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Pattern Recognition Tools and Techniques– A Study

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Abstract

Pattern recognition is used everywhere in the fields like hospitals, universities, medical use, banks, private sector etc. Its benefits are according to their use as in hospitals, for conducting ECG, Xray, MRI for body recognition, in banks for security and confidentiality. We can also get knowledge of diagnosis image recognition in the field of agriculture, for identification of plant diseases and other such purposes. Speech, finger print, face recognition, hand written recognition is being used for identification, security and availability of the persons using bio-metrics machines. There are so may criteria where pattern recognition could further be used.

Keywords: Pattern recognition, Face Recognition, Speech Recognition, Neural networks, Bio-metrics, Machine Learning, Deep Learning.

Pattern recognition is known by everyone, as it has a long history. Nowadays it can be found in everywhere in the world. Its basic component is prepossessing feature extraction and classification. Pattern recognition is available in every field like medical, security purpose, using face or finger recognition, speech recognition, iris discrimination, optical character recognition [9]. Each class has been recognized through prototype pattern vector. The physical events and consideration of probability is a significant design for the identification because of its no way in line and finally leads to the generation of pattern class. A pattern is a procedure of descriptors or features. A human face, any image, speech signal, fingerprint, a handwritten are part of pattern recognition. According to these features a possible class has been assigned, the object. Sorting can be easily through artificial neural which gives better results [13].

Speech recognition: Speech recognition also includes pattern recognition. It is also called automatic speech recognition. It is the basic activity of humans used in this activity in their daily life. It is a very challenging and interesting problem itself. Speech recognition has created interest in this discipline and created technological impact on society. Feature extraction, speech class, speech classifier database and performance evaluation are many issues fall in speech recognition. By this possibility for computer voice command and understand language [1]. An Interactive Voice Response with pattern recognition using neural networks is a secure approach. The security level can be enhanced for using voice pattern recognition. Intended speaker's speech data could be analyzed for training the neural network [15].

Bio-metric recognition

Biometric recognition has included computer system security, banking security, health and social services. In this review unimodal and multimodal, and their advantages and disadvantages has been presented. It is consist of basic components sensor module, feature extraction, matching module, decision-making modul [4]. In last era, the interest of fingerprint based on biometric has been increased extensively. Only limited standards have been existing for matching for development in fingerprint verification. Designer frequently accomplish core test over self-collected records [11].

Statistical Image recognition

The aim of identification is archived by the image processing and recognition opted by actual image transformation. Image recognition is very important research topic in image technology. It is vital branch of computer vision and related to social life. A huge information operation, requiring high processing speed and recognition precision, real-time and fault-tolerance of the neural network in accord with the needs of image recognition are included in image recognition. In this paper review study, method of image recognition, purpose their limitations of traditional methods and image processing algorithm for the image and how it could be enhanced further [10].

Statistical Pattern Recognition

Pattern recognition main aim is to supervise or unsupervised classification. Statically approach is one of the most important approach of pattern recognition which is frequently used in studies. Sensing environment, cluster analysis, performance evaluation, are some issues which needs careful attention [7].

Bio-informatics

Recently bio-informatics created awareness in the field of emerging computer science and engineering communities along with the significant huge data of public online database and the generated data from the human. The project on genome and its analysis with computer are highly co related. At the time of array analysis, the scientist focuses on the image analysis for the gene expression and its data extraction with pre-processing, clustering and pattern reorganization at the time of the expression of gene [8].

Handwritten recognition

The most active research area where pattern recognition is used is handwritten recognition. It is useful for blind, bank cheque, and writing documents. The character recognition system is the most classical application of the Artificial Neural Network. This is recognized as the basic system for different types of application in various field [3]. Due to the exertion of offline handwriting recognition has been enlarged in terms of popularity by researchers. Cursive nature of handwriting has created complication i.e. different size and shape of each character and large vocabularies. Many methods had been planned to solve these problems. For further offline handwriting recognition by taking multiple handwritings and data sources into account using more advantage of pertained convolution filters [16].

Image recognition

Image quality can be easy to calculate and applicable to various image processing applications by new universal objective image quality index. The basic idea is a capable initial point for the future development of more successful image and video quality assessment methods [19]. The past years yielded growing awareness in transferring expensive computations to Graphics Processing Units (GPUs). GPU-based convolutional neural networks have been used for face detection [14]. The work of face recognition can be reduced in term of manual work, like including some automated work for pre-processing. The use of

multiple image data for a single person can also be reduced by using one picture per person [17]. Neural Network and Genetic algorithm is used for more than 200 diverse application areas. They successfully deal with variety of images, different difficulty level, geographical region, ans so on[13]. In the past 10 years an extremely active research area was carried out of this image repossession but first article was published in 1980s. There are a huge use of different image related information in medical field. The area needs more and more application of tools related to pattern recognition.[12]. The neural networks and the genetic algorithms are proved to be very useful tool in magnetic resonance (MR) to segment brain images. The characteristics from the images can be defined through a set of nine attributes. Here in medical images segmentation, a good algorithm made to select the most promising attribute among a set of characteristics [9]. Deep learning is fast growing in this research, state-of art performance in wide area such as image recognition, speech recognition, and object recognition and machine translator [20]. Due to several style of writing present huge differences so, feature extraction is a tough task. So that used new box method planned and tested on a standard database [6]. Application of face recognition is getting popular day by day because of variety of important application area like human computer interaction, access control, surveillance, and so on [5].

Conclusion

In this review pattern recognition is the spirit of all scientific investigation. Pattern recognition is becoming broad area for the study. In this paper we elucidate pattern recognition in the round, include the definition of pattern recognition, the methods of pattern recognition, and the application of pattern recognition. Moreover, it is used in related field like Machine learning, Adaptive signal processing, Artificial Neural networks, Fuzzy and genetic systems Computational Neuroscience etc. So, it could be summarized that pattern recognition is highly useful application and give the tremendous scope for future use and research and this application can be used to enhance the recognition system in various fields.

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