

# CPC COOPERATIVE PATENT CLASSIFICATION

## G PHYSICS (NOTES omitted)

### INSTRUMENTS

## G06 COMPUTING; CALCULATING OR COUNTING (NOTES omitted)

## G06V IMAGE OR VIDEO RECOGNITION OR UNDERSTANDING

### NOTES

1. This subclass covers:
  - methods or arrangements for pattern recognition or machine learning specially adapted for images or video.
2. In this subclass, the following terms or expressions are used with the meaning indicated:
  - "pattern recognition" means detection, categorisation, authentication and identification of patterns for explanatory purposes or to derive a certain meaning in images or video, by acquiring, preprocessing or extracting distinctive features and matching, clustering or classifying these features or representations thereof;
  - "feature extraction" means deriving descriptive or quantitative measures from images or video;
  - "clustering" means grouping or separating patterns according to their closeness or dissimilarity;
  - "classification" means the identification of an object/feature as belonging to a class of objects/features by assigning of a label.
3. In this subclass, subject matter classified in groups [G06V 20/00](#) - [G06V 40/00](#) is also classified in groups [G06V 10/10](#) or [G06V 10/20](#) respectively, if recognition relies on specific processing at the stages of acquisition or preprocessing.

<b>10/00</b>	<b>Arrangements for image or video recognition or understanding (character recognition in images or video <a href="#">G06V 30/10</a>)</b>	10/24	. . Aligning, centring, orientation detection or correction of the image
10/10	. Image acquisition (document image scanning and transmission <a href="#">H04N 1/00</a> ; control of digital cameras <a href="#">H04N 23/60</a> )	10/242	. . . {by image rotation, e.g. by 90 degrees}
10/12	. . Details of acquisition arrangements; Constructional details thereof	10/243	. . . {by compensating for image skew or non-uniform image deformations}
10/14	. . . Optical characteristics of the device performing the acquisition or on the illumination arrangements	10/245	. . . {by locating a pattern; Special marks for positioning}
10/141	. . . . Control of illumination	10/247	. . . {by affine transforms, e.g. correction due to perspective effects; Quadrilaterals, e.g. trapezoids}
10/143	. . . . Sensing or illuminating at different wavelengths	10/248	. . . {by interactive preprocessing or interactive shape modelling, e.g. feature points assigned by a user}
10/145	. . . . Illumination specially adapted for pattern recognition, e.g. using gratings	10/25	. . Determination of region of interest [ROI] or a volume of interest [VOI]
10/147	. . . . Details of sensors, e.g. sensor lenses (fingerprint or palmprint sensors <a href="#">G06V 40/13</a> ; vascular sensors <a href="#">G06V 40/145</a> ; eye sensors <a href="#">G06V 40/19</a> )	10/255	. . {Detecting or recognising potential candidate objects based on visual cues, e.g. shapes}
10/16	. . {using multiple overlapping images; Image stitching}	10/26	. . Segmentation of patterns in the image field; Cutting or merging of image elements to establish the pattern region, e.g. clustering-based techniques; Detection of occlusion
10/17	. . {using hand-held instruments}	10/267	. . . {by performing operations on regions, e.g. growing, shrinking or watersheds}
10/19	. . {by sensing codes defining pattern positions}	10/273	. . . {removing elements interfering with the pattern to be recognised}
10/20	. Image preprocessing	10/28	. . Quantising the image, e.g. histogram thresholding for discrimination between background and foreground patterns
10/22	. . by selection of a specific region containing or referencing a pattern; Locating or processing of specific regions to guide the detection or recognition	10/30	. . Noise filtering
10/225	. . . {based on a marking or identifier characterising the area}	10/32	. . Normalisation of the pattern dimensions
10/23	. . . {based on positionally close patterns or neighbourhood relationships}	10/34	. . Smoothing or thinning of the pattern; Morphological operations; Skeletonisation
10/235	. . . {based on user input or interaction}		

