Control buggy using Leap sensor camera in Data Mining Domain

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Abstract- **This paper explores a new challenge: modeling the devices or framework semi-automatically. This framework or gadget work utilizing gestures. We control system utilizing distinctive gestures. The hand movement data is caught utilizing leap sensor motion camera. To identify appropriate motion we separate diverse features of different gesture from hand motion data. For extracting highlights we utilize eucludial distance formula and for comparision we use cosine similarity equation. We likewise have an elective method for correlation which is KNN.**
In the past framework 3D camera was utilized so they had less exactness. In this paper we have extracted more features so this framework is more exact than the past one. This framework diminishes human endeavors and it can lessen mischances to a more noteworthy broaden. Such framework would make driving simple and agreeable.

Index Terms- **Leap motion, gesture, Euclidean distance, cosine similarity, Trajectory feature, gesture recognition.**

I. INTRODUCTION

Mischances or setbacks continues happening each day in everyday existence's of people.Some accidents are subtle or are a hostile, others quit fooling around and inevitable. In some cases when a mishap happen because of impulsiveness of individuals and includes hurting others, they wind up genuine and hazardous. Hence, one ought to be watchful out and about and out in the open places so as not to hurt oneself and additionally others. So inorder to dodge such unsafe occurrence such frameworks ought to be utilized.
Programmed hand motion acknowledgment has been an extremely dynamic research point as of late with spurring applications, for example, human PC interaction(HCI), robot control and gesture based communication elucidation. The issue is very testing because of various issues including the confounded idea of static and dynamic hand signal, complex foundation. To take care of issue utilize we require calculations. What spurs us for this work is a robot route issue , in which we are keen on controlling a robot or surrey by hand posture sign given by client. The leap motion sensor is a camera based detecting gadget that catches motion and gesture information from a client as contribution for additionally processing. Its ability enables client to play computer games, upgrade client cooperation control their mouse et cetera. In this investigation, we are utilizing jump movement for route of carriage all the more precisely in light of the fact that beforehand surrey was less exact .

Fig1. Leap Sensor Camera

The surrey is either customized to take after a way or controlled physically by the administrator utilizing a controller. The administrator is utilizing a controller. This framework is worried about controlling a carriage utilizing hand signal. The client's hand signal is motion is perceived and followed directions of hand motions are moved into surrey controller.
The contribution of this paper include the following :
1)..

II. LITERATURE REVIEW

In Arabic sign language recognition using leap motion sensor;The leap motion detect and track hand and fingers placed within its field of view and presents motion tracking data as a series of snapshots called frames. Each frame of tracking data contains the measured positions orientations and other information about each entity detected in that snapshot. Data represents a set of hand and finger tracking data detected in a single frame . It has

limitation of Leap motion does not track non-manual features and need extra sensors to track other non-manual features.

Robot arm control system using LEAP Motion controller; In this paper leap motion controller's internal component is a two camera digital to detect the motion of the hand and fingers. Three LED's infrared for detecting the distance between user's hand with the leap motion controller is processing visual information . It then send the data to the movement of the hand and finger into a computer.it has limitation as It cannot detect if the hand and finger overlap and Leap motion controller use infrared light which cannot shine through objects.

Gesture control of drone using motion controller in this we study the implementation of using a motion controller to control the motion of drone via a simple human gesture and relays it to the ground station that run on ROS in linux which is used to interact with the drone. But to recognize more hand gesture and movements the python script have to be altered.

Recognizing emotion from videos by studying facial expression body posture and hand gesture in this A system for recognizing emotions from videos by studying facial expressions , hand gesture and body postures is presented .The system generalization for new hand gesture and body postures contribute to improve the emotion recognition rate with up to 5% for anger , sadness and fear compared to the standard facial emotion recognition. Its limitations are the dependence on relatively strong emotion\s the time need to analyze the fixed images one by one using facial action coding system and the time required to use this method is one of the reason that few studies have been conducted on experience compared with those on recognition of emotion.

III. PROPOSED SYSTEM

We has proffered a framework which distinguishes the signal done by the client which is identified by the leap camera and the proper motion is performed by the buggy. In this framework 6 focuses are captured from the motion done above or episode to the leap sensor camera. From this 6 focuses the highlights required for distinguishing the signal are figured . In the past framework just 12 highlights were distinguished in this framework aggregate of 15 highlights are extricated making the framework more productive.

