

Accelerometer Based Gesture Controlled Robot

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ABSTRACT

This paper displays a model for gesture controlled UI (GCUI), and recognizes drifts in innovation, application and convenience. We introduce a coordinated approach is constant recognitions, gesture based information which control vehicle development and control on gesture of the client utilizing hand developments. A three pivot accelerometer is adaption. As the individual moves their hand, the accelerometer likewise moves in like manner. The gesture is catch by accelerometer and prepared by gesture. Today human machine communications is moving far from mouse and pen and is getting to be inescapable and much mouse perfect with the physical world . With each passing day the hole amongst machines and human is being diminished with the presentation of new innovation is simple the way of life. Its having future extent of cutting edge automated arms that are outlined like the human hand itself can without much of a stretch controlled utilizing hand gesture as it were. It additionally having proposed utility in field of development, therapeutic science, perilous waste transfer and so forth.

Keywords:- Accelerometer, RF,AT89C51 microcontroller, modular, motor driver.

I. INTRODUCTION

In the existing framework, human hand developments are detected by the robot through sensors and it take after the same. As the individual moves their hand, the accelerometer additionally moves likewise sensor dislodges and this sensor detects the parameter as indicated by the situation of hand.

In this framework, a gesture driven mechanical vehicle is produced, in which the vehicle developments and controls ie, dealing with and control is relies upon the gesture of the client. In this framework, gesture is caught by accelerometer and it is handled by programming in particular, microcontroller programming and the parameters are sent to microcontroller and encoder circuit, It is further transmitted(transmitter segment) by RF433 MHZ transmitter. In the collector area, the RF 433 MHZ recipient holds down the got parameters and process with microcontroller and gives those parameters to the automated vehicle so it act in like manner to the gesture. By this framework, it is conceivable to accomplish handling of long separation. This framework is purposely created to apply in therapeutic field for nursing help to doctors and in surgeries.

II. PROPOSED SYSTEM

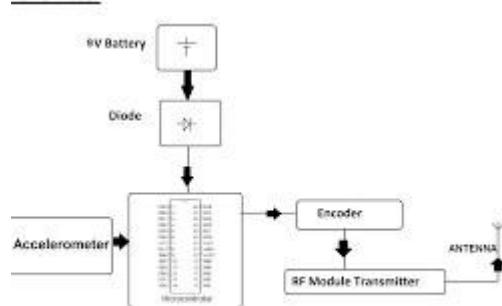


Figure 1: Blockdiagram of transmitter module

A.Accelerometer:- An Accelerometer is a kind of sensor which gives an analog data while moving in X,Y,Z direction or may be X,Y direction only depends on the type of the sensor. In accelerometer there is some arrow showing if we tilt these sensors in that direction then the data at that corresponding pin will change in the analog form.

B.Comparator: - For the purpose to change the analog voltage into digital we use comparator which compare that analog voltage to a reference voltage and give a particular high or low voltage.

C.RF Transmitter Module(TX):- The transmitter module is working on the frequency of 433MHz

and is easily available in the market at nominal cost . In the circuit, vcc pin is connected to the + terminal. The data pin is connected to the HT12E (pin no-1) that is transmitted or we can say that encoded data. The next pin is GND that is connected to the ground terminal. Now the last pin ANT this is connected to a small wire as an antenna.

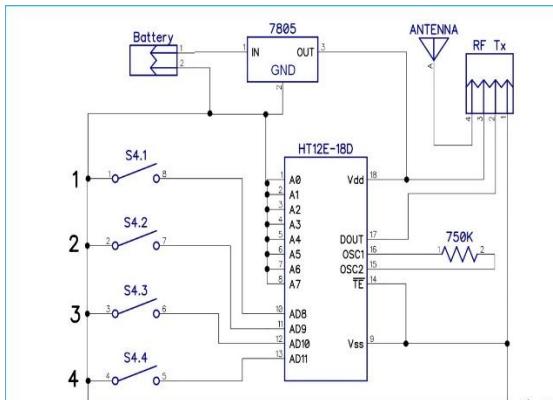


Figure 2: Block diagram of receiver module.

D.RF Receiver Module (RX):- The RF receiver module will receive the data which is transferred by the gesture device. It is also working as similar to the transmitter module- Connect the +vcc pin to the 5volt terminal. Connect the ground pin to the ground terminal .The data pin is then connected to the HT12D (pin-2) .So that we can get the decoded 4 bit data.

E.Decoder (HT12D):- We can say that an HT12D converts that serial data into parallel which is received by the RF receiver module. The input data is decoded when there is no error or unmatched codes are found. A valid transmission in indicated by a high signal at VT pin that is pin no1.

F.Microcontroller:-AT89C51 is microcontroller used in an integrated circuit with a processor and other support devices like program memory, data memory, I/O port, serial communication interface etc. integrated together.

Transmitters are usually subject to Regulatory Requirements which dictate the maximum allowable Transmitter power output, Harmonics, and band edge requirements.