- 10/36 . . Applying a local operator, i.e. means to operate on image points situated in the vicinity of a given point; Non-linear local filtering operations, e.g. median filtering
- 10/40 . Extraction of image or video features
- 10/42 . . Global feature extraction by analysis of the whole pattern, e.g. using frequency domain transformations or autocorrelation
- 10/421 . . . {by analysing segments intersecting the pattern}
- 10/422 . . . for representing the structure of the pattern or shape of an object therefor
- 10/424 . . . . Syntactic representation, e.g. by using alphabets or grammars
- 10/426 . . . . Graphical representations
- 10/431 . . . {Frequency domain transformation; Autocorrelation}
- 10/435 . . . {Computation of moments}
- 10/44 . . Local feature extraction by analysis of parts of the pattern, e.g. by detecting edges, contours, loops, corners, strokes or intersections; Connectivity analysis, e.g. of connected components
- 10/443 . . . {by matching or filtering}
- 10/446 . . . . {using Haar-like filters, e.g. using integral image techniques}
- 10/449 . . . . {Biologically inspired filters, e.g. difference of Gaussians [DoG] or Gabor filters}
- 10/451 . . . . . {with interaction between the filter responses, e.g. cortical complex cells}
- 10/454 . . . . . {Integrating the filters into a hierarchical structure, e.g. convolutional neural networks [CNN]}
- 10/457 . . . {by analysing connectivity, e.g. edge linking, connected component analysis or slices}
- 10/46 . . Descriptors for shape, contour or point-related descriptors, e.g. scale invariant feature transform [SIFT] or bags of words [BoW]; Salient regional features (colour feature extraction G06V 10/56)
- 10/462 . . . {Salient features, e.g. scale invariant feature transforms [SIFT]}
- 10/464 . . . . {using a plurality of salient features, e.g. bag-of-words [BoW] representations}
- 10/467 . . . {Encoded features or binary features, e.g. local binary patterns [LBP]}
- 10/469 . . . {Contour-based spatial representations, e.g. vector-coding}
- 10/471 . . . . {using approximation functions}
- 10/473 . . . . {using gradient analysis}
- 10/476 . . . . {using statistical shape modelling, e.g. point distribution models}
- 10/478 . . . {Contour-based spectral representations or scale-space representations, e.g. by Fourier analysis, wavelet analysis or curvature scale-space [CSS]}
- 10/48 . . by mapping characteristic values of the pattern into a parameter space, e.g. Hough transformation
- 10/50 . . by performing operations within image blocks; by using histograms, e.g. histogram of oriented gradients [HoG]; by summing image-intensity values; Projection analysis
- 10/507 . . . {Summing image-intensity values; Histogram projection analysis}
- 10/513 . . {Sparse representations}
- 10/52 . . Scale-space analysis, e.g. wavelet analysis (multi-scale boundary representations G06V 10/42)
- 10/54 . . relating to texture
- 10/56 . . relating to colour
- 10/58 . . relating to hyperspectral data
- 10/60 . . relating to illumination properties, e.g. using a reflectance or lighting model
- 10/62 . . relating to a temporal dimension, e.g. time-based feature extraction; Pattern tracking
- 10/70 . . using pattern recognition or machine learning (optical pattern recognition or electronic computations therefor G06V 10/88)
- 10/72 . . Data preparation, e.g. statistical preprocessing of image or video features
- 10/74 . . Image or video pattern matching; Proximity measures in feature spaces
- 10/75 . . . Organisation of the matching processes, e.g. simultaneous or sequential comparisons of image or video features; Coarse-fine approaches, e.g. multi-scale approaches; using context analysis; Selection of dictionaries
- 10/751 . . . . {Comparing pixel values or logical combinations thereof, or feature values having positional relevance, e.g. template matching}
- 10/7515 . . . . . {Shifting the patterns to accommodate for positional errors}
- 10/752 . . . . {Contour matching}
- 10/753 . . . . {Transform-based matching, e.g. Hough transform}
- 10/754 . . . . {involving a deformation of the sample pattern or of the reference pattern; Elastic matching}
- 10/755 . . . . {Deformable models or variational models, e.g. snakes or active contours}
- 10/7553 . . . . . {based on shape, e.g. active shape models [ASM]}
- 10/7557 . . . . . {based on appearance, e.g. active appearance models [AAM]}
- 10/757 . . . . {Matching configurations of points or features}
- 10/758 . . . . {Involving statistics of pixels or of feature values, e.g. histogram matching}
- 10/759 . . . . {Region-based matching}
- 10/76 . . . . {based on eigen-space representations, e.g. from pose or different illumination conditions; Shape manifolds}
- 10/761 . . . {Proximity, similarity or dissimilarity measures}
- 10/762 . . using clustering, e.g. of similar faces in social networks
- 10/7625 . . . {Hierarchical techniques, i.e. dividing or merging patterns to obtain a tree-like representation; Dendograms}
- 10/763 . . . {Non-hierarchical techniques, e.g. based on statistics of modelling distributions}
- 10/7635 . . . {based on graphs, e.g. graph cuts or spectral clustering}
- 10/764 . . using classification, e.g. of video objects
- 10/765 . . . {using rules for classification or partitioning the feature space}
- 10/766 . . using regression, e.g. by projecting features on hyperplanes

