

Multiple Motion Control System of Robotic Car Based on IoT to Produce Cloud Service

Rajitha Annangi, Mohammad Khadir

Abstract: A Robot is a virtual synthetic agent and an electro-mechanical system that is guided with the useful resource of pc, mobile or digital programming, and is consequently able to do obligations on its own. The controlling component of these frameworks makes them all the more exceptional. Various control framework guarantees that an accumulation of autonomous PCs appears to clients as a solitary controlling framework. It utilizes decentralized components or subsystems to control appropriate Robots offer adaptability, broadened gear life, straightforwardness of new hardware incorporation, and brought together upkeep when utilized as a part of a mechanical domain ted forms. The openness and accessibility of modest charge card estimated single board PC is needed. Here this gadget is proposed with the help of low energy wireless sensor network to trace out the intruders and the robot will take the important movement mechanically. Thus the proposed tool, an Intelligent Robot saves human live and reduces guide error in protection thing. This is specially designed spy robotic tool to store human existence and shield America from enemies. One of the most critical things about these robots is that they have the capability to carry out missions remotely inside the place, with none actual threat to human lives.

Keywords: Microcontroller, Smart Phone, IoT, robot.

I. INTRODUCTION

The regulating part from these systems makes them remarkable. Different control systems certifications that a aggregation of independent PCs seems to customers as a single regulating system. It utilizes decentralized segments to handle appropriated types. They provide “adaptability, broadened gear life, straightforwardness of new equipment incorporation, and brought together upkeep when used as a segment of a mechanical domain” [6]. Several “propelled control frameworks of robots” are made in perspective from claiming present control methodologies that have been grow on determinations [7].

Therefore, for versatile and effective handling, the different control gadgets will be in excess of a need. The availability and openness of “modest charge card assessed single board PC”, for instance, “Raspberry Pi has enabled the making of different controlling and computerized system” which has low power usage, quicker preparing capability at a low price. The different control procedure of robots suggested in this manuscript coordinates the usage of “sensible instruments, availability, remote correspondence and productivity of regulating framework”.

II. BACKGROUND WORK

This fragment offers for a elucidating framework of a few strategies that have been executed and attempted to regulating plan of devices and robots by “Raspberry Pi and Arduino”. The work [1] portrayed a “Raspberry Pi home robotization framework where Raspberry Pi” fills in as a sensor internet center for handling apparatuses in home automation that makes it perfect phase for connecting with an extensive variety of gadgets. Here “Raspberry Pi” will be not only a sensor center yet a controller [1]. Nonetheless, the regulating device includes majority of the data accumulation and work just in indoor situation. Another “device controlling gadget of Raspberry Pi” is delineated in a “Raspberry Pi based home robotization framework through email” [2]. The duty for this manuscript is “Raspberry Pi” could read out summons of customers through email and the gadgets to be regulated are interfaced with “Raspberry Pi using exchange driver” [2]. In any case users might simply handle replacing situation of apparatuses; no different regulating framework will be involved. The work [3] suggests versatile and cheap control stage utilizing “Raspberry Pi and Arduino running the REX control system” which will be an open structure for introduced control [3]. At that point again, “REX phase” will be not adequately standard and unfit to handle many devices. In turn continuous watching method has been performed in building up a “fire alert system using Raspberry Pi and Arduino” [4]. In this manuscript it will be depicted how “Raspberry Pi” handles the state in perspective about sensors. At any rate it need not combined any customer controlled collaboration and will be recently a sensor built module.

Revised Manuscript Received on 30 March 2019.

* Correspondence Author

Rajitha Annangi*, PG Student, Department of Electronics and Communication Engineering, Institute of Aeronautical Engineering, Hyderabad, India

Mohammad Khadir, Department of Electronics and Communication Engineering, Institute of Aeronautical Engineering, Hyderabad, India

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Anita Sabo et al. delineated a regulating part of mechanical arm utilizing “Raspberry Pi through the internet in an examination paper” [12]. In any case of its positive position circumstances, it has a couple imperatives. It barely fuses the regulating instrument flying through web profit and the client can't recognize its range. Further, there will be no input system thus the client has no true route to verify about feasible execution of charge, which is an absolute need have highlight clinched alongside at whatever schema connected with those web. The response for the complications from the earlier investigates as expressed above will be to improve a dissimilar controlling framework that empower users to handle robots from detached spots through voice orders and client provision through internet. The “remote association” will be deliberated here. In this manuscript, the “movement control arrangement of mechanical auto” is deliberated. At first the charges include: “push ahead, go in reverse, turn left, turn right, pivot left, pivot right, enact deterrent discovery, and deactivate impediment recognition”. This summons can be given by means of voice charges and additionally client application.

