

**CPC****COOPERATIVE PATENT CLASSIFICATION****G10L****SPEECH ANALYSIS OR SYNTHESIS; SPEECH RECOGNITION;  
SPEECH OR VOICE PROCESSING; SPEECH OR AUDIO CODING  
OR DECODING****NOTE**

This subclass does not cover:

- devices for the storage of speech signals, which are covered by subclasses [G11B](#) and [G11C](#);
- encoding of compressed speech signals for transmission or storage, which is covered by group [H03M 7/30](#).

**G10L 13/00****Speech synthesis; Text to speech systems****G10L 13/02**

- . Methods for producing synthetic speech; Speech synthesisers

**G10L 2013/021**

- .. {Overlap-add techniques}

**G10L 13/027**

- .. Concept to speech synthesisers; Generation of natural phrases from machine-based concepts ([generation of parameters for speech synthesis out of text G10L 13/08](#))

**G10L 13/033**

- .. Voice editing, e.g. manipulating the voice of the synthesiser

**G10L 13/0335**

- ... {Pitch control}

**G10L 13/04**

- .. Details of speech synthesis systems, e.g. synthesiser structure or memory management

**G10L 13/043**

- ... {Synthesisers specially adapted to particular applications}

**WARNING**

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**G10L 13/047**

- ... Architecture of speech synthesisers

**G10L 13/06**

- . Elementary speech units used in speech synthesisers; Concatenation rules

**G10L 13/07**

- .. Concatenation rules

**G10L 13/08**

- . Text analysis or generation of parameters for speech synthesis out of text, e.g. grapheme to phoneme translation, prosody generation or stress or intonation determination

**G10L 2013/083**

- .. {Special characters, e.g. punctuation marks}

**G10L 13/086**

- .. {Detection of language}

**G10L 13/10**

- .. Prosody rules derived from text; Stress or intonation

**G10L 2013/105**

- ... {Duration}

**G10L 15/00****Speech recognition ([G10L 17/00](#) takes precedence)****G10L 15/005**

- . {Language recognition}

**G10L 15/01**

- . Assessment or evaluation of speech recognition systems

G10L 15/02	. Feature extraction for speech recognition; Selection of recognition unit
G10L 2015/022	.. {Demisyllables, biphones or triphones being the recognition units}
G10L 2015/025	.. {Phonemes, fenemes or fenones being the recognition units}
G10L 2015/027	.. {Syllables being the recognition units}
G10L 15/04	. Segmentation; Word boundary detection
G10L 15/05	.. Word boundary detection
G10L 15/06	. Creation of reference templates; Training of speech recognition systems, e.g. adaptation to the characteristics of the speaker's voice ( <a href="#">G10L 15/14 takes precedence</a> )
G10L 15/063	.. {Training}
G10L 2015/0631	... {Creating reference templates; Clustering}
G10L 2015/0633	.... {using lexical or orthographic knowledge sources}
G10L 2015/0635	... {updating or merging of old and new templates; Mean values; Weighting}
G10L 2015/0636	.... {Threshold criteria for the updating}
G10L 2015/0638	... {Interactive procedures}
G10L 15/065	.. Adaptation
G10L 15/07	... to the speaker
G10L 15/075	.... {supervised, i.e. under machine guidance}
G10L 15/08	. Speech classification or search
G10L 2015/081	.. {Search algorithms, e.g. Baum-Welch or Viterbi}
G10L 15/083	.. {Recognition networks ( <a href="#">G10L 15/142</a> , <a href="#">G10L 15/16 take precedence</a> )}
G10L 2015/085	.. {Methods for reducing search complexity, pruning}
G10L 2015/086	.. {Recognition of spelled words}
G10L 2015/088	.. {Word spotting}
G10L 15/10	.. using distance or distortion measures between unknown speech and reference templates
G10L 15/12	.. using dynamic programming techniques, e.g. dynamic time warping [DTW]
G10L 15/14	.. using statistical models, e.g. hidden Markov models [HMMs] ( <a href="#">G10L 15/18 takes precedence</a> )
G10L 15/142	... {Hidden Markov Models [HMMs]}
G10L 15/144	.... {Training of HMMs}
G10L 15/146	..... {with insufficient amount of training data, e.g. state sharing, tying, deleted interpolation}
G10L 15/148	.... {Duration modelling in HMMs, e.g. semi HMM, segmental models or transition probabilities}
G10L 15/16	.. using artificial neural networks
G10L 15/18	.. using natural language modelling
G10L 15/1807	... {using prosody or stress}
G10L 15/1815	... {Semantic context, e.g. disambiguation of the recognition hypotheses based on word meaning}
G10L 15/1822	... {Parsing for meaning understanding}
G10L 15/183	... using context dependencies, e.g. language models

