International Journal of Innovative Research in Science and Engineering
Volume 7, Issue 06, 2021
www.ijirse.com
ISSN: 2454-9665

GESTURE CONTROL SMART SURVEILLANCE ROVER

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ABSTRACT

This purpose project is a real time monitoring system by which human interacts with rovers through pre command gestures. This will be a great and an immense aid for people for whom mobility is a challenge. There is a dire need for vision base interface over pre command recognition as it failed to mandate the rover because of modulation and varying frequency. Gesture recognition consists of three stages: capturing of image of surrounding, camera streaming and data extraction. The implementation is achieved by navigation of the rover through various pre command gestures. By the impact of this project, life of physically challenged people will becomes less challenging and easy. For the further research of it will benefit various areas consist of applications in defense, high security bases, etc.

Keywords: *Convexity, Surveillance, real time, computing, gesture, IOT Communications.*

I. INTRODUCTION

In this project user will also be able to control motions of the rover by wearing controller watch and performing predefined gestures. A Gesture Controlled rover is a kind of rover which can be controlled by our hand gesture not by old buttons. Human hand gestures are natural and with help of wireless communication. Gesture recognition can be seen as a way for robot to begin to understand human body language . The traditional wired button control rover becomes very bulgy and it will also limit the distance the rover moves across. The Gesture Control Smart Surveillance Rover will be controlling the function by a wearable hand clutch from which the movements of the hand can be used as the input for the movement of the rover. The basic idea of this project is to develop a system (Rover) which can recognize the Human Interaction with it to accomplish the certain tasks assigned to it.

In this project we will design a wearable Hand Watch which will contain sensors mounted on it to capture the movement of the hand and convert the raw mechanical data into electrical form. This data will be further processed and converted into an understandable format for the Gyro Sensor mounted on the Watch. This Gyro Sensor will act as a transmitter of the data for wireless communication purpose. Once the transmitted data is received by the receiver module which will be connected to the Microcontroller, it will be processed and further sent to the Microcontroller.

II. PROPOSED OBJECTIVE

We purpose a System using which the user can navigate the wireless robot in the environment using various gesture commands. The main objective is to provide reliable and a more natural technique for the user to navigate a wireless rover in the environment using gestures. In this system user operates the rover from a control station that can be a laptop or a PC with a good quality-in-built webcam or external webcam. This webcam is used to capture real time

video or image stream of hand gesture to generate commands for the rover. Gesture commands are given using hand palm. Mainly two kinds of gesture are used which are explained further. Irrespective of the gesture technique used, rover is moved in all possible directions in the environment using four possible types of command which are Forward, Backward, Right, Left. Image frame is taken as an input and processed using Image Processing. Processed image is then used to extract the gesture commands. Easy control by a remote through wireless network. Send video and data captured to the server wirelessly. This gesture command can have one of the four possible commands as specified.

III. METHODOLOGY

1. Camera Streamer: So here, we have created a method named Camera Streamer. this method is used to operate the camera and that method controls when the camera starts streaming, when it stops and also when a timeout occurs when no input is given in a fixed period of time. This method is present in camera_streamer.py and its file loaded in the raspberry pi. Camera starts streaming: if input for camera start is received then a subprocess raspberry-pi camera streamer is started and a timer is started. Camera stops streaming. If input for camera stop is received then camera Streamer Process. Terminate () is executed and timer is stopped Camera timeout. A timeout counter of 2 mins is set if timer that is started when the camera starts streaming exceeds the timer counter then stop streaming process is executed.

2. Rover Controller: This method is used move the rover. It takes input from the switch button in the web page and in turns sends relevant input to the motor through the motor driver. It also is responsible for the camera tilt movement and resetting of the switch button back to the original position when the input is done.

3. Android Implementation: We normally create a new window to interact connect with the user. So, we have to create a new android project selecting the minimum SDK version API 8 to support the wider range of the rover. Then we need to add the several permissions into this proposed vehicle AndroidManifest.xml file to make our proposed project support raspberry-pi. INTERNET –to make the app use internet services ACCESS NETWORK STATE. To access network state (used to reconnect internet status). WAKE LOCK needed if your app needs to wake your devices when it sleeps. VIBRATE, needed if your support vibration after receiving command.

