connected to a server through a communication network and verifying whether the detected IP address is the one of a registered member and the cited invention discloses processes of detecting the IP address transmitted from a user's terminal connected to a server and verifying whether the IP address of the terminal is the one stored in a verification server. Accordingly, the processes disclosed in both the claimed invention and the cited one are the same.

Also, claim 1 is directed to verifying whether the input ID and password correspond to the IP address of the subordinately registered member. Accordingly, the two inventions show a difference in the order of verification for e-transaction.

Difference 1

Claim 1 and the cited invention are somehow different in that claim 1 describes a process of storing IP addresses of members that preliminarily made requests for registration, while the cited invention does a process of storing an IP address of a terminal connected to the Internet.

Determination on difference 1

When it comes to claim 1, the process of storing an IP address of a member is an optional choice of a person skilled in the art and the IP address of a member is a general business method for which the registered member only can transact on-line, which can be translated that an IP address of an individual terminal of the cited invention is changed into the one of a member. Accordingly, a person skilled in the art may easily implement the claimed invention only through a design modification.

Difference 2

Claim 1 is directed to confirming a user's ID / password and then verifying the IP address of a member, while the cited invention is for establishing an e-transaction after verifying ID and password, an IP address stored at a verification server. Accordingly, both inventions show a difference in the order of verification for e-transaction.

Determination on difference 2

There are various kinds of means for user verification, and it is obvious to a person skilled in the art to use these means in a complicated manner to reinforce the verification process. Also, claim 1 discloses processes of confirming an IP address of a member and then carrying out the verification through an ID and password of a user. Since these processes represent a different verification order – from the IP address to ID and password – from the one of the cited invention, it can be said that there is no advantage effect found in the claimed invention.

Therefore, the invention disclosed in claim 1 does not involve an inventive step over the cited invention.

5. EPO analysis

Patentability (Article 52(1) EPC, Article 54 EPC, Article 56 EPC)

The claimed method relates to a method for e-commerce. Since carrying out each of the individual method steps requires technical means, all the steps have technical character, following the EPO's "any-technical-means approach". The claimed subject-matter is therefore regarded as having technical character, i.e. to represent an invention within the meaning of Art. 52(1) EPC.

Hence, the method must be examined with respect to novelty and inventive step. The examination of inventive step requires an assessment of which features contribute to the technical character of the invention (Guidelines G-VII, 5.4).

Application of the steps of the problem-solution approach according to Guidelines G-VII, 5.4:

Step (i): In this first step of the problem-solution approach, the features which contribute to the technical character of the invention are determined on the basis of the technical effects achieved in the context of the invention. All features which contribute to the technical character need to be taken into account. Since this applies to each of the steps, all features are taken into account.

Step (ii): In the next step of the problem-solution approach, a suitable starting point in the prior art is selected as the closest prior art with a focus on the features contributing to the technical character of the invention (here: all features). In this example the closest prior art mentioned under point 3 also specifies a method for e-commerce.¹² This known method discloses all but one of the features of the claimed subject-matter, such distinguishing feature being

- *transmitting a start-up screen corresponding to a registered user having a verified IP address to the user's terminal and displaying it;*

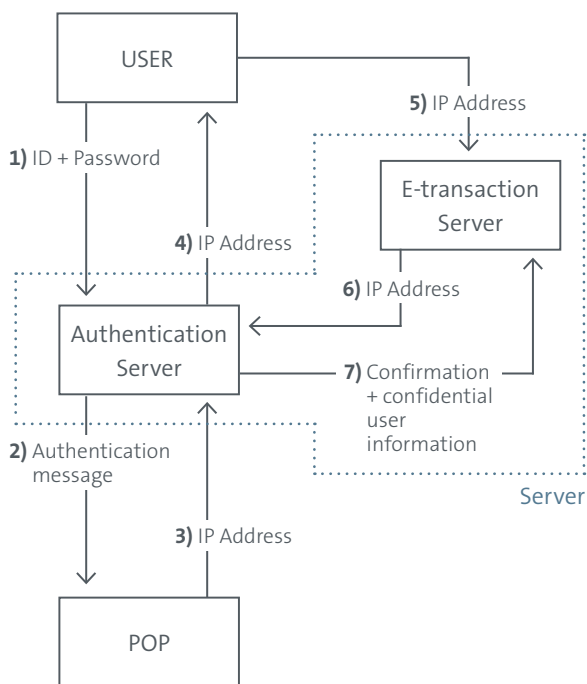
For such an evaluation, the following findings are relevant:

The claimed subject-matter involves the "open" claim form, i.e. reading "an e-commerce process comprising...". This means that the individual method steps can be in any sequence. Also, the claimed subject-matter comprises "a server". This does not limit the server to a single, i.e. only one server. Also, a set of distributed servers as present in

¹² Ibid.

the closest prior art, namely an “e-transaction server” and an “authentication server”, hence takes away the novelty of “a server” (if only for the reason that a single server can also have both said functionalities).

For further clarification of the above, the sequence of messages exchanged in the closest prior art between the user, the authentication server, the e-transaction server and the POP can be illustrated graphically as follows:



Having regard to this illustration, and considering the e-transaction server and the authentication server of the closest prior art as “the server” referred to in claim 1, it becomes evident that said server stores the IP addresses of registered users, their identities and their passwords (via messages 1, 2 and 3). This server is connected through a communication network from a user’s terminal (via messages 1 and 5), the IP address is detected and verified (via messages 5, 6 and 7), the ID and the password of the user are input (via message 1) and the ID and password are verified (via messages 1 and 2). The steps of purchasing and establishing the e-transaction are implied by the method disclosed in the closest prior art.

Step (iii): In this third step of the problem-solution approach, the differences from the closest prior art are identified. The differences of the claimed subject-matter over said prior-art method are the additional steps of: transmitting a start-up screen corresponding to the registered user member having a verified IP address to the user’s terminal and displaying it.

Sub-step iii (a): In sub-step (a), an objection of lack of novelty is raised if there are no differences with respect to the prior art (not even a non-technical difference). However, since the subject-matter of claim 1 is novel over the prior art, the distinguishing features will be considered in the next sub-step.

Sub-step iii (b): In sub-step (b), an objection of lack of an inventive step is raised if the differences do not make any technical contribution. However, since the distinguishing features identified above are of a technical nature, they will be considered in the next sub-step.

Sub-step iii (c): In this sub-step, the objective technical problem is formulated on the basis of the technical effects achieved by the distinguishing features. If the claimed technical solution to the objective technical problem is obvious to the person skilled in the art, an objection under Article 56 EPC is raised.

The distinguishing feature of transmitting and displaying a start-up screen corresponding to the member having the verified IP address is related to the problem of initiating an e-shopping interface. Indeed, this feature is necessary for any e-commerce application and very clearly forms part of the common general knowledge of the skilled person. Therefore, the claimed method is obvious to the skilled person, with the effect that no inventive step within the meaning of Article 56 EPC can be acknowledged.

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