

Introduction to Human Behavior Prediction

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Abstract— Human personality recognition is becoming most important in the modern world. It helps human simplify their jobs and solve more complex tasks. Handwriting analysis is also known as Graphology. An approach to modeling human behavior is to examine the human as a device with a large number of internal mental states. The research makes on the observation that although human behaviors such as speech, handwriting, hand gestures or identity authentication using biometrics applies pattern .This is a challenging task because we can judge about behaviour of a human being by analyzing through their handwriting with various aspects such as Sign-language recognition, Temporal patterns ,Facial, gestural and voice-based .

Index Terms: LVQ, HMM, MCVT ,CCA.

1. INTRODUCTION

Human personality recognition is becoming most important in the modern world. It helps human simplify their jobs and solve more complex tasks. Handwriting analysis which is also known as Graphology is a scientific method for evaluating, identifying and understanding personality through the hit and patterns revealed by handwriting of human. In Graphology, handwriting is observed by structural graphic elements in order to derive information about the writer's personality and various aspects. With the aid of graphology theory, graphologists identify the traits, attitudes, qualities, sentiments or body language that seems indicated in the handwriting; they further seek insight into how these aspects of selfhood may bind to constitute the dynamic organization that we remember as the personality of that writer [1]. Here are two approaches in graphology i.e. graphical observation of the structure type of writing and analysis of the type of symbols or letter. Signature prediction includes first approach. This research integrates both of the above two approaches. Type of writing in the form of handwritten signatures and letters stroked can describe the personality of the author. Some types the each letter is written [2]. Meanwhile the use of hand

the appearance of dots, streaks, shapes or shell, and bottom line [3,4]. Domains where human behavior understanding is a very crucial need (e.g., affective Computing, human computer interaction and social signal processing) depends on advanced pattern recognition techniques to automatically interpret complex behavioral patterns arises when humans interact with machines or with others. The topics of the Human Behavior Understanding (HBU) Workshop reflect some of the domain:

- a. Social behavior analysis & modeling
- b. Temporal patterns
- c. Facial, gestural and voice-based affect recognition
- d. Sign-language recognition
- e. Human motion analysis
- f. Human-computer interaction
- g. Benchmarking studies on novel database
- h. Behavioral biometrics

2. ARTIFICIAL NEURAL NETWORK

Artificial neural networks (ANNs) are a family of statistical learning algorithms i.e. inspired by biological neural networks (the central nervous systems). They include nervous system of animals, especially the brain and are most used to estimate or approximate functions that can depend on a variety of number of inputs that are generally unknown .Artificial neural networks are generally presented as systems of hooked "neurons" which can calculate values from inputs. There are various application of artificial neural network:

- a. Pattern recognition
- b. Sequence recognition
- c. Can be trained to solve various tasks

3. HANDWRITING ANALYSIS

An approach to modeling human behavior is to examine the human as a device with a large number of internal mental states. The research makes on the observation that although human behaviors such as speech, handwriting, hand gestures and even American Sign Language. Personal reorganizations or identity authentication using biometrics applies pattern identification techniques to measure physiological or behavioral characteristics. There are two types of biometric systems that help to include the link between a person and his/her identity. Identity verification (or authentication) occurs when a user declare who he is and the system accepts (or reject) his claim. Identity identification (sometimes called search) occurs when the system makes a subject identity (or fails to do it) without any prior claim. Human personality recognition is becoming more and more value in the modern world. Identifying, evaluating and understanding personality is finish by a scientific method known as Handwriting analysis or Graphology, through the strokes and patterns revealed by handwriting. Type of writing in the shape of signatures and letters stroked can describe the personality of the author. The use of signatures is mostly used to identify certain personality as with appearance of dots, streaks, shapes or shell, and bottom line. Precision of handwriting analysis depends on how skilled the analyst is. Human intervention in handwriting analysis has been constructive; it is costly and prone to fatigue. Development in image processing and pattern recognition used to analyzing of handwriting based on graphology can be done automatically. Handwriting is included in the image, so that identification can be performed through the stages of conversion of images into numerical vector, image processing for quality improvement, imitate by pattern recognition and feature extraction. Fact that biometrics, as an automatic means of human. Most of research handwriting analysis automatically with the aid of a computer without the human intervention to calculate personality traits have been conducted. Among all Some of them, using guideline, the pen pressure and the height of T - bar on the stem of the letter t are considered for predicting the personality of the writer identification, constitutes a relatively novel field of research most efforts undertaken by