10/768	. . {using context analysis, e.g. recognition aided by known co-occurring patterns}	10/92	. . {using spatial domain filters, e.g. joint transform correlators}
10/77	. . Processing image or video features in feature spaces; using data integration or data reduction, e.g. principal component analysis [PCA] or independent component analysis [ICA] or self-organising maps [SOM]; Blind source separation	10/94	. Hardware or software architectures specially adapted for image or video understanding
10/771	. . . Feature selection, e.g. selecting representative features from a multi-dimensional feature space	10/945	. . {User interactive design; Environments; Toolboxes}
10/7715	. . . {Feature extraction, e.g. by transforming the feature space, e.g. multi-dimensional scaling [MDS]; Mappings, e.g. subspace methods}	10/95	. . {structured as a network, e.g. client-server architectures}
10/772	. . . Determining representative reference patterns, e.g. averaging or distorting patterns; Generating dictionaries	10/955	. . {using specific electronic processors}
10/774	. . . Generating sets of training patterns; Bootstrap methods, e.g. bagging or boosting	10/96	. Management of image or video recognition tasks
10/7747	. . . . {Organisation of the process, e.g. bagging or boosting}	10/98	. Detection or correction of errors, e.g. by rescanning the pattern or by human intervention; Evaluation of the quality of the acquired patterns
10/7753	. . . . {Incorporation of unlabelled data, e.g. multiple instance learning [MIL]}	10/987	. . {with the intervention of an operator}
10/776	. . . Validation; Performance evaluation	10/993	. . {Evaluation of the quality of the acquired pattern}
10/778	. . . Active pattern-learning, e.g. online learning of image or video features	20/00	<b>Scenes; Scene-specific elements (control of digital cameras <a href="#">H04N 23/60</a>)</b>
10/7784	. . . . {based on feedback from supervisors}	<b>NOTE</b>	
10/7788	. . . . . {the supervisor being a human, e.g. interactive learning with a human teacher}		In this group, the following term is used with the meaning indicated:
10/7792	. . . . . {the supervisor being an automated module, e.g. "intelligent oracle"}		• "scene" is a visual representation of the world or of some elements of it, as captured by a sensor or generated by a computer.
10/7796	. . . . {based on specific statistical tests}	20/05	. Underwater scenes
10/80	. . . Fusion, i.e. combining data from various sources at the sensor level, preprocessing level, feature extraction level or classification level ( <a href="#">multimodal speaker identification or verification G10L 17/10</a> )	20/10	. Terrestrial scenes ( <a href="#">scenes under surveillance with static cameras G06V 20/52</a> ; <a href="#">scenes perceived from the exterior of a vehicle G06V 20/56</a> ; <a href="#">scenes perceived from the interior of a vehicle G06V 20/59</a> )
10/803	. . . . {of input or preprocessed data}	20/13	. . Satellite images
10/806	. . . . {of extracted features}	20/17	. . taken from planes or by drones
10/809	. . . . {of classification results, e.g. where the classifiers operate on the same input data}	20/176	. . {Urban or other man-made structures}
10/811	. . . . . {the classifiers operating on different input data, e.g. multi-modal recognition}	20/182	. . {Network patterns, e.g. roads or rivers}
10/814	. . . . {using belief theory, e.g. Dempster-Shafer}	20/188	. . {Vegetation}
10/817	. . . . {by voting}	20/194	. . {using hyperspectral data, i.e. more or other wavelengths than RGB}
10/82	. . using neural networks	20/20	. in augmented reality scenes
10/84	. . using probabilistic graphical models from image or video features, e.g. Markov models or Bayesian networks	20/30	. in albums, collections or shared content, e.g. social network photos or video
10/85	. . . {Markov-related models; Markov random fields}	20/35	. {Categorising the entire scene, e.g. birthday party or wedding scene}
10/86	. . using syntactic or structural representations of the image or video pattern, e.g. symbolic string recognition; using graph matching	20/36	. . {Indoor scenes}
10/87	. . {using selection of the recognition techniques, e.g. of a classifier in a multiple classifier system}	20/38	. . {Outdoor scenes}
10/88	. Image or video recognition using optical means, e.g. reference filters, holographic masks, frequency domain filters or spatial domain filters	20/39	. . . {Urban scenes}
10/89	. . {using frequency domain filters, e.g. Fourier masks implemented on spatial light modulators}	20/40	. in video content ( <a href="#">extracting overlay text G06V 20/62</a> ; <a href="#">video retrieval G06F 16/70</a> ; <a href="#">processing of video elementary streams in video servers H04N 21/234</a> ; <a href="#">processing of video elementary streams in video clients H04N 21/44</a> )
10/893	. . . {characterised by the kind of filter}	20/41	. . {Higher-level, semantic clustering, classification or understanding of video scenes, e.g. detection, labelling or Markovian modelling of sport events or news items ( <a href="#">segmenting video sequences G06V 20/49</a> )}
10/895	. . . . {the filter being related to phase processing, e.g. phase-only filters}	20/42	. . . {of sport video content}
10/898	. . . . {combination of filters, e.g. phase-only filters}	20/43	. . . {of news video content}
		20/44	. . {Event detection}
		20/46	. . {Extracting features or characteristics from the video content, e.g. video fingerprints, representative shots or key frames}
		20/47	. . . {Detecting features for summarising video content}

