

Facial Expression and Gesture Identification using Artificial Neural Network

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Abstract: Similar technologies can be used for knowledge exchange for two individuals. These could be words or motions. Movement recognition involves the detection and acknowledgment of movements from all forms of body's movement, but only from the face and the hand. This is a way of conveying knowledge through movements made by users. This provides important dimensions for behavioural and human-computer interaction. user interface. Many methods are usable, including MATLAB, Artificial Neural Networking, etc. There are several solutions. This paper offers an in-depth examination of how neural networks enable movements to be understood more naturally. This involves three phases: image processing, retrieval and identification of features. In the first step, the picture is taken with an average frame rate with a webcam, a digital camera. Attributes are extracted with the input picture during the second phase. The features can be angle between fingertips, open, no-open, closed or semi-closed fingers, and finger recognition. The artificial neural network structure is primarily used for image recognition.

Keywords— Gesture Identification, ANN, MATLAB, Image Acquisition, Feature Extraction

I. INTRODUCTION

Communication is nowadays characterized as the communication by voice, images, signals or actions of thoughts and messages. Yet people with disabilities (i.e., sour-stupid persons) have trouble communicating. And dumb and stupid people use their hands to bark out. We make various motions in order to talk to others. The activities include the creation of alphabets in English. The sign language is called so. The movements can not be easy for the person on the contrary as they talk via the machine. So these expressions can be translated into signals and spoken phrases to be easily understood. Gesture Understanding means that the detection and understanding of movements arises from any kind of body motion, but usually comes from the face or hand [1][7][11]. The recognition of gesture expression is one of the fields studied for the surrounding population and is highly important.

Management identification is the mechanism through which user movements are used to transmit information or to monitor the system. Visual movements are a strong communication device in everyday life[5][12]. As in sign languages, a series of physical signals that make up a whole language. You will express a variety of facts and emotions economically. This seminar indicates modestly that gesture-based feedback is so valuable for the transmission of information or device management through defining specific human movements [2][9][10].

Numerous methods have been developed for identification of hand gesticulate actions, from Hidden Markov mathematical chains to software or soft computerized approaches [3][4]. The Secret Markov Input Outsourcing models were suggested by Sebastiean Marcel. In order to extract hand regions for various lighting environments for manual identification and many attempted applications of colour or gesture information, a new complexion model had been proposed by the author Jianjie Zhang. A hand-gesture-recognition-system based on the Type-Analysis of Static Being was developed by Attila Licnsar. Papapmarkos states that color segmentation allows for the identification of the area of the eye. The system of Hand Manual Recognition utilizing Hidden Markov models was suggested by Byung-Woo Min [4][8].

Huang et al. use the 3D neural network approach for creating a recognition system for Taiwanese Sign Language (TSL) with 15 separate movements [4]. In comparison, this paper presents the understanding of a

manual movement by way of the Neural Network, which takes movements from a webcam, creates a text and talks.



Figure 1: Different facial expressions

II. TYPES OF GESTURE IDENTIFICATION

Gesture Identification is the process by which gestures are perceived to decide this intent. The particular human movements can be defined by using gesture recognition technologies to relay different information or to monitor equipment with different applications. It is the representation of a human movement by a digital system. Leadership recognition, facial-recognition, voice-recognition, eye-tracking, and lip-expression recognition are components of a general user interface model. Gestures information can be static, as the user assumes a particular position or configuration or dynamic like press, stroke, poststroke. The following styles can be widely recognized by the gesture:

Identification of head and face: Identification of facial movements provides an important touch free interaction for consumers and their devices. These are basic means for people to express their feelings. They are naturally significant.

The goal of the facial gesture-identification is to make the machines understand the speech and emotions of human effectively, without missing of various physical challenges.

- ❖ knots or tears,
- ❖ eyebrow elevation,
- ❖ eyes,
- ❖ emotions such as joy, sadness, surprise, rage, terror, etc...

A few examples are. Facial-expression involves getting specific information from facial symbols, such as lips, nose and eyes from any given image. Like the identification of hand- gesture, this technique addresses a set of special challenges caused by physical variations in human faces.

