Gesture Copter

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Abstract- The major objective of this propose system is to design a copter which can controlled by hand gesture. The movement of the quadcopter base on the movement of the user hand gesture. The first step is to designing quadcopter with electronic components which will give us accurate flight characteristic.

This system based on android technology are designed for trying to control the quadcopter by hand gesture. This paper presents movement of quadcopter based system on hand gesture which will help user who don't know how to control the copter using remote controller.

Quadcopter is basically a drone which is a form of the helicopters. Copter will move in several direction on the basis of user instruction. We implemented face detection for the authentication purpose so that unauthorized user could not access the drone. Drone will not move from its original position until any command is given with hand gesture.

Indexed Terms- Quadopter, Android, Hand Gesture, Drone, Face detection, Authentication.

I. INTRODUCTION

Drone is one of the type of helicopter which having stability. Drone is complex flying machine due to its movement. Drone will move in several direction on the basis of user hand gesture. User found difficulty to use drone by the remote controller. This drone made for the user who want to easily operate drone without remote controller. This drone made with four rotors and with the camera for recording the live scenario. A pair of rotors rotate in clockwise direction and another pair of rotors rotate in anticlockwise direction based on the hand gesture direction[5].The use of this system in major field is military, movie making, rescue, surveillance and weather monitoring ,traffic monitoring, firefighting and some other important areas.

This system implemented face recognition for the authentication so that unauthorized user cannot access the system. Face recognition is for the authentication purpose. Only authentic user can access the system.

II. LITERATURE SURVEY

The paper [1] proposes smart human detection drone for the rescue. In the calamitous situation like conflict earthquakes, any major challenge for the rescue team to finding the people, in this case rescue team fail to find the people who fallen into the debris. This is one of the reason many people losing their lives. Rescue team are unable to reach the in that area because of the debris but on the other hand the existing system like drone that are controlled by remote controller are ineffective. The camera which will be attache with the drone capture the live scenario. This system will help the rescue team to finding the people who trapped because of the earthquakes or any other disastrous situation, so the rescue team can help the people who are trapped under the debris. This system take the picture, recorded the video of current situation and send it to the server for monitoring.

Face Authentication is the process in which after capturing and training the image of the user system will give the message user is authentic or not.. The paper [2] based on the real time face authentication. Face recognition and authentication technology are very challenging. Face authentication provide the security and identify between the authentic and non-authentic user. This propose system proved the face authentication using deep learning base on Convolution Neural Network(CNN).Face authentication is done by capturing and training the image of user and it provides the confidence value after the testing image. If the value is above 0.7 then the person is authentic user else person is not authentic user.

The paper [3] propose is design to control the copter based on the hand gesture recognition. The interaction between human and machine are challenging. This paper shown the interaction between human and the machine by using the hand gesture. Hand Gesture recognition system include two methods;1) Data glove 2) Computer vision. In the data glove base system user need to wear specialize data glove and position tracker for communicating with any other system. In computer vision base hand recognition system only need the camera to identify the hand gesture. User can communicate with the system based on the hand gesture.

III. PROPOSED METHODOLOGY

The proposed method is to move the drone in several direction base on the hand gesture. The drone will move in several direction on the basis of giving the instruction by user through the hand gesture. First, this system capture the image of the user then train the user image for the face authentication. Face authentication using deep learning base Convolution Neural network. After the recognition of the image it give the confidence value. If the value id above 0.7 then the person is authentic user. If the user is authentic then user can give the direction to the drone by the hand gesture else user cannot give the directions.

Only authentic user can give the direction to the drone. The camera equipped with drone capture the hand gesture which is given by the user and move base on the gesture given by the user. Wire frame make the stability of the drone.

Features	Literature summary			
	Our system	Paper 1	Paper 2	Paper 3
Live Streaming	Yes	No	No	Yes
Image Capturing	Yes	Yes	No	Yes
Wireframe	Yes	No	No	No
Face Authentication	Yes	Yes	Yes	No
Gesture Control	Yes	No	No	

This proposed system has two different main method as 1) Face recognition 2) Hand gesture recognition. These two different modes is important part in this proposed system. Face recognition is for the authentication to find out the user is authentic or not. Once the proposed system confirm the user is authentic then this system will allow the user to give the direction to the drone by the hand gesture.