- 20/48 . . {Matching video sequences}
- 20/49 . . {Segmenting video sequences, i.e. computational techniques such as parsing or cutting the sequence, low-level clustering or determining units such as shots or scenes}
- 20/50 . Context or environment of the image
- 20/52 . . Surveillance or monitoring of activities, e.g. for recognising suspicious objects ([recognising microscopic objects G06V 20/69](#))
- 20/53 . . . {Recognition of crowd images, e.g. recognition of crowd congestion}
- 20/54 . . . of traffic, e.g. cars on the road, trains or boats
- 20/56 . . exterior to a vehicle by using sensors mounted on the vehicle
- 20/58 . . . Recognition of moving objects or obstacles, e.g. vehicles or pedestrians; Recognition of traffic objects, e.g. traffic signs, traffic lights or roads
- 20/582 . . . . {of traffic signs}
- 20/584 . . . . {of vehicle lights or traffic lights}
- 20/586 . . . . {of parking space}
- 20/588 . . . {Recognition of the road, e.g. of lane markings; Recognition of the vehicle driving pattern in relation to the road}
- 20/59 . . inside of a vehicle, e.g. relating to seat occupancy, driver state or inner lighting conditions
- 20/593 . . . {Recognising seat occupancy}
- 20/597 . . . {Recognising the driver's state or behaviour, e.g. attention or drowsiness}
- 20/60 . Type of objects
- 20/62 . . Text, e.g. of license plates, overlay texts or captions on TV images
- 20/625 . . . {License plates}
- 20/63 . . . {Scene text, e.g. street names}
- 20/635 . . . {Overlay text, e.g. embedded captions in a TV program}
- 20/64 . . Three-dimensional objects
- 20/647 . . . {by matching two-dimensional images to three-dimensional objects}
- 20/653 . . . {by matching three-dimensional models, e.g. conformal mapping of Riemann surfaces}
- 20/66 . . Trinkets, e.g. shirt buttons or jewellery items ([recognising microscopic objects G06V 20/69](#))
- 20/68 . . Food, e.g. fruit or vegetables
- 20/69 . . Microscopic objects, e.g. biological cells or cellular parts
- 20/693 . . . {Acquisition}
- 20/695 . . . {Preprocessing, e.g. image segmentation}
- 20/698 . . . {Matching; Classification}
- 20/70 . Labelling scene content, e.g. deriving syntactic or semantic representations
- 20/80 . Recognising image objects characterised by unique random patterns
- 20/90 . Identifying an image sensor based on its output data
- 20/95 . {Pattern authentication; Markers therefor; Forgery detection}

**30/00**

**Character recognition; Recognising digital ink; Document-oriented image-based pattern recognition** ([scanning, transmission or reproduction of documents or the like H04N 1/00](#))

**NOTE**

This group covers recognition of characters or digital ink, where the characters or the digital ink can include representations in three dimensions, e.g. as written by performing gestures in the air.

- 30/10 . Character recognition
- 30/12 . . Detection or correction of errors, e.g. by rescanning the pattern
- 30/127 . . . {with the intervention of an operator}
- 30/133 . . . {Evaluation of quality of the acquired characters}
- 30/14 . . Image acquisition
- 30/141 . . . {using multiple overlapping images; Image stitching}
- 30/142 . . . using hand-held instruments; Constructional details of the instruments
- 30/1423 . . . . {the instrument generating sequences of position coordinates corresponding to handwriting ([preprocessing or recognising digital ink G06V 30/32](#))}
- 30/1426 . . . . {by sensing position defining codes on a support}
- 30/1429 . . . {Identifying or ignoring parts by sensing at different wavelengths}
- 30/1431 . . . {Illumination control}
- 30/1434 . . . {Special illumination such as grating, reflections or deflections, e.g. for characters with relief}
- 30/1437 . . . {Sensor details, e.g. position, configuration or special lenses ([G06V 30/1429 takes precedence](#))}
- 30/144 . . . using a slot moved over the image; using discrete sensing elements at predetermined points; using automatic curve following means
- 30/1444 . . . {Selective acquisition, locating or processing of specific regions, e.g. highlighted text, fiducial marks or predetermined fields}
- 30/1448 . . . . {based on markings or identifiers characterising the document or the area}
- 30/1452 . . . . {based on positionally close symbols, e.g. amount sign or URL-specific characters}
- 30/1456 . . . . {based on user interactions}
- 30/146 . . . Aligning or centring of the image pick-up or image-field
- 30/1463 . . . . {Orientation detection or correction, e.g. rotation of multiples of 90 degrees}
- 30/1465 . . . . {by locating a pattern ([G06V 30/1475 takes precedence; centring within a document with a marking G06V 30/1448](#))}
- 30/1468 . . . . . {Special marks for positioning}
- 30/147 . . . . {Determination of region of interest}
- 30/1473 . . . . {Recognising objects as potential recognition candidates based on visual cues, e.g. shapes}
- 30/1475 . . . . . {Inclination or skew detection or correction of characters or of image to be recognised}
- 30/1478 . . . . . {of characters or characters lines}
- 30/148 . . . Segmentation of character regions