Body Motion Recognition: Body motion means full body movement that understands body movements and human activity. The recognition of body behaviour and human activity. For eg, a)tracking two environmental activities b) understanding human recovery and sport training gaits.

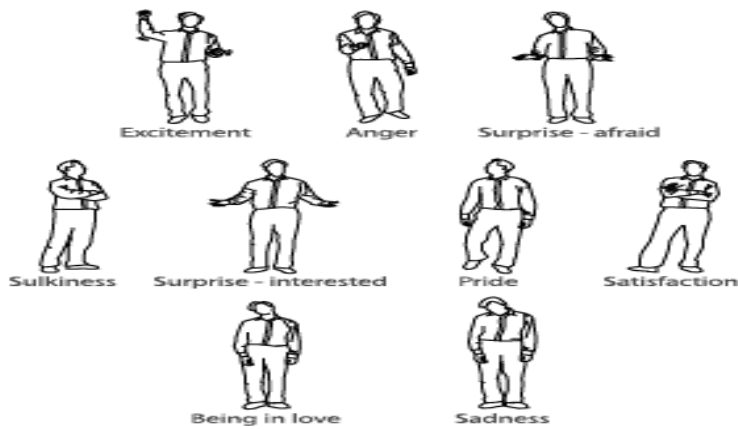


Figure 2: Body gestures

Hand-Gesture-Recognition utilizes two different techniques i.e., Glove hand recognition and Eye-hand recognition. Management Recognition Glove allows the consumer to be wired to a device. This requires the user to carry a lengthy brace and to bring several cables to the machine. The operator will wear a glove in front of the camera and make signals. This makes it very easy and normal for the user to communicate with the machine.

A vision-based system captures photographs from human hand movements and lights that increase the precision of gesture recognition utilizing one or more lenses [5]. It is quick and easy to track finger movements when the hand of the consumer shifts. A computer focused on perception can accommodate properties such as texture and motion light. This is depending upon the aspects of a camera as below.

- The speed and latency of camera used; 2-D or 3-D
- The need for users;
- Time.

A vision-based system gets a sense of the kind of finger movement at best. The movements should be selected with their accompanying context to set up a database for a gesture machine and every gesture should include multiple samples to increase the accuracy of the system [6].



Figure 3: Glove based gesture and visual gesture

III. ARTIFICIAL NEURAL NETWORK

The definition of a neuron is basically derived from biological area, where artificial neural networks play a basic key role in the human body. Everyone of our research in the body is performed by neural networks composed of millions of parallel neurons. Growing neuron is produced by small electrical signals from other neurons, and electric signals to other neurons are also issued. The weighting of these outputs is in that no feedback' ages' the neuron unless there is a certain level / bib. Such weights can be modified through experience. Artificial neural networks comprise, similar to human brain, the artificial neurons called perceptrons that obtain the numerical value and after measuring and integrating the inputs. Then, we convert the effects into output by a transfer method. The transition function may be like Sigmoid tangent functions, which are hyperbolic.

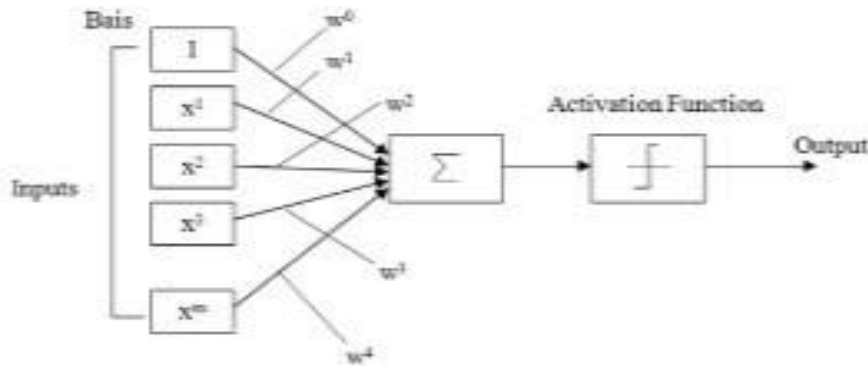


Figure 4: Structure of Artificial Neural Networks

Neural networks will today be equipped to solve difficult problems for traditional machines or for humans. Certain networks can be derived from unmonitory various training techniques or programming approaches directly. The directed training methods are widely used.

