Smart Phone Based Robot for Domestic purpose using Bluetooth.

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Abstract - *Robot is a reprogrammable, multifunctional gadget which is basically intended to do work like human, for example, pick and place, stacking and emptying, observation, social insurance, modern, aviation application. Robots can perform hazardous and precise work to build the profitability as they can work 24 hours without rest. This paper manages the outline and control of robotized vehicle write robot which can move wanted way and catches pictures and recordings of required area. An android application has created and a Bluetooth correspondence is made with robot which interfaces with raspberry pi 3 to control its speed and course. Point of this work is to plan and control the movement of robot utilizing Bluetooth gadget of an Android telephone.*

***Key Words*: Bluetooth device, Raspberry Pi 3, Dc Motor, Smart Phone, Camera, GUI etc.**

1. INTRODUCTION:

A robot is an electromechanical machine that is controlled by PC program to perform different operations. Modern robots have intended to decrease human exertion and time to enhance profitability and to diminish fabricating cost. Today human-machine collaboration is moving far from mouse and pen and ending up significantly more inescapable and considerably more good with the physical world. Android application can control the robot movement from a long separation utilizing Bluetooth correspondence to interface controller and android Raspberry Pi 3 is interfaced with Bluetooth module. According to the summons got from android application the robot movement can be controlled. The yield movement of an automated vehicle is precise and repeatable. Pick and Place robots can be reprogrammable and device can be exchanged to accommodate different applications. The motivation behind this work is to outline and actualize an Android Controlled Bluetooth Robot which is utilized for Surveillance, home robotization, wheelchairs, military and prisoners Rescue applications.

2. LITERATURE REVIEW

A. Conventional Wireless Robotics:

In customary mechanical autonomy, the controlling and operation of robots is generally done by utilizing RF [Radio Frequency] circuits. These circuits are broadly utilized for control and working applications and are additionally dependable over a little range. The RF circuits comprise of transmitter and recipient which are autonomous of each other. All the control flags and charges are sent by means of remote medium in the middle of transmitter and collector

B. Bluetooth:

Remote innovations, for example, Bluetooth give the capacity to reinforce the neighborhood remote system. Bluetooth innovation was made by Ericsson in 1994 and is utilized to supplant the links in the workplace, in research centers or at home. Bluetooth gadget worked in the scope of 10 meters. Bluetooth gadget can relevant for voice and information recordings and pictures transmission and gathering. Favorable circumstances of Bluetooth have low expenses and low power and nature can be indicated parts of Bluetooth has been included into different sorts of cell phones, for example, cell phones, PDAs and different remote set.
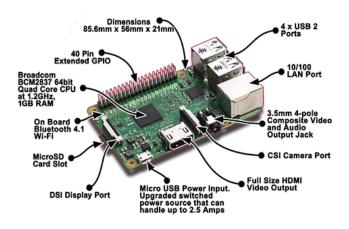
3. HARDWARE REQUIREMENTS

3.1 Raspberry pi 3

Fig-1: Raspberry Pi 3

This is the brain of robot loaded by a program written in Python language to do the required functioning and is interfaced with Bluetooth module. The motor driver are used to make the system work as we want.

3.2 Dc Motor

Fig -2: Dc Motor

Relatively every mechanical development that we see around us is refined by an electric motor. Motors take an

electrical vitality and deliver mechanical vitality. Electric motor is utilized to control several gadgets we use in regular daily existence. HC - 05 Bluetooth module. D.C. motor is controlled by DC voltages and moves in forward, in reverse, left and right, heading as per the extremity of voltage connected. For the most part all mechanical development which robot performs is refined by an electric motor. Electric machines are methods for changing over vitality into mechanical vitality. Electric motor is utilized to control gadgets. A case of little motor applications, for example, motors utilized as a part of cars, robot, hand control devices and nourishment blenders. Smaller scale machines are electric machines with parts the span of red platelets and find numerous applications in prescription.