- 30/15 . . . . {Cutting or merging image elements, e.g. region growing, watershed or clustering-based techniques}
- 30/153 . . . . {using recognition of characters or words}
- 30/155 . . . . {Removing patterns interfering with the pattern to be recognised, such as ruled lines or underlines}
- 30/158 . . . . {using character size, text spacings or pitch estimation}
- 30/16 . . Image preprocessing
- 30/1607 . . . {Correcting image deformation, e.g. trapezoidal deformation caused by perspective}
- 30/1613 . . . {Interactive preprocessing or shape modelling, e.g. assignment of feature points by a user}
- 30/162 . . . Quantising the image signal
- 30/164 . . . Noise filtering
- 30/166 . . . Normalisation of pattern dimensions
- 30/168 . . . Smoothing or thinning of the pattern; Skeletonisation
- 30/18 . . Extraction of features or characteristics of the image
- 30/1801 . . . {Detecting partial patterns, e.g. edges or contours, or configurations, e.g. loops, corners, strokes or intersections (extracting features by contour coding [G06V 30/182](#))}
- 30/18019 . . . . {by matching or filtering}
- 30/18029 . . . . {filtering with Haar-like subimages, e.g. computation thereof with the integral image technique}
- 30/18038 . . . . {Biologically-inspired filters, e.g. difference of Gaussians [DoG], Gabor filters}
- 30/18048 . . . . . {with interaction between the responses of different filters, e.g. cortical complex cells}
- 30/18057 . . . . . {Integrating the filters into a hierarchical structure, e.g. convolutional neural networks [CNN]}
- 30/18067 . . . . {by mapping characteristic values of the pattern into a parameter space, e.g. Hough transformation}
- 30/18076 . . . . {by analysing connectivity, e.g. edge linking, connected component analysis or slices}
- 30/18086 . . . {by performing operations within image blocks or by using histograms}
- 30/18095 . . . . {Summing image-intensity values; Projection and histogram analysis}
- 30/18105 . . . {related to colour}
- 30/18114 . . . {involving specific hyperspectral computations of features}
- 30/18124 . . . {related to illumination properties, e.g. according to a reflectance or lighting model}
- 30/18133 . . . {regional/local feature not essentially salient, e.g. local binary pattern}
- 30/18143 . . . {Extracting features based on salient regional features, e.g. scale invariant feature transform [SIFT] keypoints}
- 30/18152 . . . . {Extracting features based on a plurality of salient regional features, e.g. "bag of words"}
- 30/18162 . . . {related to a structural representation of the pattern}
- 30/18171 . . . . {Syntactic representation, e.g. using a grammatical approach}
- 30/18181 . . . . {Graphical representation, e.g. directed attributed graph}
- 30/1819 . . . {sparse representations}
- 30/182 . . . by coding the contour of the pattern
- 30/1823 . . . . {using vector-coding}
- 30/1826 . . . . {analysing the spectrum of the contour, e.g. Fourier expansion}
- 30/1829 . . . . {using an approximation function}
- 30/1831 . . . . {using gradient analysis}
- 30/1834 . . . . {using statistical shape modelling, e.g. point distribution model}
- 30/1837 . . . . {using wavelet analysis}
- 30/184 . . . by analysing segments intersecting the pattern
- 30/186 . . . by deriving mathematical or geometrical properties from the whole image
- 30/187 . . . . {Frequency domain transformation; Autocorrelation}
- 30/188 . . . . {Computation of moments}
- 30/189 . . . . {Scale-space domain transformation, e.g. with wavelet analysis}
- 30/19 . . Recognition using electronic means
- 30/19007 . . . {Matching; Proximity measures}
- 30/19013 . . . . {Comparing pixel values or logical combinations thereof, or feature values having positional relevance, e.g. template matching ([specially adapted for image segmentation G06T 7/10](#); [specially adapted for the analysis of motion G06T 7/20](#); [specially adapted for image alignment G06T 7/30](#); [specially adapted for the calculation of depth from stereo images G06T 7/50](#); [specially adapted for position determination G06T 7/70](#))}
- 30/1902 . . . . . {Shifting or otherwise transforming the patterns to accommodate for positional errors}
- 30/19027 . . . . . {Matching of contours}
- 30/19033 . . . . . {by mapping curve parameters onto an accumulator array, e.g. generalised Hough Transform}
- 30/1904 . . . . . {involving a deformation of the sample or reference pattern; Elastic matching}
- 30/19047 . . . . . {based on a local optimisation criterion, e.g. "snakes", i.e. active contour models of the pattern to be recognised}
- 30/19053 . . . . . {based on shape statistics, e.g. active shape models of the pattern to be recognised}
- 30/1906 . . . . . {based also on statistics of image patches, e.g. active appearance models of the pattern to be recognised}
- 30/19067 . . . . . {Matching configurations of points or features, e.g. constellation matching}
- 30/19073 . . . . {Comparing statistics of pixel or of feature values, e.g. histogram matching}
- 30/1908 . . . . {Region based matching}
- 30/19087 . . . . {based on parametric eigenspace representations, e.g. eigenspace representations using pose or illumination parameters; Shape manifold}
- 30/19093 . . . . {Proximity measures, i.e. similarity or distance measures}

