ISSN:1991-8178

Australian Journal of Basic and Applied Sciences

Journal home page: www.ajbasweb.com

Grid Matching Based Hand Posture Recognition Using Neuro-Biology

[1]Vinodhini S, [2]Dhinakaran K, [3]Sankara Narayanan S

[1]*UG Scholar Department of Computer Science and Engineering, Saveetha School of Engineering, Saveetha University, Chennai, India.*
[2]*Assistant Professor, Department of Computer Science and Engineering, Saveetha School of Engineering, Saveetha University, Chennai, India.*
[3]*Assistant Professor, Department of Information Technology, ARM College of Engineering and Technology,Anna University, Chennai, India.*

ARTICLE INFO

Article history:
Received 10 March 2015
Received 20 in revised form
March 2015
Accepted 25 March 2015
Available online 10 April 2015

Keywords:
Hand posture recognition, graph matching, human-computer interaction, biologically galvanized choice.

ABSTRACT

An elastic graph matching formula manipulation biology stimulated choices is planned for the recognition of hand postures. Each node inside the graph is labelled exploitation image feature extracted exploitation the procedure model of the ventral stream of cortical area. The graph nodes square measure appointed to geometrically significant positions inside the hand image, and, the model graphs are measure created. Bunch graph methodology is utilized for modeling the variability in hand posture look. Recognition of a hand posture is finished by the elastic graph matching between the model graphs and so the input image. A radial basis perform is employed because the similarity perform for the matching method. The projected formula is tested on ten category hand posture information that consists of gray scale pictures with light-weight and dark weight backgrounds. The formula is used to provide higher recognition accuracy compared to the reported results within the literature. Elastic graph matching (EGM) technique to develop someone self-employed hand posture recognition system. EGM may be a neutrally impressed visual perception technique that has wide applications normally visual perception, face finding and recognition, gesture recognition, and also the analysis of littered scenes. In EGM the model square measure matched with the input image that contains the pattern to be recognized.

© 2015 AENSI Publisher All rights reserved.

To Cite This Article: Vinodhini S, Dhinakaran K, Sankara Narayanan S., Grid Matching Based Hand Posture Recognition Using Neuro-Biology. ***Aust. J. Basic & Appl. Sci.,*** *9(11): 582-587, 2015*

INTRODUCTION

Graph matching Lee K. H and Kim J. H (1999) plays an important role in several areas of compute from pc vision to networking, wherever there is a necessity to work out correspondences between the elements of two attributed structures. Graph matching may be a graph illustration and matching technique and may be a powerful tool in pc vision owing to its high mimetic nature and also the ability to handle advanced pictures. Hand gesture recognitionChen F. S *et al*. (2003)is a crucial space of analysis in visual pattern analysis, having wide applications in language recognition, human-robot interaction (HRI)Yang H. D(2009), human- pc interaction (HCI) and video game (VR). Visual interaction is a simple and effective approach of interaction that does not need any physical contact and does not get tormented by clattering environments. Hand gestures square measure typically classified as static and dynamic gestures . Static hand gesturesGe S.S *et al*.(2008) (also called a hand posture) square measure those during which the hand position doesn't amendment throughout the gesturing amount. Static gestures the data about the flexure angles of the fingers.

In dynamic hand gesturesJust A and Marce S (2003) (also called a hand gesture), the hand position is temporal and it changes continuously with relation to time. Dynamic gestures swear not solely on the finger's flex angles, however additionally on the hand trajectories and orientations. Dynamic gestures are viewed as actions composed of a sequence of static gestures that square measure connected by continuous motion. A dynamic hand gesture is expressed as a ranked Combination of static gesturesRamamoorthy A *et al*,(2003). During this paper the popularity of static hand gestures is taken into account.

Proposed Model Description:

Figure 1 describes about the vision-based hand gesture recognition technique is loosely divided into two classes, appearance-based approaches and 3D hand model-based approaches. Appearance-based approaches use options of the coaching image to

Corresponding Author: Vinodhini S, UG Scholar Department of Computer Science and Engineering, Saveetha School of Engineering, Saveetha University, Chennai, India.

model the visual look of the hand, and, compare these parameters with the extracted options of the testing image. The tools used for vision primarily based hand gesture recognition is classified into three classes. (Hidden Andrei Markov Model (HMM) primarily based strategies. Neural network (NN) and learning primarily based strategies). This work utilizes a graph primarily based approach for the popularity of static hand gestures. During a typical graph illustration, regions of the image square measure delineate by nodes during a graph. These nodes square measure associated with each other by edges, that categorical the structural relationships between regions.

