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Vehicle Information System using R-Pi and Internet of Things

S. Kevin Andrews[1], V.Jeyabalaraja[2], M.S.Josephine[3]
[1,,3]Assistant Professor, Department of Computer Applications, Dr. MGR Educational and Research Institute, University, Chennai.
[2]Professor, Department of CSE, Velammal Engineering college, Chennai
stevekevins89@gmail.com[1] , Jeyabalaraja@gmail.com[2],josejbr@yahoo.com[3]

ABSTRACT

In this paper, (i) an individual leaving space the executives gadget that naturally identifies the accessibility of empty openings for leaving vehicles and a (ii) climate data announcing gadget (useful in crisis such as a landslide) is demonstrated. Methods: Conventionally high-accuracy location information from the on-board global positioning system (GPS) is processed and transmitted by a device to central office via cellular technologies. Alternately, in this research, the implanted controller ATMEGA Arduino alongside the sensors is associated with the on-board diagnostics through Internet of Things. The open source cloud administrations like Django (with 24x7 backend support), Xively and Twitter is utilized to screen the condition of the procedure sent from the controller and update the equivalent consequently to the vehicle proprietor. Conclusions: This work can change over procedures that are by and by non ongoing in a current control framework into continuous. The non-prerequisite of GPS or GSM gadget and the incorporation of the cloud administration are the benefits of this work.

Key words: Internet of Things, Embedded system, Smart Parking, Weather reporting.

1. INTRODUCTION

Monitoring and delivery of the values is done using two cloud services namely the twitter and This work focuses on developing embedded system based multi parameter monitoring and using the Internet of Things for delivering the parameters to the vehicle users. A hardware implementation in MIMO/cascaded systems that improve the system processing speed is proposed. The Django and hence can be operated at higher sampling rates using master slave architecture. Design of partitioned hardware system offers faster response time and becomes well suited for fast motion system.

1.1 Smart Parking System

The reason for the brilliant stopping framework is to identify the quantity of void stopping spaces and send the data over the web to savvy stopping application backend. These applications can be gotten to by drivers from Smartphone's, tablets or from in-vehicle route frameworks. In savvy stopping, sensors are utilized for each stopping opening, to identify whether the space is unfilled or involved. This data is accumulated by a neighborhood controller and after that sent over the web to a server. Each leaving opening has ultrasonic sensors fixed, which can recognize the nearness of a vehicle in a space. Every sensor is perused at ordinary interims and the condition of the stopping space (unfilled or involved) is refreshed in a database. The area model incorporates a physical substance for the stopping opening and the comparing virtual element. The gadget in this model is a Raspberry-pi installed framework which has ultrasonic sensor and climate checking units joined to it. The space model likewise incorporates the open source administrations and web administrations required for data transmission. The data shrewd stopping model characterizes the property (condition) of the stopping opening virtual element with two potential qualities (vacant or involved). The data climate model reports to a twitter account and needn't bother with extra administrations.

1.2 Climate Reporting System

The reason for the climate detailing bot is to gather information on ecological conditions, for example, temperature, weight, dampness and light in a region utilizing numerous end hubs. The climate data is sent through Twitter. End hub contains stickiness, temperature, a Raspberry Pi Minicomputer, light and weight sensors. This proposed structure includes different center points put in different territories for watching temperature, moistness and weight in a locale. The end hubs are outfitted with various sensors (for example: temperature, weight, light and moistness). End hubs send the information to the cloud and the information is taken care of cloud database. The examination of information is completed in cloud to total information and makes expectations. Twitter application is used for envisioning information. Concentrated Controller can send control directions to end hubs, For instance, to design the checking interim on end hubs. Gadgets as well as segments utilized in the model are Raspberry Pi Minicomputer, Temperature and Stickiness Sensor (DHT22), weight as well as

temperature sensor (BMP085) and LDR sensor. A simple to computerized (A/D) converter (MCP3008) is used for changing over simple contribution from LDR to advance.

2. LITERATURE SURVEY

The researcher [1] designed a high performance automatic irrigation system using low-power technology and Wireless Sensor Network. The node gathers the data such as water-level, Gate position as well as rainfall and sink node collects the real-time data. The data centre stores and process that information which are transmit from the Sink node through GPRS network. It is replaced from wired transmission into a wireless network. This network reduces the systems cost, improve the systems extension and progress the systems performance. This system can be use in water resources dispatch as well as flood prevention since it has a high stability.

Free-RTOS based Online date Acquisition and controlling systems using cortex-M3 core[2]. It has ethernet device for Cortex-M3 core to broadcast the monitored sensor data to Internet. System support remote monitoring as well as maintenance operations of equipment through the Network by Web browser [3].

Usage innovation based observing and controlling the field types of gear (or) machines utilizing Phone, Tablet Laptop (or) and work area pc having [4]. The proposed framework is partitioned into two sections for better usage; the initial segment is checking the implanted framework (field supplies) information and the subsequent part controls the field types of gear. It is an exceptionally simple, dependable, secure, quick remote arrangement [5].