A. Face Recognition

The First Step is face recognition for the authentication. In Face Recognition first step is Face Detection. First, the camera capture the image of the user. Face Detection is done using haarcascade classifier. Haarcascade features are similar to convolution kernels which are used to detect the user face. After capturing user image from the camera it detect the face of the user and then identify the user is authentic or not.
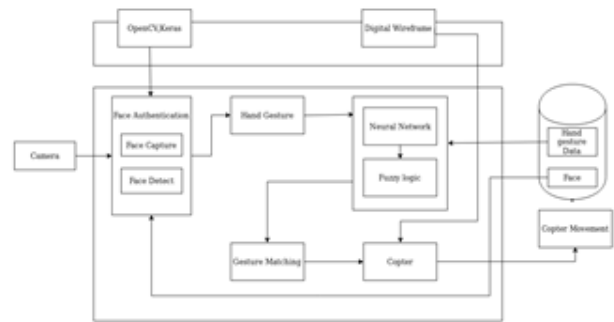

Figure 1. System Architecture

This is the process used to detect different edges using kernels. A Haarcascade-Feature is just similar to a kernel in Convolution Neural Network (CNN).The values of the kernel are calculated by training. Analysis of the face base on the accurate detection of the human face. In the user face authentication frontal face image is very important criteria. Haarcascade is computer computer vision technique which is use for the face detection [2].Face authentication process includes three different methods;
a) Frontal face detection
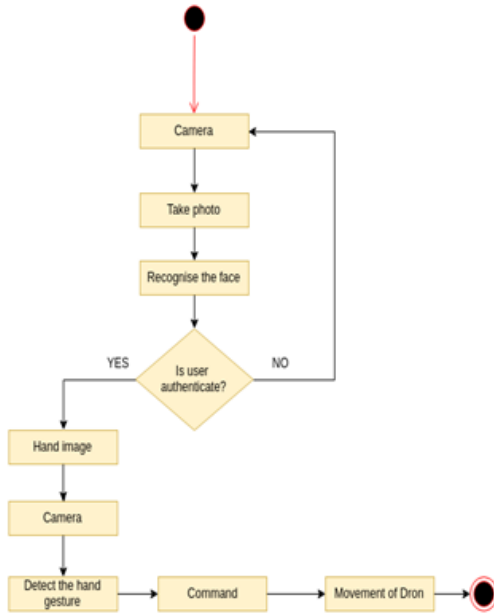b) Constrained Local Model alignment
c) Face trained.

Fig 1: Flow Chart

a) Front Face Detection: - In the frontal face detection it capture the user face. Frontal face detection is depend on the accuracy of detection of the user face. Frontal face detection is for the user face authentication purpose. Haarcascade is computer technique by this technique face can be detected.

b) CLM Alignment:-Geometric shape of the human face can be detected by the face alignment. Face alignment determine the human face landmarks such eyes, nose, lips etc. On the basis of landmarks it identify the face of the user. In this system we have used Constrained Local Model for the 3-dimension alignment [2].

c) Neural Network Trainig: - Neural network training is the core process in the face authentication. The capture image of the human is trained to extract the features by applying neural network. It extracted only facial image of the human.[2]

B. Hand Gesture

The interaction between human and machine can be done by the hand gesture. User can interact with the computer by two ways;