It may be possible to discover the auto persistently in UI and acquire data and criticism w.r.t the auto. Similarly the “ultrasonic separation sensor” inspires the robot to avoid impact with objects coming in the center of its path.

III. Proposed Method

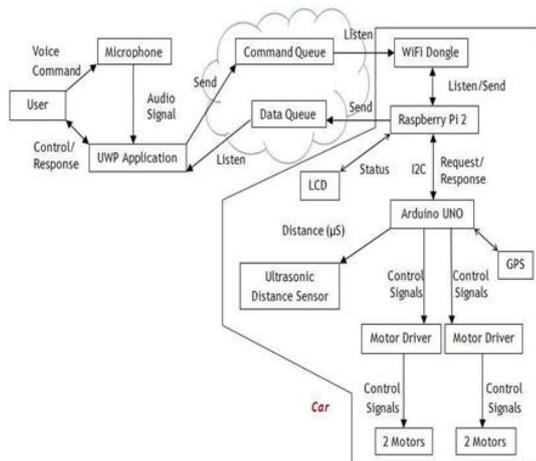


Figure.1. System Block Diagram

In this segment the framework workflow depicted in detailed. The working methodology may be isolated into 7 main parts and they are as follows:

A. Sending command

There are 2 methods of sending summon to the auto: voice order of catches obvious in UI. The conceivable words or summons that may be talked by clients are recorded in XML sentence structure document. Clients can likewise control the auto straightforwardly from interface of UWP application and send any summon same as previously.

B. Stores commands in a cloud service The UWP provision saves summon in a Queue of cloud profit enabled by “Azure IoT center”. The line offers a more flexible and portrayed help of this scheme. Concerning illustration both auto

information and summons were must have been replaced at the desired devices and in meantime, with the goal 2 lines were utilized particular case for information and elective for variety. The “Raspberry Pi” in the auto tunes over of the “Command Queue” Also it sends information of the “Data Queue”. Of course “the UWP provision in the controller end tunes clinched alongside of the information Queue” What's more it sends summon of the “Command Queue”. Thus as both the wind framework segments compelling reason not an opportunity to make joined for the “Azure IoT focal point point” clinched alongside interim thereabouts it gives the framework more guaranteed execution.

C. Raspberry Pi gathers command and passes to Arduino

There are fundamentally 3 methods of summon signals that the “Arduino UNO gets from the Raspberry Pi”. These are:

- 1) To send the GPS sensor esteems obtained from the GPS,
- 2) To send information got from the hindrance locator and
- 3) For moving auto's heading of movement as per the charge flag sent by Raspberry Pi.

D. Arduino takes action according to command

In light of the summon got Arduino makes proper move. For instance: securing GPS sensor esteem, getting deterrent separation sensor perusing and moving the auto's course of movement. The GPS sensor ceaselessly pings for receiving the genuine area of the auto. Arduino additionally pings ultrasonic separation sensor for separation of hindrance before auto. In view of the charges, Arduino alters the course and speed of the engines utilizing the engine controllers. An aggregate number of four engines considered here.

E. Sends acknowledgement to user

Whatever could a chance to be the charge sent to auto, for every summon there will be a particular response that either expresses to that the request has been satisfied or it need dismissed to fulfill summon. Regularly the affirmation will be spoken to as 0 or 1. This will be a vitally vital part whether there must be a happening of systems such as this which relies on the IoT perspective as without this component client can't understand if the method has actually executed in the preferred route or not.

Figure 3 exhibits the genuine plan of mechanical auto. Figure 4 represents the “screen shot of client application” will be showed. Customers could control the auto toward steady discourse acknowledgment schema functioned for the voice charges or basically using “moving bearing pointer” catches in UWP. Any information w.r.t auto will be showed in the customer requisition. Customers could leave requests and schema will work toward bringing requests from “Queue in first-in first-out method”.

IV. FLOW CHART

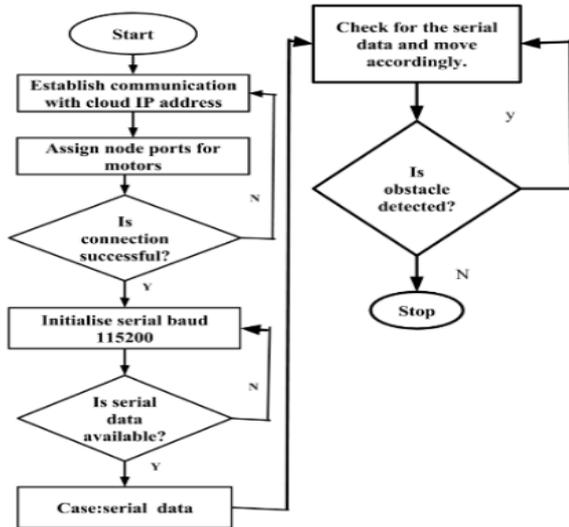


Figure.2. Work flow

The robotic car here is equipped with a surveillance camera which enables the user to be aware of the motion of the car and the environment in which the car is being operated.