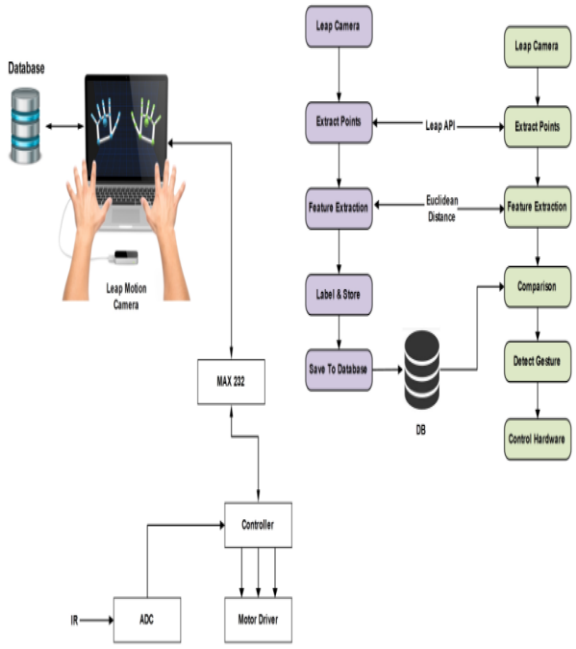

Fig2. Block Diagram

The proposed framework is divided into 4 primary advances:

1. Leap interfacing

The product utilized for leap motion keeps running as an administration of window framework. The leap movement administrations are gotten to by leap empowered application keeping in mind the end goal to get to get the information for getting the information leap movement SDK gives 2 API which are

a)Native interface

b)Web socket interface

a) Native interface :

It is an arrangement of little projects that can be stacked at whatever point required (dynamic library) which is utilized to make new leap empowered application.

b) Web attachment interface :

The web attachment interface and java content customer library are as one used to create leap empowered web applications.

2. Preprocessing and point extraction

At first the highlights for the suitable motion and the activity to be performed are put away in the database as the dataset for future acknowledgment. When the signal is finished by the client before leap camera. Extraction of the 6 focuses happen these 6 focuses show the centroid of the five fingers which are thumb, pointer, center finger, ring finger and the centroid of plan.

3. Feature extraction:

The highlights required for the framework are removed from the 6 indicates all together distinguish the activity to be played out the highlights are extricated add up to 15 highlights are separated for suitable recognizable proof of activity to be played out, the separated highlights are really the separation between all focuses.

The 6 focuses are p1(x1, y1, z1)… … p6(x6, y6, z6) to discover the separation between focuses Euclidean separation equation is connected:

$$d(\mathbf{p},\mathbf{q}) = d(\mathbf{q},\mathbf{p}) = \sqrt{(q_1 - p_1)^2 + (q_2 - p_2)^2 + \cdots + (q_n - p_n)^2}$$

$$= \sqrt{\sum_{i=1}^{n} (q_i - p_i)^2}.$$

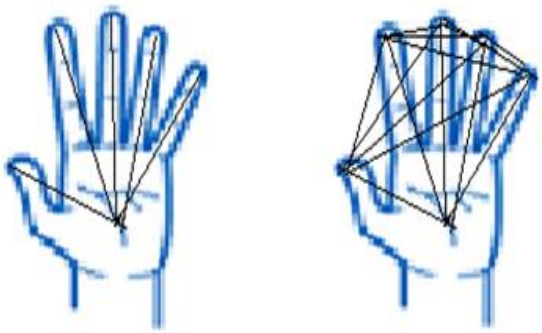

Fig3 .Point extraction

4. Feature correlation

Once the 15 highlights are extricated for each signal an esteem is figured for this. At that point the present esteem is contrasted and the highlights in the dataset the esteem which is close to the estimation of the present motion is the signaled activity which is to be performed. So as to think about and locate the suitable activity for the signal the cosine likeness recipe is utilized which is

$$\text{similarity} = \cos(\theta) = \frac{\mathbf{A} \cdot \mathbf{B}}{\|\mathbf{A}\|_2 \|\mathbf{B}\|_2} = \frac{\sum_{i=1}^{n} A_i B_i}{\sqrt{\sum_{i=1}^{n} A_i^2} \sqrt{\sum_{i=1}^{n} B_i^2}}$$

where and are parts of vector and individually.