- 30/191 . . . {Design or setup of recognition systems or techniques; Extraction of features in feature space; Clustering techniques; Blind source separation}
- 30/19107 . . . . {Clustering techniques}
- 30/19113 . . . . {Selection of pattern recognition techniques, e.g. of classifiers in a multi-classifier system}
- 30/1912 . . . . {Selecting the most significant subset of features ([G06V 30/19127 takes precedence](#))}
- 30/19127 . . . . {Extracting features by transforming the feature space, e.g. multidimensional scaling; Mappings, e.g. subspace methods}
- 30/19133 . . . . {Interactive pattern learning with a human teacher}
- 30/1914 . . . . {Determining representative reference patterns, e.g. averaging or distorting patterns; Generating dictionaries, e.g. user dictionaries}
- 30/19147 . . . . {Obtaining sets of training patterns; Bootstrap methods, e.g. bagging or boosting}
- 30/19153 . . . . {using rules for classification or partitioning the feature space}
- 30/1916 . . . . {Validation; Performance evaluation}
- 30/19167 . . . . {Active pattern learning}
- 30/19173 . . . . {Classification techniques}
- 30/1918 . . . . {Fusion techniques, i.e. combining data from various sources, e.g. sensor fusion}
- 30/19187 . . . . {Graphical models, e.g. Bayesian networks or Markov models}
- 30/19193 . . . {Statistical pre-processing, e.g. techniques for normalisation or restoring missing data}
- 30/192 . . . using simultaneous comparisons or correlations of the image signals with a plurality of references
- 30/194 . . . . References adjustable by an adaptive method, e.g. learning
- 30/195 . . . . {using a resistor matrix}
- 30/196 . . . using sequential comparisons of the image signals with a plurality of references
- 30/198 . . . . the selection of the next reference depending on the result of the preceding comparison
- 30/1983 . . . . {Syntactic or structural pattern recognition, e.g. symbolic string recognition}
- 30/1985 . . . . . {Syntactic analysis, e.g. using a grammatical approach ([syntactic image representation G06V 30/18171](#))}
- 30/1988 . . . . . {Graph matching ([graphical image representation G06V 30/18181](#))}
- 30/199 . . Arrangements for recognition using optical reference masks, e.g. holographic masks
- 30/20 . . Combination of acquisition, preprocessing or recognition functions
- 30/22 . . characterised by the type of writing
- 30/222 . . . of characters separated by spaces
- 30/224 . . . of printed characters having additional code marks or containing code marks
- 30/2247 . . . . {Characters composed of bars, e.g. CMC-7}
- 30/2253 . . . . {Recognition of characters printed with magnetic ink ([G06V 30/2247 takes precedence](#))}
- 30/226 . . . of cursive writing
- 30/2264 . . . . {using word shape}
- 30/2268 . . . . {using stroke segmentation}
- 30/2272 . . . . . {with lexical matching}
- 30/2276 . . . . . {with probabilistic networks, e.g. hidden Markov models}
- 30/228 . . . of three-dimensional handwriting, e.g. writing in the air
- 30/24 . . characterised by the processing or recognition method ([segmentation of character regions G06V 30/148](#))
- 30/242 . . . Division of the character sequences into groups prior to recognition; Selection of dictionaries
- 30/244 . . . . using graphical properties, e.g. alphabet type or font
- 30/2445 . . . . . {Alphabet recognition, e.g. Latin, Kanji or Katakana}
- 30/245 . . . . . {Font recognition}
- 30/2455 . . . . . {Discrimination between machine-print, hand-print and cursive writing}
- 30/246 . . . . using linguistic properties, e.g. specific for English or German language
- 30/248 . . . {involving plural approaches, e.g. verification by template match; Resolving confusion among similar patterns, e.g. "O" versus "Q" ([G06V 30/242 takes precedence](#))}
- 30/2504 . . . . {Coarse or fine approaches, e.g. resolution of ambiguities or multiscale approaches}
- 30/2528 . . . . {Combination of methods, e.g. classifiers, working on the same input data}
- 30/2552 . . . . {Combination of methods, e.g. classifiers, working on different input data, e.g. sensor fusion}
- 30/26 . . Techniques for post-processing, e.g. correcting the recognition result
- 30/262 . . . using context analysis, e.g. lexical, syntactic or semantic context
- 30/268 . . . . {Lexical context}
- 30/274 . . . . {Syntactic or semantic context, e.g. balancing}
- 30/28 . . specially adapted to the type of the alphabet, e.g. Latin alphabet
- 30/287 . . . {of Kanji, Hiragana or Katakana characters}
- 30/293 . . . {of characters other than Kanji, Hiragana or Katakana}
- 30/30 . . based on the type of data
- 30/302 . . . Images containing characters for discriminating human versus automated computer access
- 30/304 . . . Music notations
- 30/32 . . Digital ink
- 30/333 . . . {Preprocessing; Feature extraction}
- 30/347 . . . . {Sampling; Contour coding; Stroke extraction}
- 30/36 . . . {Matching; Classification}
- 30/373 . . . . {using a special pattern or subpattern alphabet}
- 30/387 . . . . {using human interaction, e.g. selection of the best displayed recognition candidate}
- 30/40 . . Document-oriented image-based pattern recognition
- 30/41 . . Analysis of document content ([recognition of printed characters based on code marks G06V 30/224](#))
- 30/412 . . . Layout analysis of documents structured with printed lines or input boxes, e.g. business forms or tables
- 30/413 . . . Classification of content, e.g. text, photographs or tables