III. SYSTEM IMPLEMENTATION

A. Methodology for hand motion recognition

The handheld controller is a 3D inflexible body that can be turned about the three orthogonal tomahawks. Yaw, pitch and roll are alluded to as pivot. These revolution happens as Z-hub is called yaw , the following turn X-hub is called pitch and last pivot about the Y-hub is called roll. Any introduction can be accomplished by the creating those three essential turn. In our work, the majority of the arranged hand movements for robot control are basic gestures, every one of which contains just a single of the three basic pivots. Gestures made out of in excess of one essential turn are excessively confused for such sort of use.

B. Methodology for communication signal

1.Transmitter Module

An RF transmitter module is a small PCB ie, printed circuit board sub-assembly capable of transmitting a radio wave and modulating that wave to carry data. Transmitter modules are usually implemented alongside a micro controller which will provide data to the module which is transmitted. RF transmitters are usually subject to regulatory requirements which dictate the maximum allowable transmitter power output, harmonics and band edge requirement.

2.Receiver modules

An RF Receiver module RF433-RX is 433 MHz radio receiver receives the modulated RF signal, and then it demodulates . There are two types of RF receiver module. Super-regenerative modules are usually of low cost and low power designs using a series of amplifiers use to extract modulated data from a carrier wave. Super-regenerative modules are generally imprecise as their frequency of operation varies in a fair amount with temperature and power supply voltage. Super heterodyne receivers having a performance advantage over super-regenerative; they offer increased an accuracy and stability over a large voltage and temperature range. This stability comes from a fixed crystal design which in turn leads to a comparatively more expensive product.

Radio receiver which receives the transmitted coded from the remote place these codes are converted to digital format and output is available to the pin no 2 of the ic2 master microcontroller; this is the pin of inbuilt art of the microcontroller.

We Based on the input codes master will give command to slave microcontroller and robot will behave as follows.

- Moves in forward direction
- Moves in reverse direction,
- Speed controls in both the direction
- It can even turn left or right while moving forward or in reverse direction.
- In case of bump, moves reverse turn left or right and wail for the next instruction.
- On the spot left or right turn to pass through the narrow space
- We have also added head light, back light and turning lights to left a right .

C. MethodologyforMotionControl

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers as they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors. L293D contains two inbuilt H-bridge driver circuits. In common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. The motor operations of two motors can be controlled by input logic. When an enable input is high, the associated driver gets enabled. As a result, the outputs become active and work in phase with their inputs. Similarly, when the enable input is low, that driver is disabled, and their outputs are off and in the high-impedance state.

This project controls a remote robot through RF. The ordinary 433 MHz RF modules are used in this project. AT89C51 microcontroller is used in this project. This robot can perform their operations without direct human guidance. They are used basically for industrial applications and can be made laser guided. Navigation is achieved by one of the several means, including following a path defined by buried inductive wires, surface mounted magnetic or optical strips; or alternatively by the way of laser guidance. This is an improved version of my previous robot which we designed years ago. Intelligent spy robot project has been designed for the spying purpose .it is radio controlled and can be

operated at a radial distance of 100m radius. Most probably our army youth need to venture into the enemy area just to track their activities. Which is often a very risky job and may cost precious life? Such dangerous job could be done using small spy robot all the developed and advance nations are in the process of making it, a robot that can fight against enemy. Our robot us just a step towards similar activity.

IV. WORKING OF RF CONTROL

This robot is radio operated which is, self powered, and has all the controls like a normal car. A laser gun has been installed on it so that it can fire on enemy remotely whenever required; this is not possible until a wireless camera is installed. Wireless camera will send real time video and audio signals which could be seen on a remote monitor and action can be taken accordingly. Being in size small of it, will not be tracked by enemy on his radar. Robot silently enter into enemy canopy or tent and send us all the information through its' tiny camera eyes. It can also be used for suicide attack, if required.

Heart of our robot is microcontroller 8051 family, we are using at89C51 In two microcontrollers where first microcontroller which acts as master controller, decodes all the commands received from the transmitter and give commands to slave microcontroller. Slave microcontroller is responsible for executing all the commands received from the master and also generating pulse width modulation pulses for the speed control driver circuit which drives 4 nos. of motors. Two no bumper switch is added bmp 1 and bmp2 so that in case of accident our battery dose not drains out. Both the motors will stop instantly and after few second robots will move in opposite direction take turn to left or right direction and stops and stop.

V. CIRCUIT ELEMENT

3-Axis accelerometer

XL335 is a three axis Low-G accelerometer with user selectable having 1.5g or $\pm 6g$ acceleration range. Board has all the necessary components required for the accelerometer. As board comes with onboard 3.3V Low Drop voltage regulator. Accelerometer module can be powered from 2.2V to 6V. XL335 accelerometer has self test, 0g-

Detect which detects linear freefall, user selectable g range of 1.5g and 6g and sleep mode to reduce power consumption. Possible applications of this board include Robotics, Tilt and Motion Sensing, Freefall Detection, Image Stabilization,

Navigation and Dead Reckoning, Tilt Compensation in inertial sensors, 3D-Gaming. transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission occurs at the rate of 1Kbps-10Kbps. The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitted

VI. RESULT

The vision based gesture recognition system designed a robot which performs the task of cleaning through interfacing between robot and manipulator. The Finger gesture recognition make use of fingers to interact with computer. The Accelerometer based hand gesture recognition makes use of accelerometer as a tool to detect and recognize human gestures.