IV. FEATURE EXTRACTION ALGORITHM

1.Read point, Array A[2][3] define d temporary var.
2.Then calculate distance from each point.
3.for(i=0 to 18 , increment I by 3)
for(j=0 to 3)
D[j]=A(i+j)
End fun
Add in vector 'v'
End fun
For(i=1 to 'v' size)
Final row(int)= distance(V(0),V(i))
End loop
For(i=1 to v.size)
For(j=i+1 ,j<v.size)
Final(index)=distance(V(i),V(j))
Display final row
End loop
End loop

V. HARDWARE USED

1 .At mega 32

ATMEGA32 is anything but simple to program AVR controller. With apparent program memory it can fulfill most EMBEDDED SYSTEMS. With different rest modes it can deal with MOBILE EMBEDDED SYSTEMS. Alongside 32 programmable Input/Output pins, it would interface with numerous peripherals effortlessly. With Watchdog clock to reset under mistake it can be utilized on frameworks with no human obstruction. With such a large number of highlights with each acknowledging other we can execute ATMEGA32 in numerous control frameworks.

There are a great many applications for ATMEGA32. Temperature control frameworks Simple flag estimating and controls.

Installed frameworks like espresso machine, candy machine.
Engine control frameworks.
Computerized flag preparing.
Fringe Interface framework.

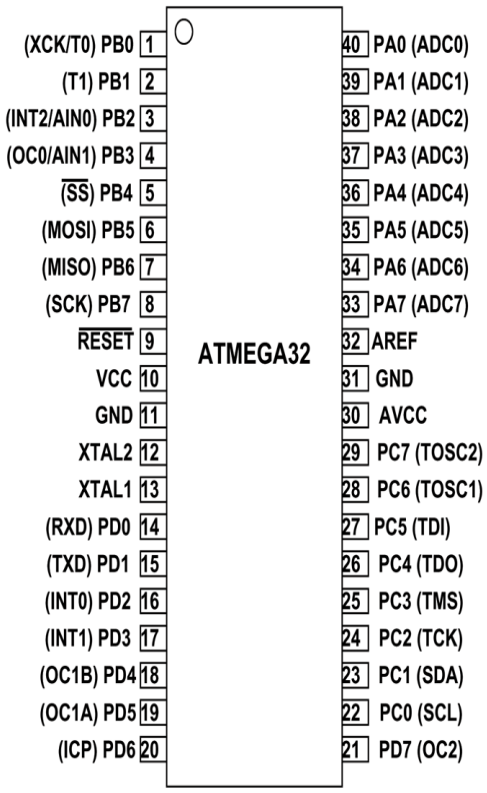

Fig4. AtMega32

2. MAX232

IC MAX232 is utilized for TTL/CMOS to RS232 transformation. Meaning the majority of our Microcontrollers (PIC/ARM/Atmel) works on TTL/CMOS rationale that is it conveys through either 0V or +5V, however our PCs work with the assistance of RS232 which works at rationale level -24V or +24V. In this way, in the event that we need to interface these microcontrollers with Computer we have to change over the TTL/CMOS rationale to RS232 rationale. Thus on the off chance that you are searching for an IC to play out this change and interface a Microcontroller with your PC then MAX232 IC is the correct one for you

Applications

Used to Connect Microcontroller with Computers
TTL/CMOS rationale to RS232 converters
Utilized as a part of RS232 link

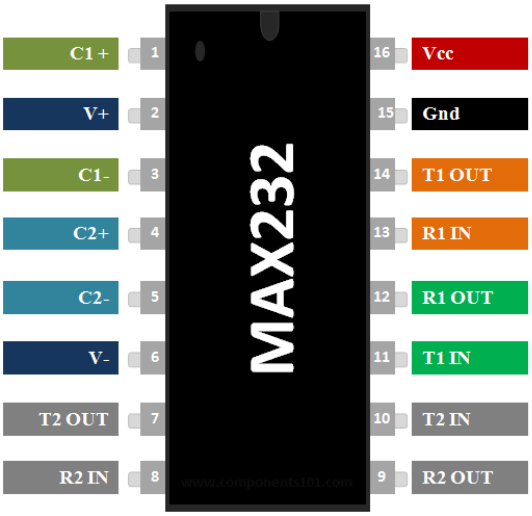

Fig5. MAX232

3.ULN2803:

Used in following situations:

Case1: Where you have to control Inductive burdens utilizing LOGIC from CONTROL UNIT. DARLINGTON ARRAYs in ULN2803 IC basically goes about as eight individual switches which can be activated ON and OFF independently. Each set can drive a HIGH POWER LOAD taking LOGIC from CONTROL UNIT.

Case2: Where you need to drive various burdens. ULN2803 can drive eight loads all the while. Despite the fact that utilizing MOSFETS or TRANSISTORs will do the trick, however putting eight gadgets on board will winds up lumbering. So utilizing ULN2803 is best to replace mass exchanging gadgets.

Case3: Programmable LOAD SHARING. When we have one HIGH POWER LOAD and ONE LOW POWER LOAD, we can associate numerous ARRAYs parallel together to drive a HIGH POWER LOAD.