Elastic graph matching (EGM) techniqueSu M. C, (2000) to develop someone self-employed hand posture recognition system. EGM may be a neutrally impressed visual perception technique that has wide applications normally visual perception, face finding and recognition, gesture recognition, and also the analysis of littered scenes. In EGM the model square measure matched with the input image that contains the pattern to be recognized.

Advantage of proposed system:

Fast detection process allows the real time video application with low cost sensors such as pc and USB camera.

The shape of the hand posture is recognized by identifying the structure of distribution of nodes in the input image.

The graphs are matched using a radial basis function as the similarity function.

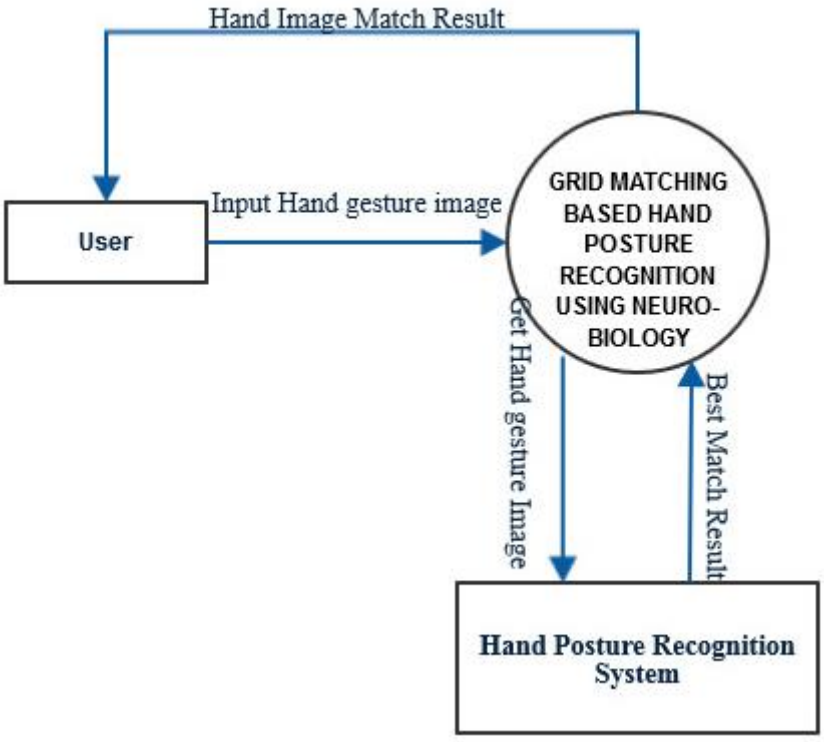

Fig. 1: Data Flow Diagram

1) The native image description connected to every node matches the image region round the position wherever the node is allotted.

2) The graph is not distorted an excessive amount. The current work utilizes a brand new set of image options, extracted exploitation the process model of the ventral stream of visual area to label the varied nodes within the graph. The model graph is formed by distribution the nodes to geometrically significant positions within the hand image. The classification of the hand posture is completed by distinctive the most effective match between the input image and also the model graphs. A radial basis operate (RBF) is employed because the similarity operate for the comparison of node options.

The planned algorithmic program is tested on ten category hand posture information. It provided higher recognition accuracy compared to the reported leads to the literature. Section two of this paper briefly reviews the feature extraction method. The planned hand posture recognition algorithmic program is explained in Section three. Section four discusses the experimental results and Section five provides the last remarks.