the different parties involved in the development of this technology (industry, researchers, evaluators, etc.) have been mainly (but not exclusively) point to the improvement of its performance (i.e. finding ways to obtain lower error rates). Different studies have manifest that performance of biometric systems is heavily affected by the quality of the input signals, and that even the finest systems worldwide struggle in the presence of noisy samples. the term quality is examine from the utility point of view in order to investigate the cause that makes some signatures more suitable for automatic recognition than others.

4. PERSONALITY RECOGNITION BASED ON DIGIT OF HANDWRITING AND SIGNATURE ANALYSIS

Handwriting stroke which return back the written trace of each individual's behavior and style. By examining all elements of handwriting and translate them separately, first, generate a sketch of the writer's character, emotional disposition and social way using standard of graphology. According to image, the analysis of graphology is divided into two level that graphics features and the segmentation digit each character. Using combination of graphical approach depends on signature and digits of character of an application form using multi-structure algorithms and artificial neural networks (ANN). The image divide into two areas: the signature based on nine features and application form of letters digit area. Each area had preprocessing performed to increased the recognition exactness. In an image, Signature area is classified using ANN based on five features which result an correctness of 56-78%. While four feature of the signature that detection using multi structure algorithm result 87- 100% correctness. In meantime, pattern recognition of application form digit area using Learning Vector Quantization gave 43% exactness. It used 100 sets of data testing after training with 10-25 data. The system has been executed with the software so that it can be used for classification of personality from handwriting scanned automatically.

5. LITERATURE REVIEW

Span of Research Work

A number of research papers and journals presented during the above interval 1998-2014 have been considered. The various facet of the problem were examined.

Esmeralda C Djamalet al.(2013) proposed that as image, the analysis of graphology is divided into two approaches that graphics features and segmentation digits each character. In this research, using combination of graphical approach based on signature and digit of character of application using multi-structure algorithms and artificial neural networks (ANN). The image split into two areas: (1) signature base on nine features, (2) application form of letters digit area. Each area had preprocessing performed to improve the recognition accuracy [1]

Alex Pentland et al.(1998) propose that most of human behaviors can be accurately described as a set of dynamic models (e.g., Kalman filters) sequenced together by a Markov chain. After than use these dynamic Markov models to recognize human behaviors from sensory data and to predict human behaviors over some seconds time. To test the power of this modeling approach, report an experiment, we were able to achieve 95% accuracy at predicting an automobile drivers' subsequent actions from their initial preparatory movements [2]

Javier Galbally et al.(2011) study two main issues are shown from a kinematic perspective of humanly-produced movements. On the one hand, what makes when some signatures perform better than others in automatic signature verification systems, and on the other hand if that information might be used as a quality measure in order to predict the expected performance of a given sample. Experiments were carried out on the MCYT database and shown the high potential of certain kinematic features for signature quality assessment [3]

Swarna Bajaj et al.(2013) proposed a technology based on human behavior to type their password. Analysed the human behavior with their typing pattern where keystroke dynamics are hardware independent, no extra hardware is used. Only software based technology keyboard is required for password protection. The result provides emphasis with pleasure security that growing in demand in web-based application based on internet [4]

S. M. E. Hossain et al.(2011) Biometric authentication of a person is most challenging and complex problem. A significant research effort has gone into this area and a many research works were published, but still there is an immense shortage of accurate and robust methods and techniques. In this paper survey of several important research works published in this area and they found new technology to identify a person using multimodal physiological and behavioural biometrics. For our first stage of experimental evaluation, they used side face and gait for their experiments and we achieved around 100% recognition rate [5]

Albert Ali Salah et al. (2010) Recent advanced in pattern recognition will allowed computer scientists and psychologists to jointly address automatic analyses of human behavior via computers. The Workshop on the Human Behavior Understanding at the International Conference on Pattern Recognition explore many different aspects and then open questions in this field, and demonstrates the multi disciplinary nature of research area. In this summary, we give an overview of the Workshop and discuss the main research challenges [6]

