

# Hand Gesture Recognition for Dance Movements

V . Janaranjani<sup>1</sup>, N. Megala<sup>2</sup>, R.Naveeth Kumar<sup>3</sup>

<sup>1,2,3</sup>Assistant Professor in Biomedical Engineering, Rathinam Technical Campus, Coimbatore

**Abstract** - This paper involves recognition of hand gestures using flex sensors. It consists of PIC16F877A microcontroller chip, to process the digital signals. The sensors are fixed in position inside a fabric glove which is worn by the user. The movements of the finger digits produce electrical signal which are conditioned, processed and displayed in PC. The template of gestures are stored in the PC as a database. The database stores five different gestures for a single person. These gestures form the basic mudras for a prominent classical dance form of India. Inputs from any person/same person fed from the sensors embedded on the glove is processed and compared with the templates already stored in the database. A match between the two gestures is identified and an output information “Match Identified” or “not matched” is displayed in the PC. This helps to teach/learn basic mudras with the help of a hand gesture recognition system. This can also be implemented as a Dance Learning App in an ANDROID mobile.

**Index Terms** - gesture recognition, flex sensor, Basic mudras, data base, dance learning.

## I.INTRODUCTION

Hand gesture recognition system can be used for interfacing between computer and human using hand gesture. This work presents a technique for a human computer interface through hand gesture recognition that is able to recognize 5 static gestures. Gesture is defined as an expressive movement of body parts which has a particular message, to be communicated precisely between a sender and a receiver. It is important to consider three important characteristics, i.e. ease-of-use, easy configuration, coverage. This approach have been used in activity recognition based on different sensing technologies: wearable sensors. Now, gesture recognition is being used extensively in international sign use of deaf and dumb, in the world of dance, for religious practices We have taken hand gesture database .The database consist of 5-6 mudras of basic classical dance. In order to improve the

gesture recognition capability, a flex sensor is placed inside the gloves and hand is covered by the gloves.

## II.EXISTING SYSTEM

Gesture recognition is a topic with the goal of interpreting human gestures. Gestures can originate from any bodily motion or state but commonly originate from the face or hand. Current focuses in the field include emotion recognition from face and hand gesture recognition. Users can use simple gestures to control or interact with devices without physically touching them. Many approaches have been made using computer vision algorithms to interpret sign language. Gesture recognition can be seen as a way for computers to begin to understand human body language, thus building a richer bridge between machines and humans. Gesture recognition enables humans to communicate with the machine (HMI) and interact naturally without any mechanical devices. Using the concept of gesture recognition. The major application areas of gesture recognition in the current scenario are Automotive sector, Consumer electronics sector, Transit sector, Gaming sector, To unlock smartphones, Defence ,Home automation, Sign language interpretation .Gesture recognition technology has been considered to be the highly successful technology as it saves time to unlock any device .Gesture recognition can be conducted with techniques from computer vision and image processing.

## III.PROPOSED METHODS

The aim of the project is Gesture recognition with gloves that are fixed with flex sensors to identify hand movements. A prototype model is developed by basic hardware implementation that incorporates hand gesture analysis using a microcontroller. Gestures recorded are compared with a database in the PC. A display informs the user when the gesture recorded matches with any template in the database. This

recognition is implemented to provide learning experience to a person interested to gain knowledge in the field of dance. A flex sensor is used to sense or recognize the hand movements and the the recorded hand gestures and the stored templates are compared. A match between the two gestures is identified and an output information “Match Identified” or “not matched” is displayed in the PC.

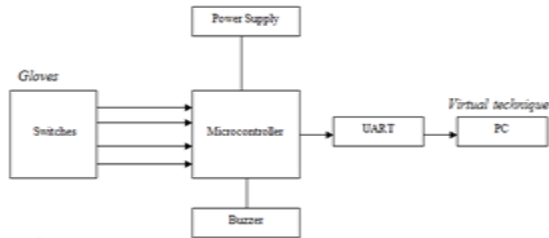


Fig.1: Proposed method

IV. OVERVIEW

We developed an effective method for hand gesture recognition using sensor over glove. We further demonstrate that proposed data augmentation achieves good performance only through camera it is possible of capturing the image using sensor but here we transform the gesture by glove based device with sensor to different positions and viewing the object directly in PC using micro controller and uart. And the output of the gestures are transformed in displaying frames within the required area. Which checks with input gesture and displays the output of the 2D image. And gives a comment of "matched" or " not matched"

1.Pic 16f877A  
 The PIC microcontroller PIC16f877a is one of the most renowned microcontrollers in the industry. This controller is very convenient to use, the coding or programming of this controller is also easier. One of the main advantages is that it can be write-erase as many times as possible because it use FLASH memory technology. It has a total number of 40 pins. There are 33 pins for input and output. An EEPROM is also featured in it which makes it possible to store some of the frequencies and some other related data.