4.IR sensor

Infrared radiation is the part of electromagnetic range having wavelengths longer than noticeable light wavelengths, however littler than microwaves, i.e., the area IR sensorroughly from 0.75µm to 1000 µm is the infrared locale. Infrared waves are undetectable to human eyes. The wavelength locale of 0.75µm to 3 µm is called close infrared, the area from 3 µm to 6 µm is called mid infrared and the district higher than 6 µm is called far infrared.

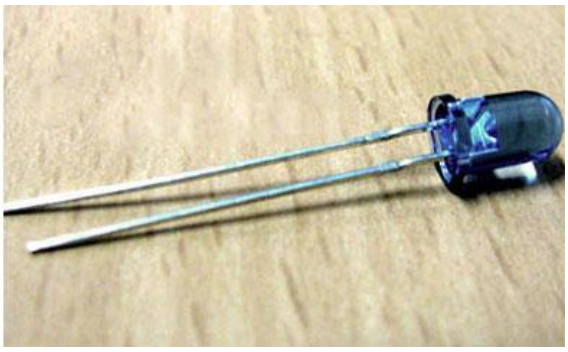

Fig6. IR Sensor

VI. TRAINING DATASET

In this framework a specific number of gestures are given by the client to the framework. At the point when this signals would be precisely performed at real time it would be contrasted and the beforehand allocated gestures all together for the navigation of the buggy.

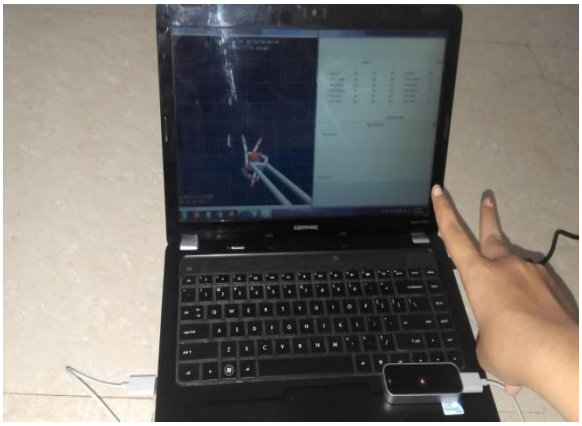

Fig7 .Gesture For Backward Detected

Fig8 .Gesture For Left Detected

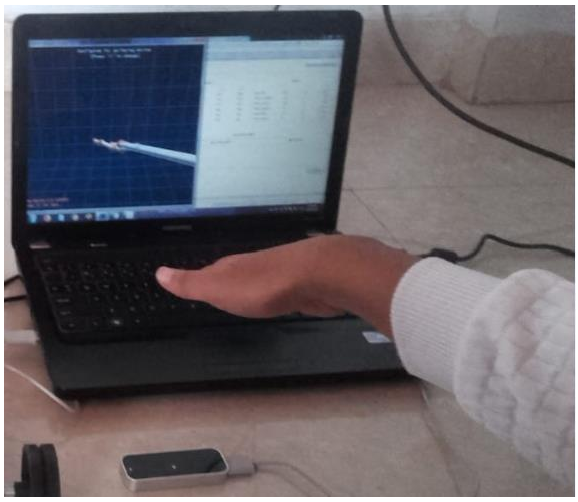

Fig9 .Gesture For Forward Detected

Fig10 .Gesture For Stop Detected

VIII. RESULT

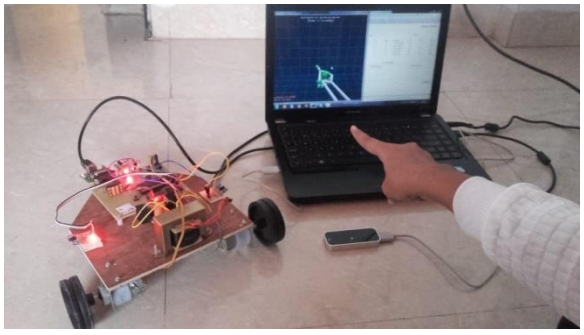

Fig11 .Complete System working with Hardware

VII. CONCLUSION

We have designed an application to control buggy using leap sensor camera. In this study we have decided few gestures like left, right, backward and

forward which is stored in the database. We are using the leap sensor camera as it is capturing 6 points from camera and extracting features that will be compared with stored database. Once the comparison between current data and stored data takes place the correct gesture is detected as the buggy does the appropriate action. We have used 3D leap motion sensor camera to overcome the shortcoming of 2D camera.

We can use intelligence based algorithm for further study

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