Left Motors	Right Motors	Outcome
Forward	Forward	Forward
Forward	Static	Left
Static	Forward	Right
Backward	Backward	Backward
Forward	Backward	Rotate Right
Backward	Forward	Rotate Left

Figure.3. Various controlling methods



Figure.4. Android Application user interface

V. RESULTS

Those Node MCU may be an open wellspring product and equipment advancement surroundings. That ESP8266. The device perfect module may be a minimal effort Wi-Fi chip for full capability (IoT) thing is that this little table need a MCU provides for those likelihood on control I/O advanced pins through basic such as modifying dialect.

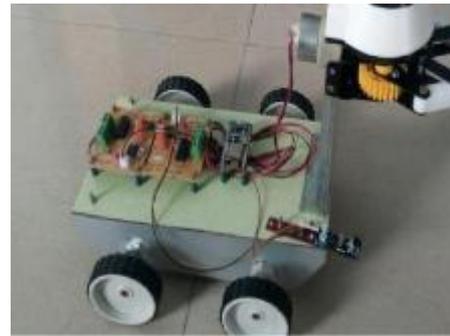


Figure.5. Hardware module for robot car

Two modes bring been outlined in this paper. That 1st mode may be remote control and the second mode is to impediment shirking. When the auto may be worked over mode I, the main technique for regulating the auto is toward operation starting with the smart phone by means of Wi-Fi.

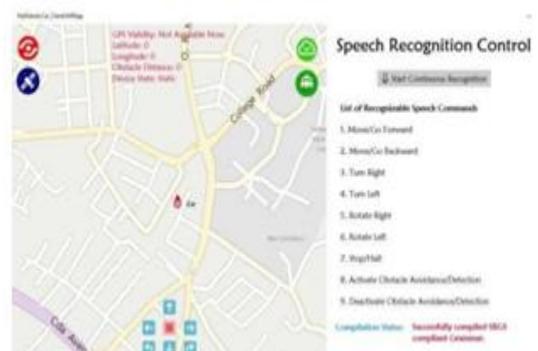


Figure.6. Picture of Robotic cars

The basic capacities need aid forward, left, correct Also opposite developments and in addition a stop, pick and drop activities In view of those touching of arrows in the client interface. On mode 2, that auto keeps setting off ahead until an impediment seems inside a characterized edge separation. After exploring those barrier, it will stop Furthermore sits tight for the summon from the client.

Distance	Time (ms)			
	Stored in cloud	Clients gets updates	Commands received by Car in	Perform action
10	5 ms	11 ms	5 ms	8 ms
20	5 ms	12 ms	5 ms	9 ms
35	5 ms	11 ms	5 ms	8 ms
45	5 ms	13 ms	6 ms	10 ms
60	6 ms	12 ms	6 ms	10 ms
90	6 ms	11 ms	6 ms	8 ms
100	7 ms	13 ms	7 ms	10 ms

Table.1. Performance evaluation

For making remote correspondence, a remote switch with a broadband association was utilized. The analysis was directed in an ordinary situation with sound level going from 60dB to 80dB. From trial outcome it is seen that flag of switch comes to up to 100m.

The outcomes depend on every one of the eight charges recorded in the XML sentence structure document. Contingent upon the separation between the automated auto and switch, there are varieties in time of accepting the summons. On a normal it takes just 6 ms to get a summon. In the meantime, orders are put away in the cloud benefit. As indicated by the method of charges, the Arduino take activities and clients get refreshed with a normal planning of 9 ms and 12 ms separately. In any case, the framework is vitally subject to the execution of switch, broadband association and the WiFi dongle connected to Raspberry Pi. The execution is nearly superior to anything past research aftereffects of any movement controlling frameworks of mechanical auto. The workplace, surface of mechanical auto and flag accessibility are kept in thought here.

VI. CONCLUSION

In this manuscript, a capable methodology of different control systems will be combined with IoT. Handling various devices in diverse paths makes cause more accommodation in taking care of a system. The cloud profit makes schema to reduce the memory stack. The performance comes about establish that whether the combination will be adequately proficient, various controlling strategies have “low impact on time and execution contrasted with single strategy” for control system.

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