An inserted sign securing framework for ongoing as indicated by the mechanical disappointment which happened with high recurrence in the pivoting machines [6]. The framework depends on a minimal effort microcontroller, Vibration sign are picked by the three pivot increasing speed sensor which has the exhibition of ease and high affectability, and the securing information from hub x, y, and z. The framework examined the working standard of information procurement module. The proposed framework has µC/OS-II to understand the information task the executives and planning, and it have compacted with structure and ease [7].

A round robin booking calculation to improve the CPU proficiency continuously and time sharing working framework [8]. The proposed calculation is unrivaled as it has less holding up reaction time, typically less pre-emption and setting exchanging along these lines diminishing the overhead and sparing of memory space.

An occasional usage of control frameworks that are exceptionally intended for remote sensor and actuator systems (WSANs) [9]. Likewise he distinguished confinements of the current IEEE 802.15.4 MAC convention and proposed a few changes to expand its adaptability and empower our executions [10]. The outcome demonstrates that the proficient correspondence systems executed concerning control and interchanges execution [11]. The authors had implemented a very simple and efficient robot for detecting the faults in the railway tracks with the help of IoT and Raspberry pie [12]. The authors have implemented the Industrial Automation with the help of Internet of Things (IoT) [13].

3. REALTIME SYSTEM IMPLEMENTATION

3.1 Case (I) Smart Parking System

Controller Code

It neighborhood that helps for continues running on Raspberry Pi. The run Controller limit is known as and examining the Ultrasonic sensor is gained. If division returned by sensor isn't actually an edge, the opening is seen as included. The present state of opening is then revived by transmitting a PUT requesting organization.

Controller Code Algorithm

Main Loop

1. Module read ultrasonic sensor to peruse ultrasonic sensor with a Type Boolean
2. On the off chance that it returns "1", set current state "involved" to cloud server
3. Else , set current state "vacant" to cloud server
4. Repeat Step 1

3.2 Read ultrasonic Sensor

1. Set the threshold range
2. Measure the sign on and off time from ECHO-PIN associated with GPIO on R-Pi
3. Convert from time to distance
4. If distance is less than threshold , return “1” to main loop
5. Else, return “0” to main loop

3.3 Cloud Side Programming

To implement cloud side services, Django framework is used.

The subsequent are the cloud side files:

- Serializers.py : permit difficult information (such as show occasions) to be changed over to local that can at that point be effortlessly render into XML, substance type.

- Views.py: Viewsets combine the rationale for set of interrelated sees in a single course. The Viewsets for the models (Mode Viewset as well as State Viewset) are included within the views file.

- It contains important fields and behavior of the information you're storing. By and large, each one demonstrate map to a sole database table.

3.4 Circuit Diagram

The association chart utilized for keen stopping is appeared in figure 1. Ultrasonic Sensor faculties the distance and is put within spaces. Figure 2 shows Association among the Electronic Circuit and the R-Pi

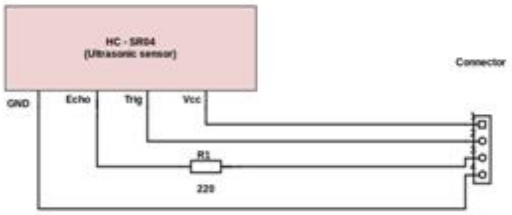

Figure 1: Association chart used for Smart Parking

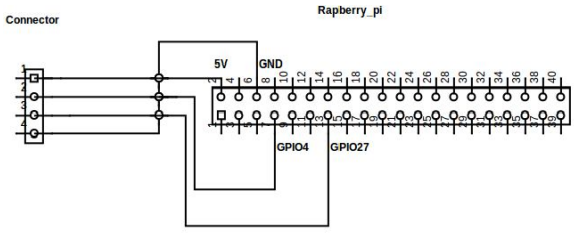

Figure 2: Association among the Electronic Circuit and the R-Pi

3.5 RASPBERRY PI Setup

- Connect Keyboard and Mouse to USB
- Connect WIFI Dongle to the USB
- Connect Power to Raspberry Pi through USB
- Make sure WIFI

3.6 Starting the Server

- Using ifconfig detect the IP address of the server.
- Run command "python manage.py runserver with the ipaddress for ex: 192.168.1.2 :8000"

3.7 CASE (II) Climate Reporting System

Controller Code

Twitter.py record is the Code for Controller nearby advantage that keeps running on Raspberry Pi. The controller advantage gets tenacity from DHT22 sensor and temperature, temperature from BMP085 sensor and weight, and light thought from LDR sensor related through simple to-advanced converter MCP3008. The controller advantage gets dampness, temperature, and light and weight readings from the sensor, every 10 seconds. The sensor reading as well as the photos is by then sent on Twitter.