- G10L 15/187 . . . . Phonemic context, e.g. pronunciation rules, phonotactical constraints or phoneme n-grams
- G10L 15/19 . . . . Grammatical context, e.g. disambiguation of the recognition hypotheses based on word sequence rules
- G10L 15/193 . . . . . Formal grammars, e.g. finite state automata, context free grammars or word networks
- G10L 15/197 . . . . . Probabilistic grammars, e.g. word n-grams
- G10L 15/20 . Speech recognition techniques specially adapted for robustness in adverse environments, e.g. in noise, of stress induced speech ([G10L 21/02 takes precedence](#))
- G10L 15/22 . Procedures used during a speech recognition process, e.g. man-machine dialogue
- G10L 2015/221 . . {Announcement of recognition results}
- G10L 15/222 . . {Barge in, i.e. overridable guidance for interrupting prompts}
- G10L 2015/223 . . {Execution procedure of a spoken command}
- G10L 2015/225 . . {Feedback of the input speech}
- G10L 2015/226 . . {Taking into account non-speech characteristics}
- G10L 2015/227 . . . {of the speaker; Human-factor methodology}
- G10L 2015/228 . . . {of application context}
- G10L 15/24 . Speech recognition using non-acoustical features
- G10L 15/25 . . using position of the lips, movement of the lips or face analysis
- G10L 15/26 . Speech to text systems ([G10L 15/08 takes precedence](#))
- G10L 15/265 . . {Speech recognisers specially adapted for particular applications (devices for signalling identity of wanted subscriber in a telephonic communication equipment controlled by voice recognition H04M 1/271; speech interaction details in interactive information services in a telephonic communication system H04M 3/4936)}

### **WARNING**

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- G10L 15/28 . Constructional details of speech recognition systems
- G10L 15/285 . . {Memory allocation or algorithm optimisation to reduce hardware requirements}
- G10L 15/30 . . Distributed recognition, e.g. in client-server systems, for mobile phones or network applications
- G10L 15/32 . . Multiple recognisers used in sequence or in parallel; Score combination systems therefor, e.g. voting systems
- G10L 15/34 . . Adaptation of a single recogniser for parallel processing, e.g. by use of multiple processors or cloud computing

### **G10L 17/00**

#### **Speaker identification or verification**

- G10L 17/005 . {Speaker recognisers specially adapted for particular applications ([G07C 9/00071 takes precedence](#))}

### **WARNING**

## G10L 17/005

(continued)

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## G10L 17/02

- . Preprocessing operations, e.g. segment selection; Pattern representation or modelling, e.g. based on linear discriminant analysis [LDA] or principal components; Feature selection or extraction

## G10L 17/04

- . Training, enrolment or model building

## G10L 17/06

- . Decision making techniques; Pattern matching strategies

## G10L 17/08

- .. Use of distortion metrics or a particular distance between probe pattern and reference templates

## G10L 17/10

- .. Multimodal systems, i.e. based on the integration of multiple recognition engines or fusion of expert systems

## G10L 17/12

- .. Score normalisation

## G10L 17/14

- .. Use of phonemic categorisation or speech recognition prior to speaker recognition or verification

## G10L 17/16

- . Hidden Markov models [HMMs]

## G10L 17/18

- . Artificial neural networks; Connectionist approaches

## G10L 17/20

- . Pattern transformations or operations aimed at increasing system robustness, e.g. against channel noise or different working conditions

