Android Camera Based Hand Gesture Recognition with Correspondence Voice Play Back Communication

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Abstract: Gesture recognition is a growing field of research among interaction of human and computers. Image processing, it is very interesting field to recognize the human gesture for general life applications. Hand gesture recognition is very popular for interaction. It is nonverbal way of communication and this research area is full of innovative approaches. Android camera is deployed as an application to capture images. Projects main idea is to understand the communication of the deaf people. Deaf people can communicate to normal person by showing there hand gesture to the android camera. Android device communicates to the server. It is used to process the hand gesture images and will transmit the corresponding values to the android phone and the voice is played accordingly to the normal person.

Keywords: *principle component analysis, Eigen faces, Image resize*

I. INTRODUCTION

Among the set of gestures intuitively performed by humans when communicating with each other, Hand gestures are especially interesting for communication and is perhaps the most intuitive interface for selection. This is particularly useful in combination with speech recognition as pointing gestures can be used to specify parameters of location in verbal statements. Gesture recognition is a topic in computer science and language technology with the goal of interpreting human gestures via algorithms. Origination of gesture from any bodily motion or state but commonly from the face or hand. Gesture recognition was used for computers to begin to understand human body language, thus providing a richer communication between machines and humans.

It enables humans to communicate with the machine and interact naturally without any knowledge devices. There has been always considered a challenge in the development of a natural interaction interface, where people interact with technology as they are used to interact with the real world. human gestures with hand free interface, where no devices are attached to the user, will naturally migrate the users from the real world to the virtual environment.
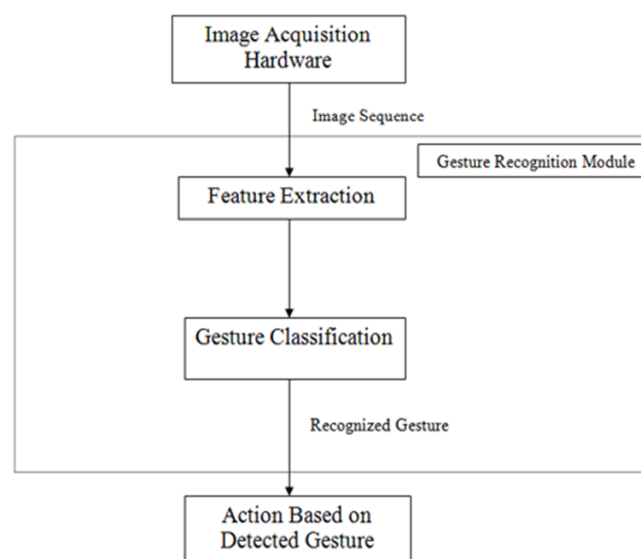
II. EXISTING SYSTEM

Fig. 1. Block Diagram of Hand Gesture Recognition

2.1 PROBLEM STATEMENT

A gesture-based interaction schema for mobile device is realized in order to enable users to operate the phone without any physical contact with the phone. However, hardware supports only a few simple interactions. No proper software to perform hand gesture analysis. Hence to indicate the actions android camera based gesture recognition application is deployed.

2.2 MOTIVATION

Most studies in gesture analysis are based on hardware. Gesture recognition can be seen as a way for computers begin to understand human body language, thus building a richer communication between machines and humans. It enables humans communication with the machine and interact naturally without any mechanical devices. The implementation of hardware gesture recognition is very costly. In order to overcome this software based gesture recognition.
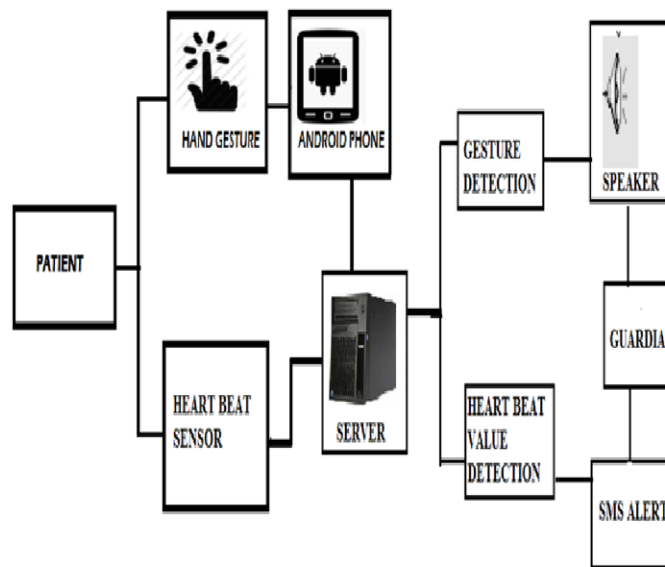

Fig 2. Hand Gesture Recognition with Voice Playback

III. PROPOSED SYSTEM

As mobile devices become more and more powerful and smart, the predominant forms of input interfaces such as keyboards and touch pads may not always satisfy users' needs nowadays. They seem to be inconvenient sometimes when users hands are occupied. And keyboards might take up too much space for handheld devices to ensure good operability. Android device brings the long-expected technology to interact with graphical interfaces to the masses. Android device captures the user's movements without the need of a controller. Android application is deployed to capture images through camera. Project on gestures is to understand the communication of the deaf people. People will show their hand gesture to the camera. These gestures are then interpreted using algorithm either based on statistical analysis or artificial. The major goal of gesture recognition research is to create a system which can identify specific human hand gestures and use them to convey knowledge. By recognizing the symbols of hand a man it can help in communication with deaf and dumb people. It helps in taking action at right time. Thus it helps communication of deaf people to the normal persons.

