International Journal of Scientific and Innovative Research 2013; 1(1):18-22

FACE RECOGNITION USING NEURAL NETWORK

***SUMAN SHARMA**
Department of Computer Science, GNIT Institute Greater Noida, U.P., India
- **Research Scholar, Sai Nath University, Ranchi, India**

ABSTRACT

Although the distinction between optimum decision and pre-processing or feature extraction is not essential, the concept of functional breakdown provides a clear picture for the understanding of the pattern recognition problem. Correct recognition will depend on the amount of discriminating information contained in the measurements and the effective utilization of this information. In some applications, contextual information is indispensable in achieving accurate recognition. For instance, in the recognition of cursive handwritten characters and the classification of fingerprints, contextual information is extremely desirable. When we wish to design a pattern recognition system which is resistant to distortions, flexible under large pattern deviations, and capable of self-adjustment, we are confronted with the adaptation problem. There are many interesting problems that remain in the area of face recognition.

The information age is quickly revolutionizing the way transactions are completed. Everyday actions are increasingly being handled electronically, instead of with pencil and paper or face to face. This growth in electronic transactions has resulted in a greater demand for fast and accurate user identification and authentication. Access codes for buildings, banks accounts and computer systems often use PIN's for identification and security clearances. Using the proper PIN gains access, but the user of the PIN is not verified. When credit and ATM cards are lost or stolen, an unauthorized user can often come up with the correct personal codes. Despite warning, many people continue to choose easily guessed PIN's. Using the proper PIN gains access, but the user of the PIN is not verified.

When credit and ATM cards are lost or stolen, an unauthorized user can often come up with the correct personal codes. Despite warning, many people continue to choose easily guessed PIN's and passwords: birthdays, phone numbers and social security numbers. Recent cases of identity theft have heightened the need for methods to prove that someone is truly who he/she claims to be. Face recognition technology may solve this problem since a face is undeniably connected to its owner expect in the case of identical twins. It is non transferable. The system can then compare scans to records stored in a central or local database or even on a smart card. The face is our

playing a major role in conveying identity and emotion. Although, the ability to infer intelligence or character from facial appearance is suspect, the human ability to recognize faces is remarkable. We can recognize thousands of faces learned throughout our lifetime and identify familiar faces at a glance even after years of separation. This skill is quite robust, despite large changes in the visual stimulus due to viewing conditions, expression, aging, and distractions such as glasses, beards or changes in hair style. Face recognition has become an important issue in many applications such as security systems, credit card verification and criminal identification.

For example, the ability to model a particular face and distinguish it from a large number of stored face models would make it possible to vastly improve criminal identification. Even the ability to merely detect faces, as opposed to recognizing them, can be important. Detecting faces in photographs for automating colour film development can be very useful, since the effect of many enhancement and noise reduction techniques depends on the image content.

Although, it is clear that people are good at face recognition, it is not at all obvious how faces are encoded or decoded by the human brain. Human face recognition has been studied for more than twenty years.

Unfortunately, developing a computational model of face recognition is quite difficult, because faces are complex, multi-dimensional visual stimuli.

Human face identification is to extract the relevant features from facial images. Research in the field primarily intends to generate sufficiently reasonable familiarities of human faces so that another human can correctly identify the face. The question naturally arises as to how well facial features can be quantized. If such a quantization is possible then a computer should be capable of recognizing a face given a set of features. Investigations by numerous researchers over the past several years have indicated that certain facial characteristics are used by human beings to identify faces.

METHODOLOGY OF FACE RECOGNITION

The first method is based on the information theory concepts, in other words, on the principal component analysis methods. In this approach, the most relevant information that best describes a face is derived from the entire face image. Based on the Karhunen-Loeve expansion in pattern recognition, M. Kirby and L. Sirovich have shown that any particular face could be economically represented in terms of a best coordinate system that they termed "eigenfaces" These are the eigenfunctions of the averaged covariance of the ensemble of faces. Later, M. Turk and A. Pentland have proposed a face recognition method based on the eigenfaces approach.

The second method is based on extracting feature vectors from the basic parts of a face such as eyes, nose, mouth, and chin. In this method, with the help of deformable templates and extensive mathematics, key information from the basic parts of a face is gathered and then converted into a feature vector L. Yullie and S.Cohen played a great role in adapting deformable

of the thesis we will gather the detailed information about Face Detection & Recognition System, how it works, and is it compatible with our thesis and operating system we are using. Complete analysis phase can take 2 months. As our work is completely depended on research Papers and it is not easy to read and understand them.

TESTING:

Testing will be done by the developer side & client side at the end of the final year thesis, as in our case we are our own clients so we will do it at our own.