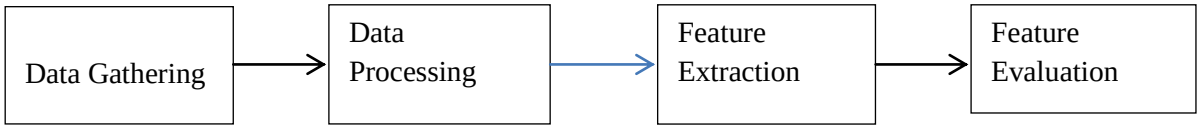

Fig. 2: Feature Extraction System

Depictionof the Feature Extraction System:

Data Gathering:

Layer one consists of electric battery of Gabor filters with completely different orientations (4 orientations) and sizes (16 sizes divided into eight bands1). This imitates {the straightforward the straightforward the easy} cells (which correspond to the classical simple cells of Hubel and Wiesel) within the primary visual area , that filters the image for the detection of edges and bars.

Data Processing:

Layer two models the advanced cells, by applying a MAX operator regionally (over completely different scales and positions) to the first layer results. This operation provides tolerance to completely different object projection size, itsposition and rotation within the 2-D plane of the visual field. The output of layer two square measure SMFs, that square measure utilized in the current work for the classification of hand postures.

Feature Extraction:

In layer three of the process model, radial basis functions (RBFs) square measure used to replicate the edges and posterior infer temporal (PIT) cortex.

Feature Evaluation:

Finally, layer four applies a MAX operator (globally, over all scales and positions) to the output of layer three, leading to an illustration that expresses the most effective comparison with antecedently seen pictures. The ASCII text file of the feature extraction system requires- higher reasoning process.

The Planned Hand Posture Recognition Algorithm:

1) This algorithmic program the planned algorithmic program utilizes the structure of distribution of the graph nodes to know and acknowledge the form of the hand posture. Every node is labeled exploitation Gabor filter primarily based options. Gabor filters square measure edge detection filters. The responses of the image to Gabor filters with numerous orientations store the form data of the hand. Within the discussed algorithmic program, the node options square measure expressed employing an image patch that contains the native form data round the node.

2) A bunch of such nodes stores the advanced form of the hand posture. The above diagram shows a simplified diagram of the algorithmic program. The model graphs square measure created from theresponse of the training pictures. The nodes of the model graphs square measure allotted to the geometrically significant positions within the hand image is employed. The variations within the hand size and form square measure taken care partially by the native maximization at the stage, and partially by exploitation the bunch graph methodology.

The patch size used is fifteen pixels. Every patch contains four orientations (0∘45∘,90∘,−45∘). These image patches are used because the model graphs node options.In RBFs are employed in the second stage that compares the complicated options at the output stage (which corresponds to the retinal image) with patches of antecedently seen visual image and form options. RBFs are a serious category of neural network model that compares the gap between inputof the image.The planned algorithmic program utilizes RBF because the similarity performs for matching the graphs. Distance between the node features of the input image which of the model graph. The algorithmic program utilizes many pictures of identical category to make the model graph, as that drained bunch graph approach . Bunch graphs model the variability in object look. In a very bunch graph, every model graph node is delineating employing a bunch of node options. The bunch of options is extracted from identical nodes (the nodes assigned to identical positions) of many pictures that vary in size and form of the posture.

System Architecture:

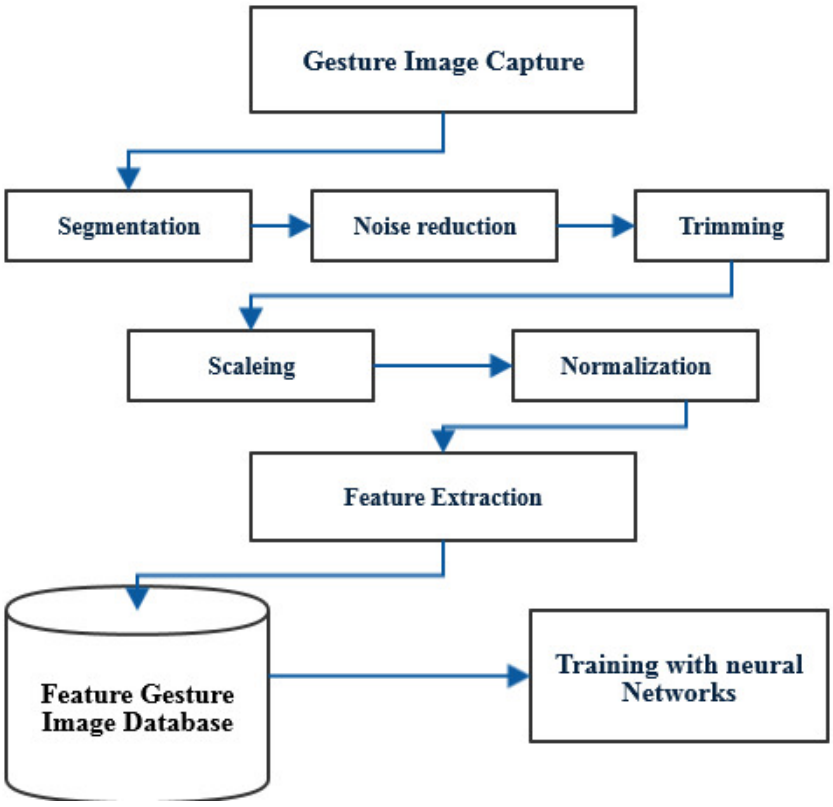

Fig. 3.1: Training Phase

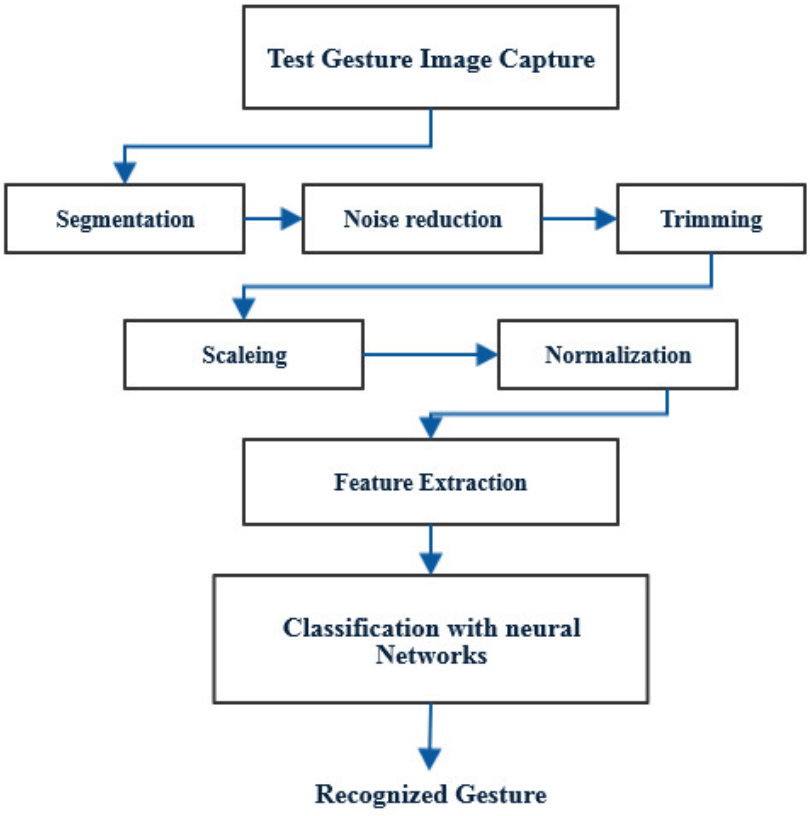

Fig. 3.2: Testing Phase

System Analysis:

Design and loading Image:

In this module we are designing the screen and image viewer. Next we load the binary image inorder to display the image that demands pruning and image resizing.

Tools and Adjusting The Image:

The arrow keys on the keyboard are used to increase or decrease the width and height of the image. The window with the picture must be the active window on screen for pressing the arrow keys to work. And also to see the adjustment in the screen while resizing the image. An EGM algorithm using a new set of biologically inspired features is proposed for hand posture recognition.

Testing Phase:

The nodes of the graph are labeled , which are extracted using the computational model of the ventral stream of visual cortex.

The algorithm is tested on a hand posture dataset. It provided better recognition accuracy compared to the earlier reported results.

The algorithm is scale tolerant and person independent. The proposed algorithm easily recognizes hand postures with uniform backgrounds.