## G10L 17/22

- . Interactive procedures; Man-machine interfaces

## G10L 17/24

- .. the user being prompted to utter a password or a predefined phrase

## G10L 17/26

- . Recognition of special voice characteristics, e.g. for use in lie detectors; Recognition of animal voices

## G10L 19/00

**Speech or audio signal analysis-synthesis techniques for redundancy reduction, e.g. in vocoders; Coding or decoding of speech or audio signal, using source filter models or psychoacoustic analysis (in musical instruments G10H)**

## G10L 2019/0001

- . {Codebooks}

## G10L 2019/0002

- .. {Codebook adaptations}

## G10L 2019/0003

- .. {Backward prediction of gain}

## G10L 2019/0004

- .. {Design or structure of the codebook}

## G10L 2019/0005

- ... {Multi-stage vector quantisation}

## G10L 2019/0006

- ... {Tree or treillis structures; Delayed decisions}

## G10L 2019/0007

- .. {Codebook element generation}

## G10L 2019/0008

- ... {Algebraic codebooks}

## G10L 2019/0009

- ... {Orthogonal codebooks}

## G10L 2019/001

- ... {Interpolation of codebook vectors}

## G10L 2019/0011

- .. {Long term prediction filters, i.e. pitch estimation}

## G10L 2019/0012

- .. {Smoothing of parameters of the decoder interpolation}

## G10L 2019/0013

- .. {Codebook search algorithms}

## G10L 2019/0014

- ... {Selection criteria for distances}

## G10L 2019/0015

- ... {Viterbi algorithms}

- G10L 2019/0016 . . {Codebook for LPC parameters}
- G10L 19/0017 . {Lossless audio signal coding; Perfect reconstruction of coded audio signal by transmission of coding error ([G10L 19/24 takes precedence](#))}
- G10L 19/0018 . {Speech coding using phonetic or linguistic decoding of the source; Reconstruction using text-to-speech synthesis}
- G10L 19/0019 . {Vocoders specially adapted for particular applications}

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- G10L 19/002 . Dynamic bit allocation ([for perceptual audio coders G10L 19/032](#))
- G10L 19/005 . Correction of errors induced by the transmission channel, if related to the coding algorithm
- G10L 19/008 . Multichannel audio signal coding or decoding, i.e. using interchannel correlation to reduce redundancies, e.g. joint-stereo, intensity-coding, matrixing ([arrangements for reproducing spatial sound H04R 5/00](#); stereophonic systems, e.g. spatial sound capture or matrixing of audio signals in the decoded state [H04S](#))
- G10L 19/012 . Comfort noise or silence coding
- G10L 19/018 . Audio watermarking, i.e. embedding inaudible data in the audio signal
- G10L 19/02 . using spectral analysis, e.g. transform vocoders or subband vocoders
- G10L 19/0204 . . {using subband decomposition}
- G10L 19/0208 . . . {Subband vocoders}
- G10L 19/0212 . . {using orthogonal transformation}
- G10L 19/0216 . . . {using wavelet decomposition}
- G10L 19/022 . . Blocking, i.e. grouping of samples in time; Choice of analysis windows; Overlap factoring
- G10L 19/025 . . . Detection of transients or attacks for time/frequency resolution switching
- G10L 19/028 . . Noise substitution, i.e. substituting non-tonal spectral components by noisy source ([comfort noise for discontinuous speech transmission G10L 19/012](#))
- G10L 19/03 . . Spectral prediction for preventing pre-echo; Temporary noise shaping [TNS], e.g. in MPEG2 or MPEG4
- G10L 19/032 . . Quantisation or dequantisation of spectral components
- G10L 19/035 . . . Scalar quantisation
- G10L 19/038 . . . Vector quantisation, e.g. TwinVQ audio
- G10L 19/04 . using predictive techniques
- G10L 19/06 . . Determination or coding of the spectral characteristics, e.g. of the short-term prediction coefficients
- G10L 19/07 . . . Line spectrum pair [LSP] vocoders
- G10L 19/08 . . Determination or coding of the excitation function; Determination or coding of the long-term prediction parameters
- G10L 19/083 . . . the excitation function being an excitation gain ([G10L 25/90 takes precedence](#))
- G10L 19/087 . . . using mixed excitation models, e.g. MELP, MBE, split band LPC or HVXC