4. Pi-Camera Implementation

Figure 1. Pi-Camera Implementation

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ISSN: 2454-9665

5. Network Implementation

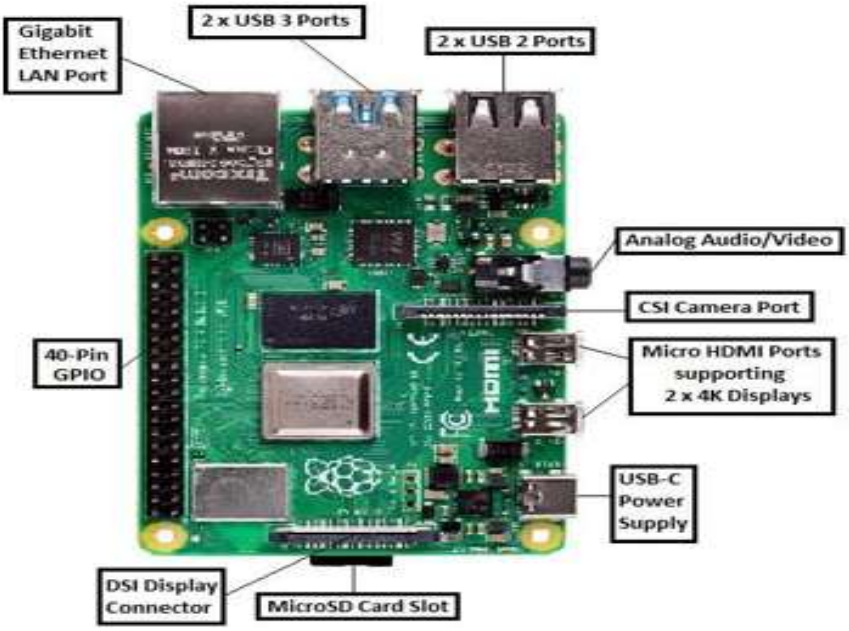

Figure 2. Raspberry-Pi

IV. BLOCK DIAGRAM

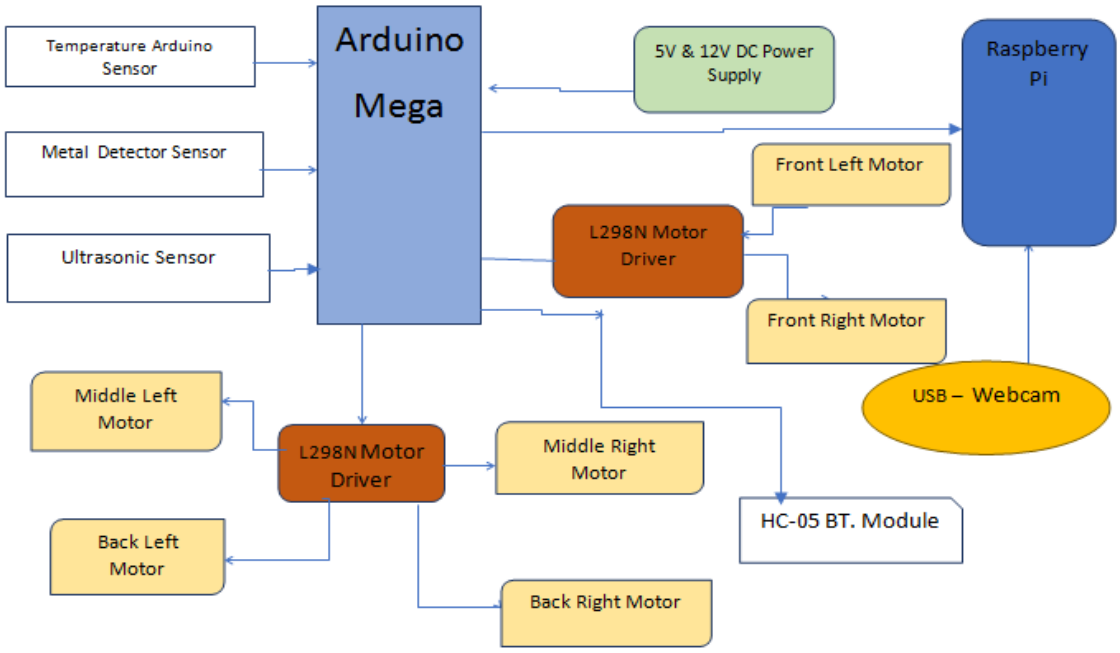

Figure 3. Block Diagram

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V. FLOW CHART

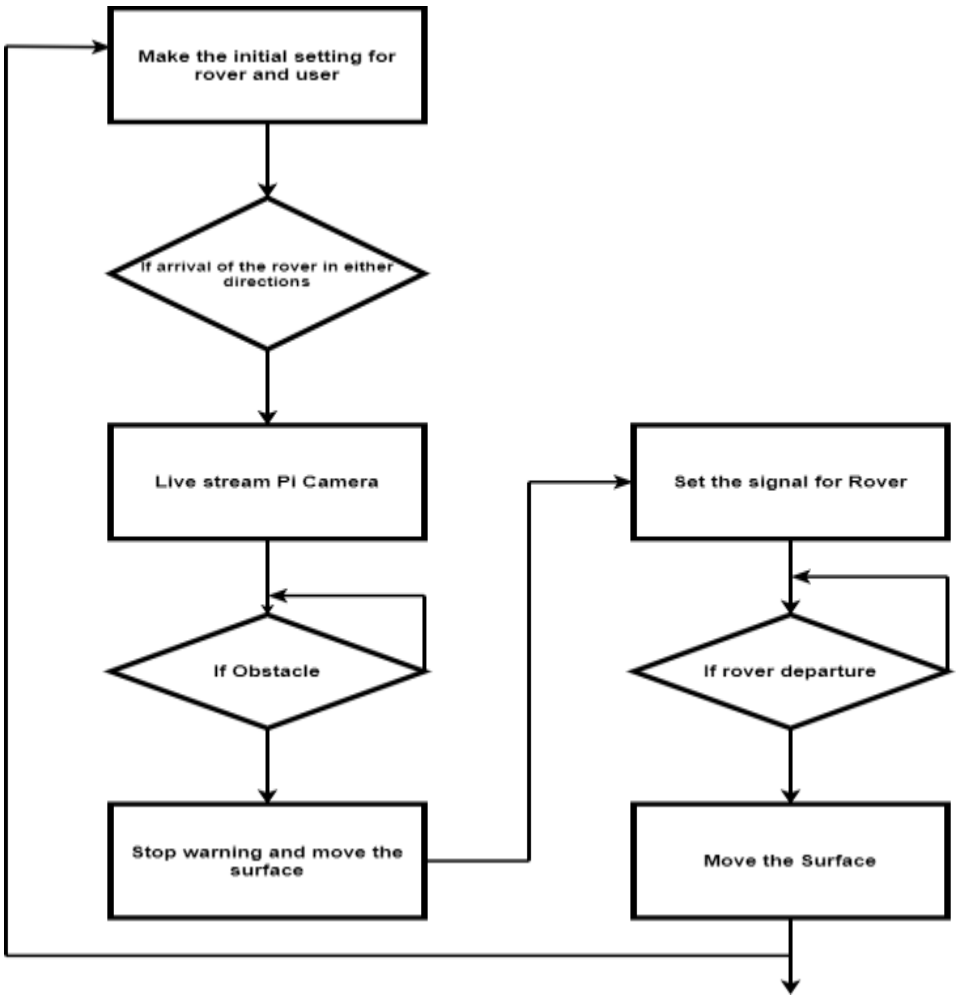

Figure 4. Flow Chart

VI. ADVANTAGES

- Due to Rover architecture, it can be travel at any rough terrain.
- Rover can be controlled by using hand gesture.
- It can be control by the remote devices (Window pc/ Laptop/ Android smartphone).
- It's also has Self intelligence mode, if no signal received by user it can operate by itself also.
- Object detection using Pi-camera.

VII. APPLICATIONS

- Wireless controlled robots are very useful in many applications like remote surveillance, military etc.
- Hand Gesture controlled robot can be used by physically challenged in wheelchairs.

- Hand gesture controlled industrial grade robotic arms can be developed.
- Gestures for Work (This one is for those workaholics who spend half their work life making
- presentations, and the other half presenting them. Ok, it is suited for gamers as well. This device from Leap Motion is known to be quite popular already, and works as an input device that lets you control your PC with hand movements).
- Driving to Safety (More than gestures, the automobile industry has seen more sensor assistance, for blind-spot recognition, and parking assist).

VIII. RESULT AND OUTCOMES

FIG 3. Gesture Controlled Smart Surveillance Rover

The proposed system, in which the user can navigate the wireless rover in the environment using various gestures commands. The rover moves in all four directions Right, Left, Front, back. Real image path monitoring through network.We control robot by using hand gesture in any places. Also, the movement of the rover is manually controlled through PC[1]. The main objective is to provide reliable and a more natural technique for the user to navigate a wireless robot in the environment using gestures. The proposed system will give the intelligent system which can controlled by the hand gestures, it works on the device accelerometer which has transmitter and receiver. The developing robot will detect the objects and name it using webcam. Object detection and tracking can be used to wirelessly control a robot's movement.