3.3 Dc Motor driver Ic

Raspberry pi 3 can't supply the current required to run DC engine. So fulfill this necessity IC's are utilized to drive the engine. The L293 and L293D are fourfold high current half – H drivers. The L293D gives bidirectional drive streams of up to 1A at voltage from 4.5V to 36V. The L293D is intended to give bidirectional drive streams of up to 600-MA at voltages from 4.5V to 36V. The two gadgets are intended to drive inductive loads, for example, transfers, solenoids, dc and bipolar venturing engines, and other high current/high voltage stacks in positive-supply applications. On the L293D, outer rapid yield cinch diodes ought to be utilized for inductive transient concealment. A Vcc1 terminal, isolate from Vcc2, is accommodated the rationale contributions to limit gadget control scattering. The L293 and L293D are described for operation from 0ͻC to 700C.

3.4 HC-05 Bluetooth modem

Fig. 3-: HC -05 Bluetooth module.

This module is equipped for speaking with pc, cell phone or some other Bluetooth empowered gadget. It is interfaced with the Raspberry pi 3. Bluetooth is a remote correspondences convention running at 2.4 GHz, with client server design, appropriate for framing individual territory systems. Bluetooth is a greatly basic component intended for low power gadgets. Bluetooth is an institutionalized element or detail that is accessible in all Smartphone running on android, workstations and PCs. It is extremely helpful as it can be effortlessly fitted with a module to permit Bluetooth correspondence. Bluetooth is the main fitting interchanges convention that has no dread of getting the recurrence

obstructions since it utilizes the MAC Address of the gadget i.e. Bluetooth permits the availability between two gadgets utilizing their MAC Address.

HC-05 module appeared in Figure-3 is a simple to utilize Bluetooth SPP (Serial Port Protocol) module, intended for straightforward remote serial association setup. Serial port Bluetooth module is completely qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with finish 2.4GHz radio handset and baseband. It utilizes CSR Blue core 04-External single chip Bluetooth framework with CMOS innovation and with AFH (Adaptive Frequency Hopping Feature). HC-05 module deal with 3.0V low power operation and 3.0 to 4.2V I/O controls. It has coordinated radio wire, edge connector and UART interface with programmable baud rate. HC-05 module has default Baud rate: 38400, Data bits:8, Stop bit 1,Parity: No equality and bolstered baud rates are 9600, 19200, 38400, 57600, 115200, 230400, 460800.

4.Sensors

4.1. Temperature Sensor (LM35):

The LM35 is a coordinated circuit temperature sensor. Yield voltage of LM35 is directly corresponding to the Celsius temperature. The upside of LM35 over straight temperature sensors adjusted in ° Kelvin, there is no compelling reason to subtract a consistent voltage from its yield to get advantageous (Centigrade) Celsius scaling. The temperature sensor (LM35) needn't bother with any outside calibrator unit or trimming to give ordinary correctness's of ±1/4°C at room temperature and ±3/4°C over a full −55 to +150°C temperature go. The cost of LM35 is low and it is very much adjusted.

4.2. Smoke Sensor (MQ-2):

MQ - 2 is an ignitable gas and smoke sensor, use to recognize the centralizations of flammable gas or smoke noticeable all around and yields its perusing as a simple voltage.

4.3. LPG Gas Sensor (MQ-6):

MQ-6 is a gas sensor use to identify condensed oil gas (LPG). It additionally identifies propane and butane fixations noticeable all around. The scope of gas fixations noticeable all around are identified by MQ-6 is from 200 to 10000ppm. High affectability and quick reaction time are the focal points of MQ-6. The yield of sensor is a simple protection. It is a basic circuit; it requires control the warmer curl with 5V, including a heap protection in it, and at that point associate the yield to an ADC.