- G10L 19/09 . . . Long term prediction, i.e. removing periodical redundancies, e.g. by using adaptive codebook or pitch predictor
- G10L 19/093 . . . using sinusoidal excitation models
- G10L 19/097 . . . using prototype waveform decomposition or prototype waveform interpolative [PWI] coders
- G10L 19/10 . . . the excitation function being a multipulse excitation
- G10L 19/107 . . . . Sparse pulse excitation, e.g. by using algebraic codebook
- G10L 19/113 . . . . Regular pulse excitation
- G10L 19/12 . . . the excitation function being a code excitation, e.g. in code excited linear prediction [CELP] vocoders
- G10L 19/125 . . . . Pitch excitation, e.g. pitch synchronous innovation CELP [PSI-CELP]
- G10L 19/13 . . . . Residual excited linear prediction [RELP]
- G10L 19/135 . . . . Vector sum excited linear prediction [VSELP]
- G10L 19/16 . . Vocoder architecture
- G10L 19/167 . . . {Audio streaming, i.e. formatting and decoding of an encoded audio signal representation into a data stream for transmission or storage purposes}
- G10L 19/173 . . . {Transcoding, i.e. converting between two coded representations avoiding cascaded coding-decoding}
- G10L 19/18 . . . Vocoders using multiple modes
- G10L 19/20 . . . . using sound class specific coding, hybrid encoders or object based coding
- G10L 19/22 . . . . Mode decision, i.e. based on audio signal content versus external parameters
- G10L 19/24 . . . . Variable rate codecs, e.g. for generating different qualities using a scalable representation such as hierarchical encoding or layered encoding
- G10L 19/26 . . Pre-filtering or post-filtering
- G10L 19/265 . . . {Pre-filtering, e.g. high frequency emphasis prior to encoding}
- G10L 21/00** **Processing of the speech or voice signal to produce another audible or non-audible signal, e.g. visual or tactile, in order to modify its quality or its intelligibility (G10L 19/00 takes precedence)**
- G10L 21/003 . Changing voice quality, e.g. pitch or formants
- G10L 21/007 . . characterised by the process used
- G10L 21/01 . . . Correction of time axis
- G10L 21/013 . . . Adapting to target pitch
- G10L 2021/0135 . . . . {Voice conversion or morphing}
- G10L 21/02 . Speech enhancement, e.g. noise reduction or echo cancellation (reducing echo effects in line transmission systems [H04B 3/20](#); echo suppression in hands-free telephones [H04M 9/08](#))
- G10L 21/0202 . . {Applications}

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G10L 21/0205 ... {Enhancement of intelligibility of clean or coded speech}

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G10L 21/0208 .. Noise filtering

G10L 2021/02082 ... {the noise being echo, reverberation of the speech}

G10L 2021/02085 ... {Periodic noise}

G10L 2021/02087 ... {the noise being separate speech, e.g. cocktail party}

G10L 21/0216 ... characterised by the method used for estimating noise

G10L 2021/02161 .... {Number of inputs available containing the signal or the noise to be suppressed}

G10L 2021/02163 ..... {Only one microphone}

G10L 2021/02165 ..... {Two microphones, one receiving mainly the noise signal and the other one mainly the speech signal}

G10L 2021/02166 ..... {Microphone arrays; Beamforming}

G10L 2021/02168 .... {the estimation exclusively taking place during speech pauses}

G10L 21/0224 .... Processing in the time domain

G10L 21/0232 .... Processing in the frequency domain

G10L 21/0264 ... characterised by the type of parameter measurement, e.g. correlation techniques, zero crossing techniques or predictive techniques

G10L 21/0272 .. Voice signal separating

G10L 21/028 ... using properties of sound source

G10L 21/0308 ... characterised by the type of parameter measurement, e.g. correlation techniques, zero crossing techniques or predictive techniques