- Look at the thesis from a micro level
- Include experiments
- Look at system results
- Test each part of the system
- Make sure that design and implementation works
- Identify errors in codes

DEPLOYMENT:

After Completion of coding and testing of the product, we will deploy the system on our client's Place. There are many tools and techniques that can help in our effort to build useful, economical, and maintainable systems. To complete ambitious and complex thesis, we rely on a wide variety of techniques and Tools that must work together. C# directly supports a variety of programming styles. In this, C# deliberately differs from languages designed to support a single way of writing programs.

- C# language is intended to be a simple, modern, general-purpose, object-oriented programming language.
- The language, and implementations thereof, should provide support for software engineering principles such as strong type checking, array bounds checking, detection of attempts to use uninitialized variables, and automatic garbage collection. Software robustness, durability, and programmer productivity are important.
- The language is intended for use in developing software components suitable for deployment in distributed environments.
- Source code portability is very important, as is programmer portability, especially for those programmers already familiar with C and C++.
- Support for internationalization is very important.
- C# is intended to be suitable for writing applications for both hosted and embedded systems, ranging from the very large that use sophisticated operating systems, down to the very small having dedicated functions.

FEATURES:

Object-oriented programming:

The possibility to orientate programming to objects allows the programmer to design applications from a point of view more like a communication between objects rather than on a structured sequence of code. In addition it allows a greater reusability of code in a more logical and productive way.

TRAINING AND LEARNING

The decision functions can be generated in a variety of ways. When complete a priori knowledge about the patterns to be recognized is available, the decision function may be determined with precision on the basis of this information. When only qualitative knowledge about the patterns is available, reasonable guesses of the forms of the decision functions can be made. In this case the decision boundaries may be far from correct, and it is necessary to design the machine to achieve satisfactory performance through a sequence of Adjustments.

The more general situation is that there exists little, if any, a priori knowledge about the patterns to be recognized. Under these circumstances pattern recognizing machines are best designed using a training or learning procedure. Arbitrary decision functions are initially assumed, and through a sequence of iterative training steps these decision functions are made to approach optimum or satisfactory forms.

It is important to keep in mind that learning or training takes place only during the design (or updating) phase of a pattern recognition system. Once acceptable results have been obtained with the training set of patterns, the system is applied to the task of actually performing recognition on samples drawn from the environment in which it is expected to operate. The quality of the recognition performance will be largely determined by how closely the training patterns resemble the actual data with which the system will be confronted during normal operation.

OUTLINE OF A PATTERN RECOGNITION SYSTEM

In the Figure, functional block diagram of an adaptive pattern recognition system is shown. One problem is image pre-processing prior to the application of the Eigen face method. It may be possible to gain better accuracy in classification if one segments the spectrum of people into different spaces. For example, if one was able to determine if an image was of a man or a woman, one could use this categorization to send an image to one of two classifiers, each specifically trained with that type of individual in mind. This would mean that there would be a set of Eigen faces specifically for males and one specifically for females (face spaces with gender, so to speak). Work in this area has been done by Lizama, Waldoestl and Nickolay [4], however it would be interesting to extend it to use Eigen faces to act as the gender classifier as well. A general face-space would be created in addition to the male and female face-spaces, with the sole purpose of being used to classify an image as male or female. Another area of future work is improving our neural network classifier. As mentioned previously, it is possible to construct the network to take its input directly from the image data rather from the vector that results from an image projection into face-space. Perhaps learning the face projection function could increase the accuracy of the neural network classifier. Additionally, more experiments are needed to see if there are other ways to tweak the network configuration to produce better results.

REFERENCE

[1] I. Craw, D. Tock, and A. Bennett, "Finding face features," Proc.of 2 nd European Conf. Computer Vision. pp. 92-96, 1992.

[2] A. Lanitis, C. J. Taylor, and T. F. Cootes, "An automatic face identification system using flexible appearance models," Image and Vision Computing, vol.13, no.5, pp.393-401, 1995.

[3] T. K. Leung, M. C. Burl, and P. Perona, "Finding faces in cluttered scenes using random labeled graph matching," Proc. 5 th IEEE int'l Conf. Computer Vision, pp. 637-644, 1995.

[4] B. Moghaddam and A. Pentland, "Probabilistic visual learning for object recognition," IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 19, no.7. pp. 696-710, July, 1997.

[5] M. Turk and A. Pentland, "Eigenfaces for recognition," J. of Cognitive Neuroscience, vol.3, no. 1, pp. 71-86, 1991.

[6] M. Kirby and L. Sirovich, "Application of the Karhunen-Loeve procedure for the characterization of human faces," IEEE Trans. Pattern Analysis and Machine Int

[7] I. T. Jolliffe, Principal component analysis, New York: Springer-Verlag, 1986.

[8] T, Agui, Y. Kokubo, H. Nagashi, and T. Nagao, "Extraction of face recognition from monochromatic photographs using neural networks," Proc. 2 nd Int'l Conf. Automation, Robotics, and Computer Vision, vol.1, pp. 18.81-18.8.5, 1992.