The cost of this controller is low and its handling is also easy. Its flexible and can be used in areas where microcontrollers have never been used before as in coprocessor applications and timer functions etc.

2.A universal asynchronous receiver-transmitter (UART)

It is a computer hardware device for asynchronous serial communication in which the data format and transmission speeds are configurable. The electric signaling levels and methods are handled by a driver circuit external to the UART. A UART is usually an individual integrated circuit (IC) used for serial communications over a computer or peripheral device serial port. UARTs are now commonly included in microcontrollers. A related device, the universal synchronous and asynchronous receiver-transmitter (USART) also supports synchronous operation

3.Flex sensor

As a variable printed resistor, the Flex Sensor achieves great form-factor on a thin flexible substrate. When the substrate is bent, the sensor produces a resistance output correlated to the bend radius—the smaller the radius, the higher the resistance value.

V.SOFTWARE IMPLEMENTATION

In video Processing is done to make a video as a frame-by-frame 2D image to acquire an exact detailed features of gestures. A fragment is usually used to as a part of an activity user interface and contributes its own layout to the activity. To study the effects of different noises, three types of noises are considered. Then it goes to noise filtering, it is an efficient method to clear the noise from the video or image to be processed. Then segmentation is the process done to make the image portioned into multiple segments of pixels and done by different segmentation methods. Then it goes to Image recognition is the ability of software to identify the object places, people, writing and action in images. Then finally compared the recognized image and acquired image using pixel calculation method.

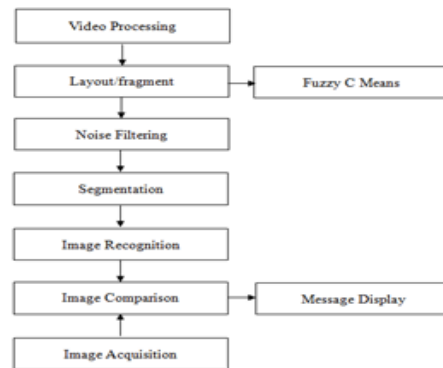


Fig.2: Flow Chart for Software Implementation

## VI. RESULT AND DISCUSSION

The developed project “HAND GESTURE RECOGNITION IN ANDROID SMART PHONES” helps to improve the capability of learning gesture to learn gesture that helps to communicate with speech-impaired people, to identify gesture, to gain knowledge in the gesture-based field like dance. It helps in recognition in both indoor and outdoor with independence.

The system is developed using microcontroller and tactile switches design approach. The gesture processing mechanism allows the assistive device to recognize the command given by the user. The gestures are already fed to the PIC micro- controller and so the limited gestures only can be processed. In case of wrong movement, the buzzer alarm is indicated. The draw backs of the phase I is that; it is used in mechanical method. The presence of processed gesture is conveyed to the user through LCD display. Finally, output is displayed in the hardware module as shown fig.3,fig4 respectively.



Fig3.:Hardware Module



Fig4.: Output when gestures are matched

## VI. CONCLUSION AND FUTURE WORK

In this paper, gesture, recognition and comparison approach has been introduced. It helps in field of dance. gesture recognition is being used extensively in international sign use of deaf and dumb, in the world of dance. This helps to teach/learn basic mudras with the help of a hand gesture recognition system. This can also be implemented as a Dance Learning App in an ANDROID mobile. We have developed a device that could only mimic finger movements of the human gesture. The system can be upgraded to recognize much gesture at a single time. The gesture processed is obtained by the mechanical input given by the user. The gesture recognition can also be incorporated with various sensors like flex sensor, motion sensor to detect various gesture. This APP can be programmed for various fields like home automation, automobile industry, and healthcare sector and so on. In the stream of bio-medical the APP can be designed to determine the flaws in heartbeat, ECG waves, Pulse rate, Myo-electric signals etc. Any signal can be processed in this APP according to the requirement. Furthermore, the movement of the foetus can be recorded and frames of the video can be taken.

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