4.4. Vicinity Sensors:

With no physical contact closeness sensor can recognize the nearness of close-by objects. A closeness sensor as often as possible outsends an electromagnetic field or a light emission radiation, and sitting tight for changes in the field

or the flag which is return by sensor. The objective of vicinity sensor is a protest, which is distinguished from predefined run. "Ostensible territory" is characterized as the most extreme remove that the sensor can distinguish. Vicinity sensors are solid and their practical life is long a direct result of the no mechanical parts are utilize and no physical contact amongst sensor and the detected protest.

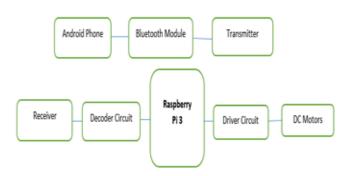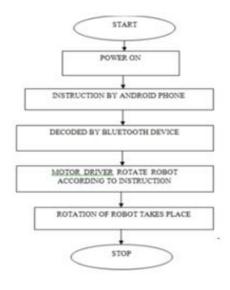## 5. SYSTEM DESIGN AND ARCHITECTURE

Fig. 4-Block Diagram of proposed System

A robot can be controlled using Bluetooth module HC-05 and Raspberry Pi 3 with android Smartphone device. The controlling devices of the whole system area Raspberry Pi 3. Bluetooth module, DC motors are interfaced to the Raspberry Pi 3.

The data receive by the Bluetooth module from android smart phone is fed input to the controller. The controller acts accordingly on the DC motor of the robot. The robot can move to move in all the four directions using the android phone. The direction of the robot is indicators using LED indicators of the Robot system. In achieving the task the controller is loaded with program written using Python Languages.

6. SOFTWARE DESIGN

Fig -5: Flow Chart

6.1 Algorithm:

1) Switch ON the Bluetooth gadget and ON the energy of Bluetooth collector.

2) Pair the HC-05 module with the android telephone. Enter the secret key for the matching gadget.

3) For interfacing the gadget tap on the "Associate" choice.

4) UP ARROW is for the forward heading of the robot to move the robot.

5) DOWN ARROW is for the descending course of the robot.

6) RIGHT and LEFT headings operations performed by the two side keys.

7) For the STOP operation Center catch is utilized.

8) Disconnecting the gadget with HC - 05 module and push on the DISCONNECT catch.

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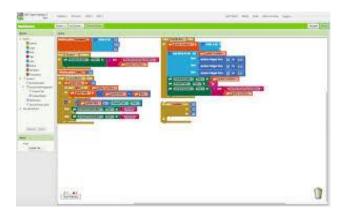
7. ANDROID APPLICATION

Fig-6: App Inventor Designer

Android is an extremely recognizable word on the planet today. A large number of gadgets are running the Google Android OS and millions are being created day by day. Google has made the Android advancement stage open to everybody around the globe, so there are a large number of engineers. Albeit a few designers simply concentrate on building the applications or amusements for the android gadgets, there are various potential outcomes also.

Application Inventor for Android is an application initially gave by Google, and now kept up by the Massachusetts Institute of Technology (MIT). It permits anybody comfortable with PC programming to make programming applications for the Android working framework (OS). It utilizes a graphical interface, fundamentally the same as Scratch and the Star Logo TNG client interface, that enables

clients to move visual items to make an application that can keep running on the Android framework, which keeps running on numerous cell phones.

The primary period of use configuration experiences App Inventor Designer. Originator is open through the website page and every one of the elements for the application are accessible on the left half of the window. The fixings incorporate components like a screen for the application, catches for tapping, content boxes, pictures, names, liveliness and some more. The correct side of the creator enables clients to see the screen and parts added to the screen. Also, the properties area of the window enables clients to adjust the properties of parts.

