Hand Gesture Of Recognition Wearable Mouse Using Deep Learning

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Abstract: *A Robot is an electro-mechanical system that is operated by a computer program. Robots can be autonomous or semi-autonomous. "An autonomous robot is not controlled by human and acts on it's own decision by sesnsing it's environment , Majority of the industrial robots are autonomous, as they are required to operated at high speed and with great accuracy. But some, applications required semi-autonomous or human controlled robots. Some of the most commonly used control systems are voice recognition, tactile or touch controlled and more motion controlled. One of the frequently implemented hand motion controlled robot is a Hand Gesture Controlled Robot. Instead of using a remote control with buttons or a joystick, the hand gestures are used to control the motion of the robot". The project is based on wireless communication, where the data from the hand gestures is transmitted to the robot over IOT.*

Keywords: ***Hand gesture, Flex sensor, accelerometer, force sensor, wearable mouse.***

1. INTRODUCTION

Much hard work is made today to make "Human Computer Interaction" and hence more easy-to-use for the user. Input devices such as mouse play an important role in this interaction between humans and computers. "The technology of the mouse has been updated with more responsive, wireless and enhancements in the last few decades". Although, it has not seen significant innovation in the fundamental way we interact with the computer using it. "A conventional mouse requires a flat and smooth surface for optimal operation, which becomes a demanding restriction". Also, we are required to get used to its operation because "dragging the mouse" is not so natural for humans. On the other hand, body languages such as hand gestures are instinctual, so if users could control the cursor with analogous hand movements they can reach a much higher level of comfort with the device by using the wearable mouse we can perform the home automation. Now-a-days accelerometer; flex sensor; force sensor are available in packages which makes them suitable for implementation of wearable devices that require motion tracking and automation of home. This paper presents study between the uses of both sensors for this particular application of 'wearable mouse'. The novelty of our work is an effort to effectively replace the conventional mouse. The proposed device is comfortable to use and maintains good accuracy and control over the pointer displacement and automation of home.

2.LITERATURE SURVEY

1. The hand and hand moments "detection and gesture recognition methods" have been studied for several decades, from which methods designed for sensor. If the hand is properly segmented, the gestures can be recognized by the shape of the hand contour and other geometric features [1].
2. Ren's at al. proposed a new contour matching method in [6] using the series of the relative distance between the 'contour points and the hand centre'.
3. They achieved 86-100 percent accuracy in their own '10-gesture challenging dataset'.
4. Klomp Makeratal Developed a interaction framework for: "touch detection and object interaction" [5].
5. The hand moments are detected by the vertices of the polygon approximating the hand contour. Yeo et al. present a similar method, but they compute more features and give several criteria to classify a polygon vertex a hand gesture [2].
6. The authors in[7]used a convex shaped composition method combined with : "skeleton extraction to detect

And recognize the gesture". Their method accuracy is between '94percent and 97' percent in Ren's dataset. Detection of "half-closed" and "closed fingertips" requires other approach, such as maxima based detection [6] or 3D model fitting [7], [2] .

3. IMPLEMENTED METHODOLOGY

The positions of the sensors make sure it rests on "the back of our palm". The mouse displacement then becomes analogous with our hand gesture movements, which gives a 'natural and comfortable' feeling for human beings. Lots of hand gesture moments come, it is easy to adapt to this technology. In this design, the control depends on the movements and we have an inherently precise control. Position of the sensor on other parts of our hand will make it difficult to perform other activities while 'using the device which also introduces a lot of unwanted pointer displacement due to unsteady finger'. The sensor remains more stable at the back of our palm when the "pointer needs to be static". Also the users have the convenience of using either hand as per 'individual preference'. Depending on the motion of hand home automation also performed. The gesture control circuitry has a main board with the :'microcontroller that takes input from ADXL' and 'two switches on the index finger' and 'middle finger' which are interpreted as left button and right button respectively. This helps the user to continue his activity without worrying about his mouse being moved unintentionally and control the home appliances on a "single click".