VenuGovindaraju et al.(2008) The author examine current research in the field and analyze the types of features used to describe different types of behaviour. After than comparing accuracy rates for verification of users using different behavioural biometric approaches, researcher addresses privacy issues which arise or might arise in the future with the use of behavioural biometrics [7]

Sandeep Dhang et al.(2014) states that handwriting reveals the true personality including emotional outlay, honesty, fears and defenses and etc. Handwriting stroke reflects the written trace of every individual's rhythm and Style. The image split into two areas: the signature based on three features and applications form of letters digit area. In this research performance evaluation is complete by calculating mean square error using with Back Propagation Neural Network (BPNN). Human behaviour is analyzed on the basis of signature by using neural network [8]

6. SURVEY CONCLUSION

SR. NO	AUTHOR'S NAME AND YEAR	TECHNIQUES	CONCLUSION
1.	Esmeralda.C.Djamal, 2013	Learning Vector Quantization (LVQ)	This system has been implemented in software to provide convenience to the public in identifying personality easily and quickly. It can be used in the selection of the employee or job from his handwriting. For future, analysis can be improved by more features and improve pre processing.
2.	Alex Pentland,1998	Expectation-maximization methods developed for use with hidden Markov models (HMM),the failure of standard statistical techniques	Human behavior will discover to other dynamic human-machine systems. This would allow us to recognize automatically people's intended actions, and thus build control systems that dynamically adapt to suit the human's purpose better.
3.	Javier Galbally,2011	Sigma-Lognormal model, MCYT database, feature selection technique	Sigma-Lognormal parameters has been proved a very high potential forthe <i>a priori</i> estimation of signature performance and has been proposed as possible quality indicators of its <i>utility</i>
4.	Swarna Bajaj,2013	short fixed text, Timing vector technique, statistical measure of proximity	The implementations of keystroke dynamics on desktop is cost effective and compatible as integration of external hardware are not required. The conclusion of this thesis is based on comparing the data stored of a user with the login input for authentication.
5.	S. M. E. Hossain,2011	LDA FACE - GAIT FUSION WITH BAYESIAN CLASSIFIERS AND 1-NEAREST NEIGHBOUR CLASSIFIER, background subtraction techniques, canonical correlation analysis (CCA) technique	Current biometric identification technologies and suggested the potential of face and gait biometric traits for our next generation biometric technologies.
6.	AlbertAli Salah,2010	advanced pattern recognition techniques	Analyze patterns emerging from interactions between humans, as well as between humans and computers or smart systems, with the goal of designing more responsible and natural interfaces and applications. If an informative feature extraction step is combined with a powerful pattern classifier and a training set with sufficiently rich variation, it may be possible to learn appropriate descriptors for most challenging concepts.
7.	VenuGovindaraju,2008	Data mining techniques,authorship identification techniques	Behavioural biometrics are particularly well suited for verification of users which interact with computers, cell phones, smart cars, or points of sale terminals. As the number of electronic appliances are used in homes and offices increases, so does the potential for utilisation of this paper and promising technology.
8.	Sandeep Dhang,2014	analytical pattern recognition techniques	It provides training time for a neural network. Prediction of human behaviour using Artificial Neural networks. Predicting is a process of conceiving something as it might happen in future, based fundamentally knowledge gathered from past experiences and from present scenario.

7. CONCLUSION

Learning Vector Quantization system has been implemented in software to provide convenience to the public in identifying personality easily and quickly. It can be used in the selection of the employee or job from his handwriting. For future, analysis can be improved by more features and improve pre processing. In Hidden Markov models, Human behavior will discover to other dynamic human-machine systems. This would allow us to recognize automatically people's intended actions, and thus build control systems that dynamically adapt to suit the human's purpose better. In Data mining techniques, Behavioral biometrics are particularly well suited for verification of users which interact with computers, cell phones, smart cars, or points of sale terminals. As the number of electronic appliances are used in homes and offices increases, so does the potential for utilization of this paper and promising technology.

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