G10L 21/0316 .. by changing the amplitude

G10L 21/0324 ... Details of processing therefor

G10L 21/0332 .... involving modification of waveforms

G10L 21/034 .... Automatic adjustment

G10L 21/0356 ... for synchronising with other signals, e.g. video signals

G10L 21/0364 ... for improving intelligibility

G10L 2021/03643 .... {Diver speech}

G10L 2021/03646 .... {Stress or Lombard effect}

G10L 21/038 .. using band spreading techniques

G10L 21/0388 ... Details of processing therefor

G10L 21/04 . Time compression or expansion

G10L 21/043 .. by changing speed

G10L 21/045 ... using thinning out or insertion of a waveform

G10L 21/047 .... characterised by the type of waveform to be thinned out or inserted

G10L 21/049 .... characterised by the interconnection of waveforms



- G10L 21/055 . . . for synchronising with other signals, e.g. video signals
- G10L 21/057 . . . for improving intelligibility
- G10L 2021/0575 . . . {Aids for the handicapped in speaking}
- G10L 21/06 . Transformation of speech into a non-audible representation, e.g. speech visualisation or speech processing for tactile aids ([G10L 15/26 takes precedence](#))
- G10L 2021/065 . . . {Aids for the handicapped in understanding}
- G10L 21/10 . . . transforming into visible information
- G10L 2021/105 . . . {Synthesis of the lips movements from speech, e.g. for talking heads}
- G10L 21/12 . . . by displaying time domain information
- G10L 21/14 . . . by displaying frequency domain information
- G10L 21/16 . . . transforming into a non-visible representation ([devices or methods enabling ear patients to replace direct auditory perception by another kind of perception A61F 11/04](#))
- G10L 21/18 . . . Details of the transformation process

**G10L 25/00** **Speech or voice analysis techniques not restricted to a single one of groups [G10L 15/00-G10L 21/00](#)**

- G10L 25/03 . characterised by the type of extracted parameters
- G10L 25/06 . . the extracted parameters being correlation coefficients
- G10L 25/09 . . the extracted parameters being zero crossing rates
- G10L 25/12 . . the extracted parameters being prediction coefficients
- G10L 25/15 . . the extracted parameters being formant information
- G10L 25/18 . . the extracted parameters being spectral information of each sub-band
- G10L 25/21 . . the extracted parameters being power information
- G10L 25/24 . . the extracted parameters being the cepstrum
- G10L 25/27 . characterised by the analysis technique
- G10L 25/30 . . using neural networks
- G10L 25/33 . . using fuzzy logic
- G10L 25/36 . . using chaos theory
- G10L 25/39 . . using genetic algorithms
- G10L 25/45 . characterised by the type of analysis window
- G10L 25/48 . specially adapted for particular use
- G10L 25/51 . . for comparison or discrimination
- G10L 25/54 . . . for retrieval
- G10L 25/57 . . . for processing of video signals
- G10L 25/60 . . . for measuring the quality of voice signals
- G10L 25/63 . . . for estimating an emotional state
- G10L 25/66 . . . for extracting parameters related to health condition ([detecting or measuring for diagnostic purposes A61B 5/00](#))
- G10L 25/69 . . for evaluating synthetic or decoded voice signals
- G10L 25/72 . . for transmitting results of analysis
- G10L 25/75 . for modelling vocal tract parameters



- G10L 25/78 . Detection of presence or absence of voice signals ([switching of direction of transmission by voice frequency in two-way loud-speaking telephone systems H04M 9/10](#))
- G10L 2025/783 . . {based on threshold decision}
- G10L 2025/786 . . . {Adaptive threshold}
- G10L 25/81 . . for discriminating voice from music
- G10L 25/84 . . for discriminating voice from noise
- G10L 25/87 . . Detection of discrete points within a voice signal
- G10L 25/90 . Pitch determination of speech signals
- G10L 2025/903 . . {using a laryngograph}
- G10L 2025/906 . . {Pitch tracking}
- G10L 25/93 . Discriminating between voiced and unvoiced parts of speech signals ([G10L 25/90 takes precedence](#))
- G10L 2025/932 . . {Decision in previous or following frames}
- G10L 2025/935 . . {Mixed voiced class; Transitions}
- G10L 2025/937 . . {Signal energy in various frequency bands}
- G10L 99/00** **Subject matter not provided for in other groups of this subclass**