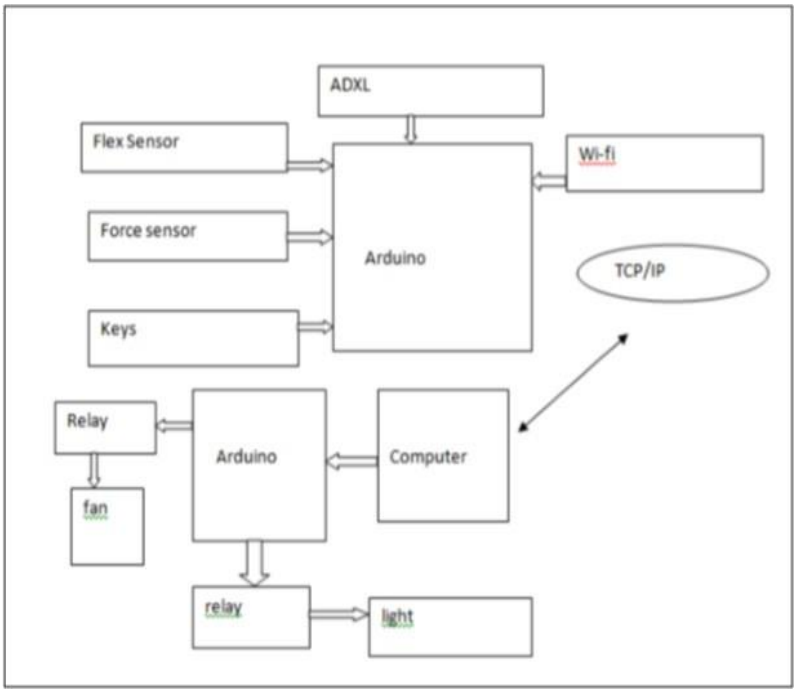
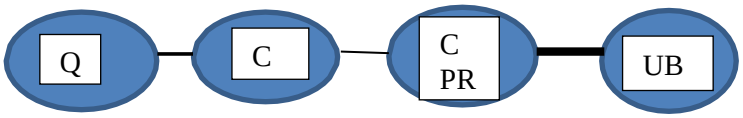


Fig.1 Block diagram of system

Mathematical Model

Where,



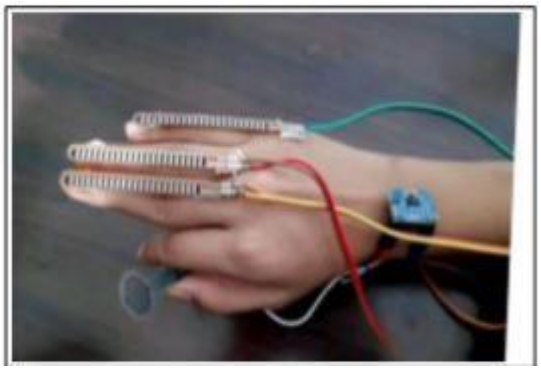
Q = input sensor data
CB = classify the data
C = according to classi_ed data match with the predefine msg
PR = predicted result
UB = change signal condition
B] Set Theory
_ Let S be as system which _nd exact match predefine value and change signal condition
S = In, P, Op,
_ Identify Input In asIn = Q
Where,
Q = input data
_ Identify Process P as
P = CB, C, PR
Where,
CB = classify the data
C = according to classi_ed data match with the predefine value
PR = predicted result
VI
_ Identify Output Op as
Op = UB
Where,
Where, UB =change signal condition
After preprocessing the request, system decides particular direction to move . If it
Is identify then system suggests the changes according to data.
_Failures and Success conditions.
{ Success Conditions:
1. Search the required information from available in Datasets.
2. Users gets result very fast according to their needs.
{ Failure Conditions:
1. 1. Huge database can leads to more time consumption to get
the information
2. Hardware failure.
3. Software failure.
_Space Complexity:
The space complexity depends on Presentations and visualizations of discovered patterns. More the storages of data it's more space complexity.
_ Time Complexity:
Check No. of patterns available in the data sets= n If (n>1) then retrieving Of information can be time consuming.
So, the time complexity of this algorithm is $O(n^2)$:z

4.RESULTS

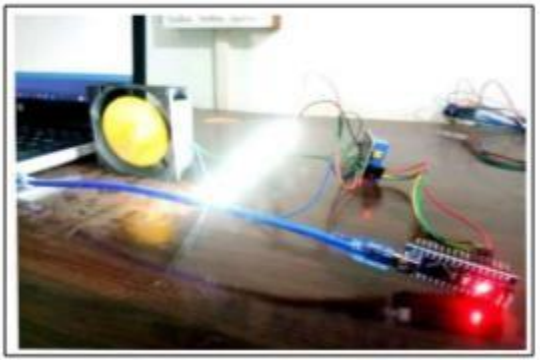
A. Outcomes

Outcomes The design successfully overcomes the requirement of flat smooth surface for a mouse and can be conveniently controlled using hand movements. The users are able to adapt to its operation within few minutes of usage. We also use this system for home automation. We can control light and fan at home using our system.

B. Screen Shots



Screenshot 1



Screenshot 2

5. CONCLUSIONS

The design successfully overcomes the requirement of 'flat smooth surface' for a mouse and can be conveniently controlled by using movements. The users are able to adapt to its operation within few minutes of usage. "Gaming experience" can be further enriched with use of this device. Also, the device can be made more compact using design technologies. It will make the device more comfortable for usage and thus subsequently make it a commercially viable alternative to replace the conventional mouse and home automation techniques.

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