TWO WAY COMMUNICATION USING GESTURE CONTROL HAND MOVEMENTS & VOICE BASED IMAGE REPRESENTATION USING ANDROID FOR DEAF & DUMB PEOPLE

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ABSTRACT

The main objective of the project is to establish the communication process between Deaf & Dumb and the normal person. It is two way communication. We deploy an Android based application where by user will provide gestures & recognized by the server and the corresponding voice is initiated to communicate with the normal person. Normal person can speak out through voice and is recognized and corresponding image is displayed to the impaired person so that this application can be implemented from the both the end.

Keywords: - *Gestures; Drone;*

1. INTRODUCTION

Drones nowadays are widely used around the world for avariety of purposes including aerial videography,photography, surveillance etc. In many cases, there is arequirement of a skilled pilot to perform these tasks using thedrone which proves to be exorbitant. A simple gesturecontroller can make the task of piloting much easier.The topic we are concerned with here is the gesture controlof an aerial drone. Gesture refers to any bodily motion orstates particularly any hand motion or face motion. In ourimplementation, the Leap Motion Controller is used forrecognition of gestures, which are motion of the hand, and as aresult, we can control the motion of the drone by simplegestures from the human hand.There are previous implementations of gesture control ofan AR Drone on platforms like cyclone.js and nodecopterusing the Leap. However, in our implementation, we are usingROS (Robot Operating System) as the platform due to itsability of hardware abstraction. Florian Lier had been able toget the AR Drone respond to gestures for roll, pitch and yawmovements of the drone using Robot Operating System. Here,
we are extending his implementation by not only making thedrone respond to gestures for roll, pitch and yaw, but also todo flips according to the corresponding flip gesture input inthe python scripts. Thus, the Leap recognizes a particular handmotion and coveys it to the ground station and according tothat particular hand movement, the python code translates thenecessary motion which the drone performs corresponding tosuch hand gesture.Here, we have been able to successfully exploit the flipfunctionality of the drone, that is, the AR Drone is capable ofdoing acrobatic flips. Hence, according to the customized code,the LEAP identifies hand gestures for flip motion and conveysit to the AR Drone.

2. RELATED WORK

MoniruzzamanBhuiyan and Rich Picking[1] **gesture**-controlled user interfaces, what have we done and what's next This paper presents a review of the history of Gesture controlled user interface (GCUI), and identifies trends in technology, application and usability. Our findings conclude that GCUI now affords realistic opportunities for specific application areas, and especially for users who are uncomfortable with more commonly used input devices. We have tried collated chronographic research information which covers the past 30 years. We investigated different types of gestures, its users, applications, technology, issues addressed, results and interfaces from existing research. We consider the next direction of gesture controlled user interfaces as rich user interface using gestures seems appropriate for current and future ubiquitous and ambient devices. This paper also provides a research background for gesture controlled research for elderly or disabled people.

Joyeeta Singha1, Karen Das2 [2] hand gesture recognition based onkarhunen-loeve transform In this paper, we have proposed a system based on KLTransform to recognize different hand gestures. The systemconsists of five steps: skin filtering, palm cropping, edgedetection, feature extraction, and classification. Firstly thehand is detected using skin filtering and palm cropping wasperformed to extract out only the palm portion of the hand.The extracted image was then processed using the Canny EdgeDetection technique to extract the outline images of palm.After palm extraction, the features of hand were extractedusing K-L Transform technique and finally the input gesturewas recognized using proper classifier. In our system, we havetested for 10 different hand gestures, and recognizing rateobtained was 96%. Hence we propose an easy approach torecognize different hand gestures.

Ondrej Kainz1, František Jakab1[3] approach to hand tracking and gesturerecognition based on depth-sensing camerasand emg monitoringIn this paper, a new approach for hand tracking and gesture recognitionbased on the Leap Motion device and surface electromyography (SEMG) ispresented. The system is about to process the depth image information and theelectrical activity produced by skeletal muscles on forearm. The purpose of suchcombination is enhancement in the gesture recognition rate. As a first we analysethe conventional approaches toward hand tracking and gesture recognition andpresent the results of various researches. Successive topic gives brief overview ofdepth-sensing cameras with focus on Leap motion device where we test itsaccuracy of fingers recognition. The vision-SEMG-based system is to bepotentially applicable to many areas of human computer interaction.

Jihyun Han[4] lessons learned in exploring the leap motiontmsensor for gesture-based instrument design
The Leap Motion TM sensor offers fine-grained gesture-recognitionand hand tracking. Since its release, there have been several uses ofthe device for instrument design, musical interaction and expressioncontrol, documented through online video. However, there has beenlittle formal documented investigation of the potential and challengesof the platform in this context. This paper presents lessons learnedfrom work-in-progress on the development of musical instrumentsand control applications using the Leap Motion TM sensor. Twoinstruments are presented: *Air-Keys* and *Air-Pads* and the potentialfor augmentation of a traditional keyboard is explored. The resultsshow that the platform is promising in this context but requiresvarious challenges, both physical and logical, to be overcome.