Extraction System:

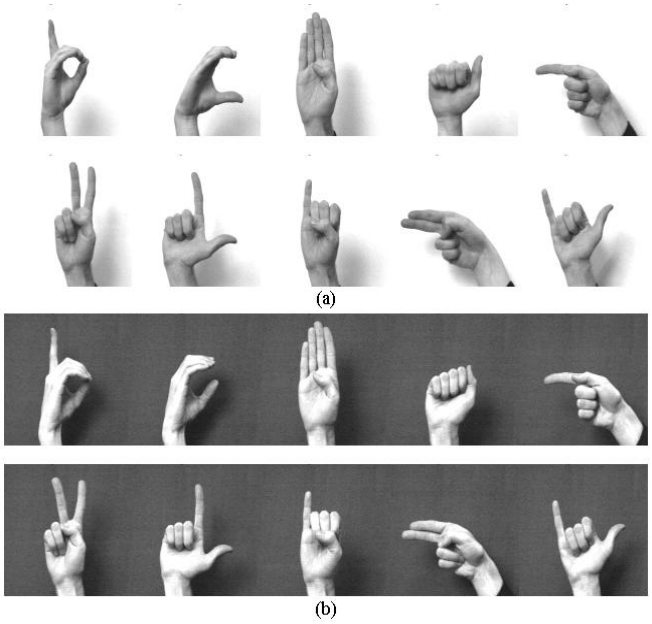

Fig. 4: Sample hand posture pictures (a) with light-weight background and (b) with dark background

Hand gestures are generally classified as static and dynamic gestures . Static hand gestures (also known as a hand posture) are those in which the hand position does not change during the gesturing period. Static gestures rely on the information about the flexure angles of the fingers. In dynamic hand gestures (also known as a hand gesture), the hand position is temporal and it changes continuously with respect to time.

Dynamic gestures can be viewed as actions composed of a sequence of static gestures that are connected by continuous motion. There are different methods for hand gesture recognition. First attempts to solve this problem utilized mechanical devices that directly measure hand and / or arm joint angles and spatial position, using glove-based devices. Later vision based noncontact methods developed. Vision-based hand gesture recognition techniques can be broadly divided into two categories, appearance-based approaches and 3-D hand model.

Conclusion:

An EGM algorithmic rule employing a new set of biologically manipulation options is planned for hand posture recognition. The nodes of the graph are labeled exploitation the SMFs that are extracted exploitation the process model of the ventral stream of cortical region. The form of the hand posture is recognized by distinctive the structure of distribution of nodes within the input image. The graphs are matched employing a radial basis operates because the similarity operates. The variations within the size and form of the hand posture are taken care by the native maximization, and by exploitation the bunch graph approach. The algorithmic rule is tested on a ten category hand posture dataset. It provided higher recognition accuracy compared to the sooner reportable results. The algorithmic rule is scale tolerant and person freelance. The planned algorithmic rule simply acknowledges hand postures with uniform backgrounds. But the performance of

the algorithmic rule in advanced backgrounds is to be improved.

REFERENCES

Chen, F.S., C.M. Fu and C.L. Huang, 2003. "Hand gesture recognition using a real-time tracking method and hidden markov models," Image and Vision Computing.

Ge, S.S., Y. Yang and T.H. Lee, 2008. "Hand gesture recognition and tracking based on distributed locally linear embedding," Image and Vision Computing,

Just, A and S. Marce, 2003. "A comparative study of two state-of-the-art sequence processing techniques for hand gesture recognition,".

Lee, K.H and J.H. Kim, 1999. "An hmm based threshold model approach for gesture recognition," IEEE Transactions on Pattern Analysis and Machine Intelligence.

Licsar, A and T. Sziranyi, 2005. "User-adaptive hand gesture recognition system with interactive training,

Ramamoorthy, A., N. Aswan, N. Chaudhury and S. Banerjee, 2003. "Recognition of dynamic hand gestures," Pattern Recognition

Su, M.C., 2000. "A fuzzy rule-based approach to spatio-temporal hand gesture recognition," IEEE Transactions on Systems, Man, and Cybernetics.

Yang, H.D., A.Y. Park and S.W. Lee, 2007. "Gesture spotting and recognition for human robot interaction," IEEE Transactions on Robotics.

Yoon, H.S., J. Soh, Y.J. Bae and H.S. Yang, 2001."Hand gesture recognition using combined features of location, angle and velocity," Pattern Recognition.

Zhou, H and T.S. Huang, 2003. "Tracking articulated hand motion with Eigen dynamics analysis," in In proceedings of International Conference on Computer Vision.