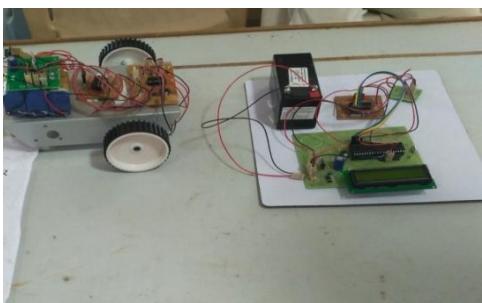


Fig.3: Prototype Model of Gesture controlled robot

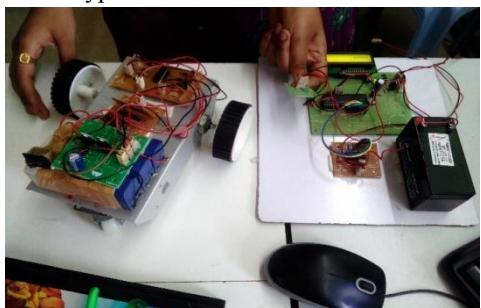


Fig.4: Left Position

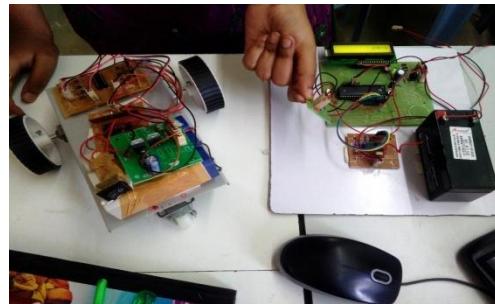


Fig.5: Right Position

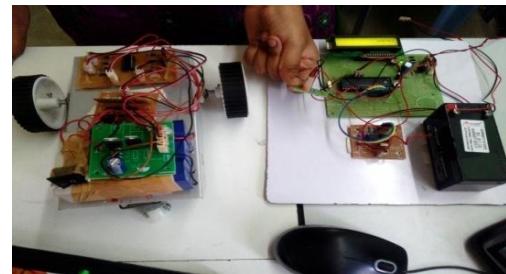


Fig.6: Front Position



Fig.7: Back Position

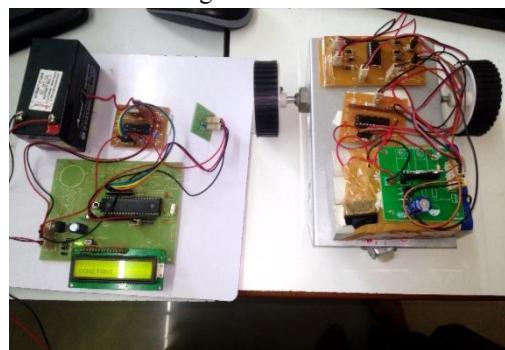


Fig.8: Constant Position

This PCB equipped with various components is mounted on hand of the users which captures the gestures of human and makes the robot move accordingly in different directions, thus creating the interaction between humans and robot.

VII. CONCLUSION

In this project, a robotized robot has been produced which works as indicated by your hand gesture. The robot moves remotely as indicated by palm gesture. The RF module is chipping away at the recurrence of 433 MHz and has a scope of 50-80 meters. This robot can be moved up to identify human life in seismic tremor and avalanche by actualizing the sensor as needs be. It can likewise be moved up to bomb identifying robot as it has automated arm it can likewise lift the bomb. GPS framework can be added to the robot by the assistance of which its area can be followed. The significant favorable position of this framework over different frameworks is that it gives constant palm gesture acknowledgment, prompting a successful and common method for controlling robots. Extra preferred standpoint - numerous existing framework have utilized Bluetooth remote control which is supplanted by RF modules in this report, and because of which the range has been improved.

VIII. FUTURE SCOPE

In the receiver segment a remote camera is set to screen the execution of robot arm alongside understanding side (Robot arm side) 5 essential parameters (ECG, Respiration rate, Pulse rate, Temperature, Heart beat) of patient is checked. This is a preventive measure for any lopsidedness in casualty's digestion (temperature, weight, heart rate), ALARM in transmitter's segment (doctor side) will ring, which thus brings into notice of doctor that patient is in some basic circumstance, with the goal that the doctor quickly going to stops the activity of mechanical arm and he will illuminate the close-by specialists to deal with understanding. This mechanical arm created is to diminish labor in medicinal field, deal with quiet without pro/specialist and to confer the automated in restorative zones.

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