3.8 Controller Code Algorithm

1. Examined DHT22 sensor, it returns stickiness and temperature
2. Examined pressure
3. calculate value
4. Examined system
5. Store Temperature, humidity, pressure and light (digital) in status
6. Specify the picture way of uploading picture
7. Overhaul picture way into twitter

3.9 Cloud Side Programming

Cloud Side arrangement is finished utilizing Twitter App. The controller administrations utilize a Python library for Twitter called tweepy to send tweets. By tweepy you can utilize Twitter REST API to mail tweets. Prior to utilizing twitter API, you would need to set up a twitter designer record and after that make another application (with read-compose authorizations). After making the application you will get the API key, access tokens and API mystery. These certifications as well as token are utilized in controller administration.

The associations is shown in figure 3.

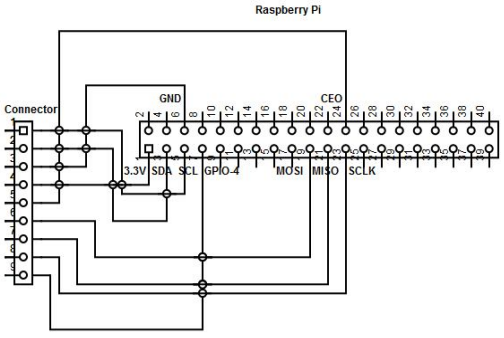

Figure 3: Connection Diagram for Raspberry PI

4. RESULTS AND DISCUSSION

CASE (I) Smart Parking

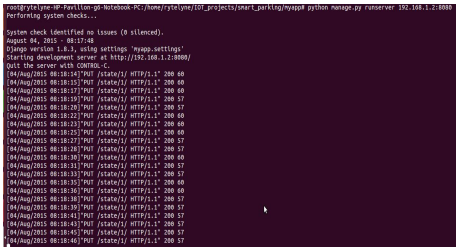

Figure 4: Server Screenshots Case (I) Smart Parking

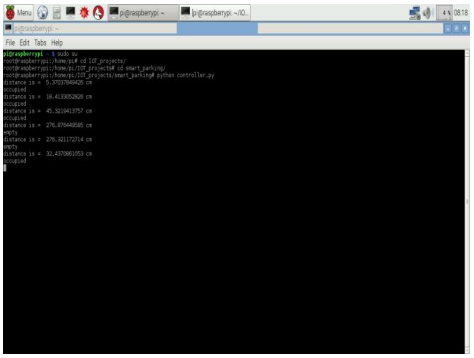

Figure 5: Raspberry Pi Screenshots Case (I) Smart Parking

Dole out real IP address and port address on web browser (192.168.1.9:8000) as well as the comes about gotten are appeared in figure 6.

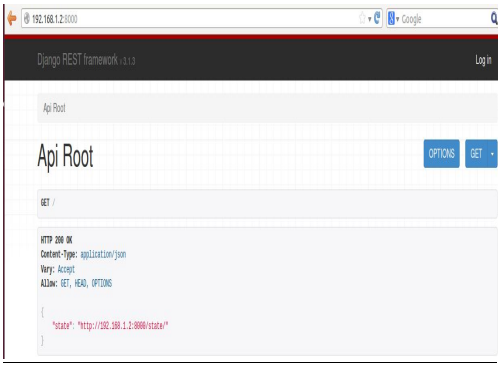

Figure 6: Checking Data on Server (Screenshots)

Regardless of whether space is involved (or) void can be verified by giving the genuine IP address and Port location in Internet Browser with State (192.168.1.2:8080/state/1/) and outcomes are refreshed on server.

CASE (II) Climate Reporting System

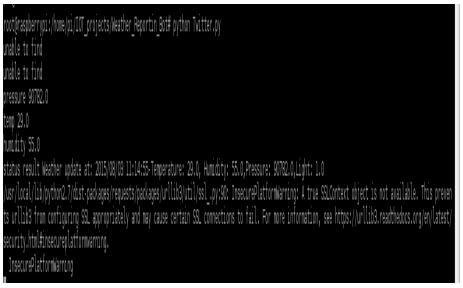

Figure 7: Raspberry Pi Screenshots

Figure 8: Updated Data on Twitter: (With Screenshots)

5. CONCLUSION AND ENHANCEMENT

An answer used for natural data correspondence with inbuilt car hardware is displayed Examination gives vehicle client ecological condition progressively as well as utilizes open source cloud and twitter benefits alongside equipment. For this reason ace slave engineering is utilized. Information procurement rationale as well as control calculation is motivated by Slave module and ace Module individually. An information obtaining rate is expanded incredibly and utilized for quick movement framework. Remote observing exercises be successfully changed into access inside the scope of vehicle clients. Future bearing of research will concentrate on including extra natural parameters observed and gave to the vehicle client to snappy choice and productive control.

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