IX. CONCLUSION

Here, we have come to the end of the project on the "Gesture controlled smart surveillance rover." In this research work, we have presented a real time algorithm to track and recognize hand gestures for human-computer interaction with the surveillance rover in context[1]. It was a wonderful learning experience for us while working on this project. This project gave us real insight into the pollution which increases daily in the world. In this project, the rover can be easily controlled with the help of an accelerometer. It can monitor the environment and send the live video of the place. The user can have the arrive view of the surroundings. The experiments have confirmed that with environmental factors in control it results in higher efficiency and, thus, better product development and application-oriented concept.

We learnt a lot from this project and we are very thankful to our guide who help us a lot while making this project. We enjoyed each and every bit of work we had put into this project.

X. FUTURE SCOPE

- This project work has been narrowed down to short range Bluetooth module. Using a long-range module and other connectivity device will result in connectivity with the robot for long distances.
- In future, this methodology can be applied to other problem domains range as military applications to operate rovers (mine detector), medical applications for the purpose of surgery. It has to improve the security regarding false rating to add new sensors and make it completely autonomous. A thermal camera can be installed to sense the heat emitted by bodies useful in military purposes to detect enemies on the lines.
- Further enhancement in project can be used for home security and military purpose where the commands can be given to robot without risk by increasing the range and by installing cameras.
- The robot is useful in places where humans find difficult to reach but human voice reaches.E.g. In fire situation, in highly toxic areas.
- Power optimization such sleep and wakeup schedules can be incorporated.
- Image processing cab be implemented in the robot to the color and the objects.

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