IV. BACKPROPOGATION LEARNING ALGORITHM

The context is a guided learning method, first defined by Paul Werbos (1974) and the same was introduced in 1986 by David Rumelhart. A distinctive activation mechanism is necessary. The 'learning' is a controlled method with the Delta rule which happens with a forward triggering flow and a reverse weight correction distribution of errors with each loop or 'epoch,' using the Delta Rule. In addition, it allows a random "surview" of what it could be when neural networks were confronted with their pattern first. It then determines how far its reaction is from the real one and adjustments its link weights accordingly. Returns operate well in a multi-layer input network.

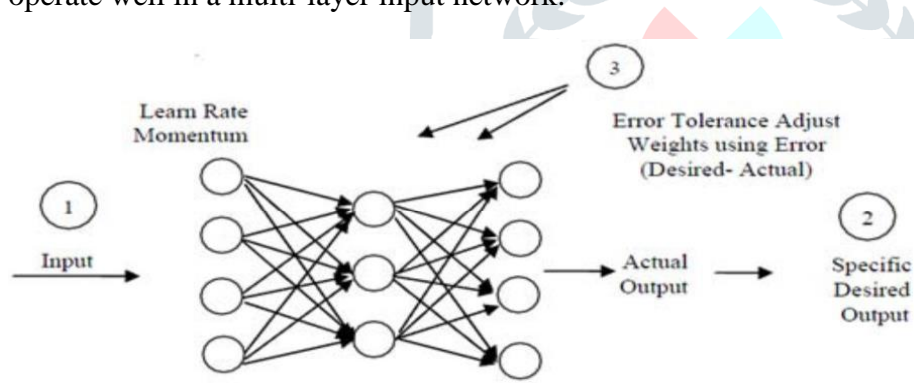


Figure 5: Back-propagation network

ANN feed forward allows signal to travel from one direction from source to destination. FFEDFORWARD Networks Network feed forwards ANN allow signals to go one route. No inputs (loops) are possible, i.e. no layer performance effects the same layer. Feedforward ANNs appear to be networks that connect inputs to outputs. These are commonly used in the identification of projects. For programming, feed-forward usually refers to a prton network with multi-layered sensed contributions from all neurons, so there are no feedback loops, but not before them.

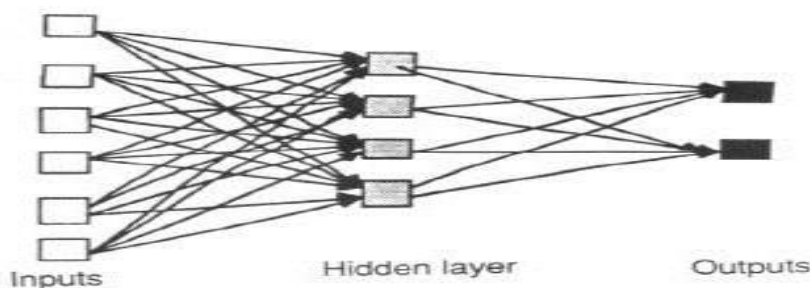


Figure 6: Feedforward Multilayer Network

V. CONCLUSION

In this paper we implemented an understanding of the identification of manual movements utilizing Neural Networks, one of the most powerful automated processing methods for hand gesture recognition. The most effective means for contact with people with disabilities are non-verbals, especially for the elderly (i.e. deaf-stupid). Neural networks are effective given the data sets are low and are not expected to improve. Another benefit of our study is that you can learn from the network production by using neural networks. In this article we used the algorithm and the Feedforward network for back propagation. The movement can be defined by recognizing fingers and their postures from the input hand gesture recording. In this process the segmentation of the hand and fingers is important. Once neural networks were used, the precision was also improved. In our paper we suggested neural connections that provide better results relative to other architectures. This work could also be extended to various other body movements.

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