3.1 SCOPE

Dump patient can communicate with guardian through the android phone that converts image to voice. Heart beat sensor gives alert to guardian to known about the health status of dump patient.SMS alert is provided to about the health .Software implementation reduces Time complexity to larger extends. It also provides clear idea about the mechanism deployed. Adapting to new changes helps in ease of use. It also provides better performance analysis. Server is used to

store the information. Hence memory storage capacity is less.

IV. SYSTEM DESIGN

Mobile Client

Mobile client is an android application which created and installed in the user's android mobile phone. The application first page consists of the user registration process. We'll create the user login page by button and text field class in the android. While creating the android application, we have to design the page by dragging the tools like button, text field, and radio button. Once we designed the page we have to write the codes for each. Once we create the full mobile application, it will generated as android platform kit (APK) file. This APK file will be installed in the user's mobile phone application

Gesture Recorder

The gesture recorder component listens to events that that human address to the camera, so it steadily monitors the action of the device. A gesture is detected after recognition of gesture based on a special threshold for a sufficient period of time. Thus, it assured that noises errors produced by unintended movements of the hand do not emit gestures. The classifier implements the dynamic time warp algorithm and is responsible for the training and recognition of gestures. Furthermore it manages the available training sets.

Server

The server application which is used to communicate with the mobile clients. The server can communicate with their mobile client by GPRS or wired medium In the project we are using WIFI technology to access with the client. . The server will monitor the mobile client's accessing information and respond to clients requested information. The server will not allow the unauthorized user from entering into the mobile phone. Server provides the testing of images from the mobile client. Server contains the database of all similar images based on which recognition of image is done. Based on the information corresponding voice play back will be displayed.

Gesture Recognition

Client communicates with the server through wireless medium. Server stores the test images and performs various operations to recognition the gesture. It performs image resize and then Eigen value detection followed by principal component analysis.

a) Image resizes

Initially image from the mobile client is stored in the test data storage in server. In test data storage it performs resizing of image based on the gesture image for recognition. Consider an image that is 300x200. It needs to be scaled down to a target dimension 30x10. To find the minimal dimension that keeps the aspect ratio of the origin where both width and height scales are at least what is specified in the target.

b) Principal component analysis (PCA)

Principal Component Analysis is a good tool to identify main characteristics of a data set. It is computationally efficient for recognition and dimensionality reduction. The construction of the eigenvectors can be very expensive .For image recognitions; image must be resized very accurately, for the technique to work.

i. Each image is an **n x m** matrix of pixels are Convert it into an **nm** vector by stacking the columns. Consider a small image of 100x100 gives a 10000 element vector, i.e. 10000 dimension space points.
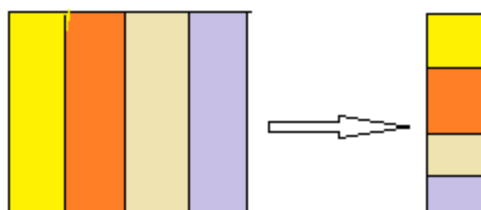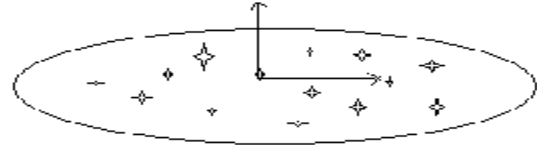

N*M matrix into N*N

ii. M compute average vector. Subtract M from each vector. That is given by zero minus centered distribution.
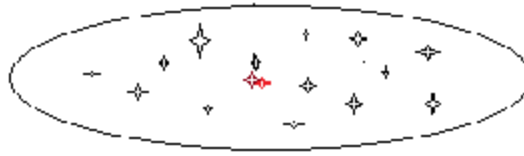
Centered Distribution

iii. C was computed for covariance matrix (10000x10000). Followed by the computation of Eigen values and Eigen

vector of C. Change all points into the Eigen vectors frame.
Eigen vectors frame

iv. Select "just enough" dimensions according to the strength of their Eigen values. Discard all the remaining dimensions.

VOICE PLAYBACK WITH SMS ALERT

After that the server recognize the image meaning the back end database produce the corresponding result as voice .Voice can be played using speakers. In addition we had find the heart beat of the disabled patient and send the heart beat result to the android user.

TESTING

In this application it was done by using IPWebCam
Android application. The application uses the camera present in the phone for continuous image capturing and a simultaneous display on the screen of the testing frame in server. The image captured by the application is streamed over its Wi-Fi connection (or WLAN without internet as used here) for recognition. The program access the image by logging to the devices IP, which is then showed in the GUI. Basic resize of original image is carried out in original image.

Training database

RESULT
To test the application, gestures are made by three different people. Some of the gestures are closed or have different orientation. They are then recognized and voice playback is produced. Gesture of different patient produces different rates of accuracy

Original image

Image Resize

V. CONCLUSION

This system a hand free interface, based only on human gestures, where no devices are attached to the user, will naturally immerse the user from the real world to the virtual environment. It is useful for communicating with a deaf and dumb person. The system database has sign gestures of size of 176X144 pixels so that it takes less time and memory space during pattern recognition. Android camera helps in capture of image and is stored in mobile database. In server database a collection of hand gesture is images are stored for future recognition. The project opens up the possibility of intuitively indicating objects and locations, e.g., to make changes in direction of robot movement or to simply mark some object. This is particularly useful in combination with speech recognition and can be used to specify parameters of location in verbal statements. This work briefly describes the schemes of capturing the image from android device, image detection, processing the image to recognize the gestures as well as few results.

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