Leigh Ellen Potter[5] the leap motion controller: a view on sign language This paper presents an early exploration of the suitabilityof the Leap Motion controller for Australian SignLanguage (Auslan) recognition. Testing showed that thecontroller is able to provide accurate tracking of handsand fingers, and to track movement. This detection losesaccuracy when the hand moves into a position thatobstructs the controller's ability to view, such as when thehand rotates and is perpendicular to the controller. Thedetection also fails when individual elements of the handsare brought together, such as finger to finger. In both ofthese circumstances, the controller is unable to read ortrack the hand. There is potential for the use of thistechnology for recognizing Auslan, however furtherdevelopment of the Leap Motion API is required.

3. EXISTING METHODOLOGY

In the existing system, Hardware control achieved using Bluetooth, Zigbee or some other hardware resources. There is no other to control the hardware / Robots using Hand gesture based communication.

There is no other way of communication with the people ,if they want to communicate with the physically challenged people they have to learn the action way of speaking in which many of them will not be interested to learn and they will not have communication with these people thereby they become isolated and none of them will help them whole heartedly.

4. PROBLEMS IN THE EXISTING SYSTEM

In existing system there is no technology developed to recognize the hand actions shown by the people and it is very less effective for communication.

5. PROPOSED WORK

We propose, Android based application is deployed and using camera installed in it user Gestures are recognized and accordingly Drone is controlled. The main objective is to establish the communication process between Deaf & Dumb and the normal person. It is two way communications. We deploy an Android based application where by user will provide gestures & recognized by the server and the corresponding voice is initiated to communicate with the normal person. Normal person can speak out voice is recognized and corresponding image is displayed to the impaired person so that this application can be implemented from the both the end.

5.1. MODULES:

5.1.1. MOBILE APPLICATION:

In first module, Android based mobile application is deployed in the deaf & dumb person for communication purpose. This is the main model to obtain their gesture inputs and to be processed. In this application camera is automatically initiated and captures the gesture input image provided by the deaf & dumb person. We also stored prerecorded voices. Normal Person will speak through the Android Application, which recognizes the Voice input and it converts into Hand Gesture image to the Deaf & Dumb Person.

5.1.2. SERVER:

In second module, The Server Application which is used to communicate with the Mobile Clients. The Server can communicate with their Mobile Client by GPRS and GPS. The Server will monitor the Mobile Client's accessing information and Respond to Client's Requested Information. The Server will not allow the Unauthorized User from entering into the mobile phone.

5.1.3. IMAGE ACQUISITION:

In this module, A image acquisition android camera is used, after that frames are send to the server and edge detection of the video is done which is followed by thinning that reduce the noise, tokens are being created from thinning image after tokens are fetched. The paper briefly describes the schemes of capturing the image from android device, image detection, processing the image to recognize the gestures as well as voice result.

5.1.4. IMAGE PREPROCESSING:

In the field of image processing it is very interesting to recognize the human gesture for general life applications. Gesture recognition is a growing field of research among various human computer interactions; hand gesture recognition is very popular for interacting between human and machines. It is nonverbal way of communication and

this research area is full of innovative approaches. That is in this module every image as meaning and it will be stored in the server and it create the communication between the disable and human.

5.1.5.RECOGNITION:

The main features used are centroid in the hand, presence of thumb and number of peaks in the hand gesture. That is the algorithm is based on shape based features by keeping in mind that shape of human hand is same for all human beings except in some situations. The recognition approach used in this paper is artificial neural network among Machine learning algorithm.

5.1.5.VOICE & IMAGE RESULT:

Server will recognized the image meaning and produce the result as voice to normal person. Normal Person will speak through the Android Application, which recognizes the Voice input and it converts into Hand Gesture image to the Deaf & Dumb Person. We can also transfer the Hand Gesture input by deaf & dumb person to multiple Android normal People.

6. CONCLUSION:

With the help of the LEAP Motion Controller, we havebeen able to move the Parrot AR DRONE by using handmotion. The drone responds to any hand gesture and movesaccordingly. We have been able to make the drone flipaccording to certain hand gesture which is again recognized bythe 2 stereo cameras and 3 IR LEDs. Hence, it can beconcluded that with the help of the Leap Motion Controller,we can use the AR DRONE to perform various tasks such asaerial videography, performing acrobatic tasks, to name a few.The Leap can be taught to recognize more hand gestures andmovements by altering the python scripts and adding morefunctionality to it.

7. FUTURE WORKS:

- Our future work focuses on several aspect,.like providing a richer user experience - Whether you're using a Java technology-enabled mobile phone to play a game or to access your company's network, the Java platform provides the foundation for true mobility. The unique blend of mobility and security in Java technology makes it the ideal development and deployment vehicle for mobile and wireless solutions.
- The ideal execution environment for Web services providing maximum reach to everyone, everywhere, every time, to every device and platform.

8. REFERENCES

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