30/414	. . . Extracting the geometrical structure, e.g. layout tree; Block segmentation, e.g. bounding boxes for graphics or text	40/161	. . . {Detection; Localisation; Normalisation}
30/416	. . . Extracting the logical structure, e.g. chapters, sections or page numbers; Identifying elements of the document, e.g. authors	40/162	. . . . {using pixel segmentation or colour matching}
30/418	. . . Document matching, e.g. of document images	40/164	. . . . {using holistic features}
30/42	. . based on the type of document	40/165	. . . . {using facial parts and geometric relationships}
30/422	. . . Technical drawings; Geographical maps	40/166	. . . . {using acquisition arrangements}
30/424	. . . Postal images, e.g. labels or addresses on parcels or postal envelopes	40/167	. . . . {using comparisons between temporally consecutive images}
30/43	. . {Editing text-bitmaps, e.g. alignment, spacing; Semantic analysis of bitmaps of text without OCR}	40/168	. . . {Feature extraction; Face representation}
<b>40/00</b>	<b>Recognition of biometric, human-related or animal-related patterns in image or video data</b>	40/169	. . . . {Holistic features and representations, i.e. based on the facial image taken as a whole}
40/10	. Human or animal bodies, e.g. vehicle occupants or pedestrians; Body parts, e.g. hands	40/171	. . . . {Local features and components; Facial parts (eye characteristics G06V 40/18); Occluding parts, e.g. glasses; Geometrical relationships}
40/103	. . {Static body considered as a whole, e.g. static pedestrian or occupant recognition}	40/172	. . . {Classification, e.g. identification}
40/107	. . {Static hand or arm}	40/173	. . . . {face re-identification, e.g. recognising unknown faces across different face tracks}
40/11	. . . {Hand-related biometrics; Hand pose recognition}	40/174	. . . {Facial expression recognition}
40/113	. . . {Recognition of static hand signs}	40/175	. . . . {Static expression}
40/117	. . . {Biometrics derived from hands}	40/176	. . . . {Dynamic expression}
40/12	. . Fingerprints or palmprints	40/178	. . . {estimating age from face image; using age information for improving recognition}
40/13	. . . Sensors therefor	40/179	. . . {metadata assisted face recognition}
40/1306	. . . . {non-optical, e.g. ultrasonic or capacitive sensing}	40/18	. . Eye characteristics, e.g. of the iris
40/1312	. . . . {direct reading, e.g. contactless acquisition}	40/19	. . . Sensors therefor
40/1318	. . . . {using electro-optical elements or layers, e.g. electroluminescent sensing}	40/193	. . . {Preprocessing; Feature extraction}
40/1324	. . . . {by using geometrical optics, e.g. using prisms (G06V 40/1312 takes precedence)}	40/197	. . . {Matching; Classification}
40/1329	. . . . {Protecting the fingerprint sensor against damage caused by the finger}	40/20	. Movements or behaviour, e.g. gesture recognition (recognition of facial expressions G06V 40/16)
40/1335	. . . {Combining adjacent partial images (e.g. slices) to create a composite input or reference pattern; Tracking a sweeping finger movement}	40/23	. . {Recognition of whole body movements, e.g. for sport training}
40/1341	. . . {Sensing with light passing through the finger}	40/25	. . . {Recognition of walking or running movements, e.g. gait recognition}
40/1347	. . . {Preprocessing; Feature extraction}	40/28	. . {Recognition of hand or arm movements, e.g. recognition of deaf sign language (static hand signs G06V 40/113)}
40/1353	. . . . {Extracting features related to minutiae or pores}	40/30	. Writer recognition; Reading and verifying signatures
40/1359	. . . . {Extracting features related to ridge properties; Determining the fingerprint type, e.g. whorl or loop}	40/33	. . {based only on signature image, e.g. static signature recognition}
40/1365	. . . {Matching; Classification}	40/37	. . {based only on signature signals such as velocity or pressure, e.g. dynamic signature recognition}
40/1371	. . . . {Matching features related to minutiae or pores}	40/376	. . . {Acquisition}
40/1376	. . . . {Matching features related to ridge properties or fingerprint texture}	40/382	. . . {Preprocessing; Feature extraction}
40/1382	. . . {Detecting the live character of the finger, i.e. distinguishing from a fake or cadaver finger}	40/388	. . . . {Sampling; Contour coding; Stroke extraction}
40/1388	. . . . {using image processing}	40/394	. . . {Matching; Classification}
40/1394	. . . . {using acquisition arrangements}	40/40	. Spoof detection, e.g. liveness detection
40/14	. . Vascular patterns	40/45	. . {Detection of the body part being alive}
40/145	. . . Sensors therefor	40/50	. Maintenance of biometric data or enrolment thereof
40/15	. . {Biometric patterns based on physiological signals, e.g. heartbeat, blood flow}	40/53	. . {Measures to keep reference information secret, e.g. cancellable biometrics}
40/155	. . {use of biometric patterns for forensic purposes}	40/55	. . {Performing matching on a personal external card, e.g. to avoid submitting reference information}
40/16	. . Human faces, e.g. facial parts, sketches or expressions	40/58	. . {Solutions for unknown imposter distribution}
		40/60	. Static or dynamic means for assisting the user to position a body part for biometric acquisition
		40/63	. . {by static guides}
		40/67	. . {by interactive indications to the user}