In this applications advancement the App Inventor gives a flexible chance to build up a modified application begins with set up a Bluetooth association via looking through the accessible Bluetooth gadgets and make combine with them. For Robotic Movement appoint a Character for every operation, for example, Forward – „U", Backward – „D", Left – „L" and Right – „R". These characters were transmitted to 8051 microcontrollers UART module by means of Bluetooth Device HC-06 which can transmits the character in 9600baud. The App Inventor has an element to test the operation utilizing Emulator

8. OPERATION OF THE SYSTEM

The task is intended to control an automated vehicle utilizing an android application. Bluetooth gadget is interfaced to the control unit on the robot for detecting the signs transmitted by the android application. This information is passed on to the control unit which moves the robot as wanted. A Raspberry pi 3 is utilized as a part of this task as control gadget. Remote operation is accomplished by any PDA/Tablet and so on., with Android OS, upon a GUI (Graphical User Interface) based touch screen operation. Transmitting end utilizes an android application gadget remote through which summons are transmitted. At the recipient end, these charges are utilized for controlling the robot every which way, for example, forward, in reverse and left or right and catches the video and transmits to TV through RF flag

At the less than desirable end the development is accomplished by two engines that are interfaced to the Raspberry pi 3. Serial correspondence information sent from the android application is gotten by a Bluetooth beneficiary interfaced to the Raspberry pi 3. The program on the Raspberry pi 3 alludes to the serial information to create individual yield in light of the info information to work the engines through an engine driver IC. The engines are interfaced to the control unit through engine driver IC.

9. CONCLUSIONS

The working arrangement of advanced mobile phone is android which can create successful remote control program. In the meantime, this program utilizes blue-tooth

association with speak with robot. It has demonstrated to take into account important two-path correspondence between the Android telephone and the robot which would permit a non-master to communicate with and modify the usefulness of a framework which utilizes ATmega328 controller, a solitary board smaller scale controller proposed to make the utilization of intuitive articles or situations more available. The reconnaissance is dependably has been a very delicate undertaking. What's more, it incorporates such huge numbers of dangers. So it's smarter to utilize robot for this activity rather than individuals. What's more, on the off chance that you can control the robots with proficiency and exactness then you can promise yourself with great outcomes and achievement. This framework is a decent advance for secure reconnaissance utilizing robots. Remote control is a standout amongst the most essential fundamental requirements for every one of the general population everywhere throughout the world. Be that as it may, shockingly the innovation isn't completely used because of an immense measure of information and correspondence overheads. For the most part a significant number of the remote controlled robots utilize RF modules. In any case, our venture for automated control make utilization of Android cell phone which is extremely modest and effortlessly accessible. The accessible control summons are more than RF modules. For this reason, the android versatile client needs to introduce a planned application on her/his portable.

10. REFERENCES

[1] Rahul Kumar, Ushapreethi, Pravin R. Kubade, Hrushikesh B. Kulkarni, "Android Phone controlled Bluetooth Robot", International Research Journal of Engineering and Technology.

[2] M.Selvam"Smart Phone Based Robotic Control For Surveillance Application", International Journal of Research in Engineering and Technology.

[3] Prof-Zadbuke Ashwini, Miss-Amruta Khot, Miss-Kharat Sandhya, Miss-supriya shelar, Miss –khomane shital," Educational Bluetooth quizzing application for Android phone based on Raspberry pi", International Journal of Recent Trends in Engineering & Research.

[4] Ms. S.D. Mulla, Ms. A.S. Mali, Ms. S.T. Shibe, Asst. Prof. S.S.Joshi." Android Application Controlled Remote Robot Operation", International Journal for Scientific Research & Development.

[5] Vrushali K. Jadhav, Prof. R. G. Dabhade," Smart Home System Using Service Robot and Wireless Sensor Network", International Research Journal of Engineering and Technology.

[6] Dr. Shantanu K. Dixit, Mr. S. B. Dhayagonde," Design and Implementation of e-Surveillance Robot for Video Monitoring and Living Body Detection", International Journal of Scientific and Research.

[7] Surbhi Verma," Android App Controlled Bluetooth Robot", International Journal of Computer Applications.