1) Using data glove

2) Computer vision but in this system we implemented computer vision to create the communication between the human and machine. Drone will move on the basis of user hand gesture instruction.
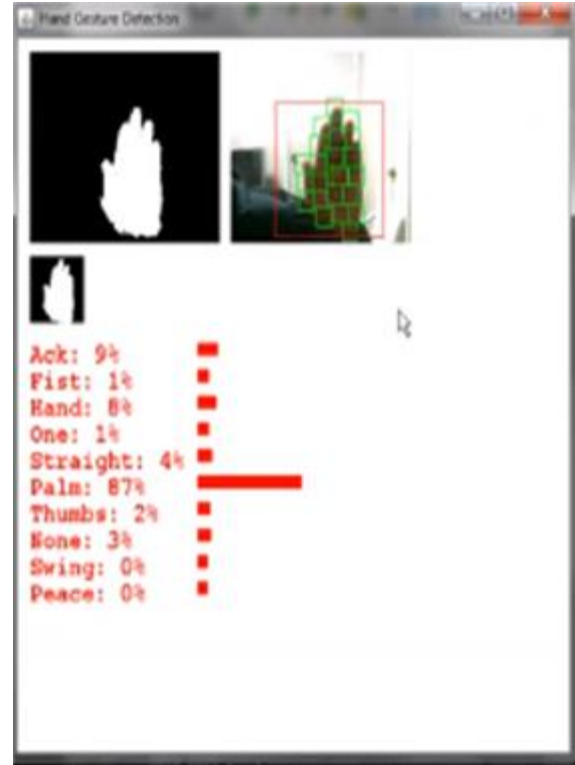
a)   Working:- First we have collected our data of hand gesture so that we can classify hand gesture from the other body part. We used OpenCv, Numpy and Keras library for the hand gesture recognition. After collecting the data we have trained the data. Whenever user give the direction to the drone by using the hand gesture so that trained algorithm will detect the hand gesture and then drone will move on the basis of hand gesture given by the user. In this system we have implemented wire frame for the drone stability.
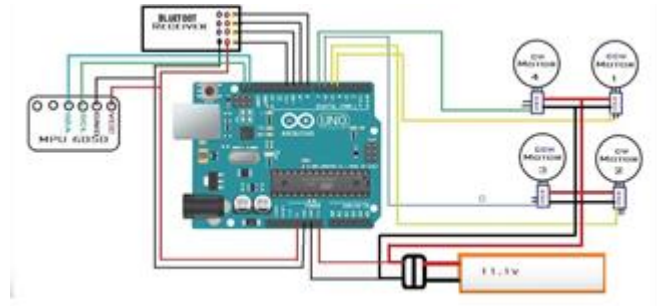
C. Drone architecture

Figure:3 drone architecture

IV. EXPECTED RESULT

The output of Face Recognition Authentication using pickle results are given below. First, it capture the image from the camera, train the image of the user and then recognize face of the user for the authentic user. If the user authentic then system allow the user to access the drone otherwise it won't allow the user to access the user. After the face authentication user can give the instruction to the drone by the hand gesture so that drone can move in several direction.

Figure: 3 Recognized Face result

V. CONCLUSION

This proposed system is remote less drone which move base on the hand gesture command after the face recognition authentication. This proposed system designed in a way which reduced the cost economically. The accuracy of face recognition is 87% till now and the accuracy of hand gesture recognition is 80% till now. Development process of the face recognition for the authentication and hand gesture recognition is in progress. Our aim is to achieve more accuracy so that user can get good experience by providing interaction between system and user.

VI. FUTURE SCOPE

The proposed system can be improved by addition of various components like location tracking which will send the current location of the drone. By adding the dongle in the proposed system will increase the range. Wire frame will be use to provide the more stability to the drone.

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REFERENCES

[1] Rameesha Tariq,Maham Rahim,Nimra Asiam, Narmeen Banwany, Ummay Faeeha "A smart human detection drone for rescue",2018.

[2] S Sharma,Samreen Shaik " Real time face authentication using convolution neural network",2016.

[3] Shinig Song, Dongsong Yan, Yongiun Xie, "Design of control system based on hand gesture recognition", 2018.

[4] R. Ajeeth Kumar, S.Ashokkumar, V. Prithiv Raj, K.Suriya Kala Devi,"Design of quadcopter with hand glove control", 2010.

[5] Manavender R.Malgireddy, Jason J. Corso, Srirangaraj Stlur, Dinesh Mandalapu, Venu Govindaraju,"A framework of hand gesture recognition and spotting using sub gesture modeling",2010.

[6] Sheng-Yu Peng, Kanokask, Hwei-jen Lin ,Kuan-Ching Ling,"A real time hand gesture system for daily information retrieval from internet",2011.

[7] Amit Pal,"Multicuses face detection in complex background for frontal faces", 2008.