- 40/70 . Multimodal biometrics, e.g. combining information from different biometric modalities

**2201/00 Indexing scheme relating to image or video recognition or understanding**

- 2201/01 . Solutions for problems related to non-uniform document background
- 2201/02 . Recognising information on displays, dials, clocks
- 2201/03 . Recognition of patterns in medical or anatomical images
  - 2201/031 . . of internal organs
  - 2201/032 . . of protuberances, polyps nodules, etc.
  - 2201/033 . . of skeletal patterns
  - 2201/034 . . of medical instruments
- 2201/04 . Recognition of patterns in DNA microarrays
- 2201/05 . Recognition of patterns representing particular kinds of hidden objects, e.g. weapons, explosives, drugs
- 2201/06 . Recognition of objects for industrial automation
- 2201/07 . Target detection
- 2201/08 . Detecting or categorising vehicles
- 2201/09 . Recognition of logos
- 2201/10 . Recognition assisted with metadata
- 2201/11 . Technique with transformation invariance effect
- 2201/12 . Acquisition of 3D measurements of objects
  - 2201/121 . . using special illumination
  - 2201/122 . . Computational image acquisition in electron microscopy
- 2201/13 . Type of disclosure document
  - 2201/131 . . Book
  - 2201/132 . . Book chapter
  - 2201/133 . . Survey article
  - 2201/134 . . Technical report or standard
  - 2201/135 . . Master, PhD or other thesis
  - 2201/136 . . Tutorial