RAIN SENSING CAR CRUISE CONTROLLER USING IOT

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***Abstract*— Intelligent road sign congestion problem is a phenomena which contributed huge impact to the transportation system in country. This causes many problems especially when there are abnormal weather conditions cases at Intelligent road sign system intersections which are always busy with many vehicles. A Intelligent road sign system controller system is designed in order to solve these problems. This system was designed to be operated when it received signal from abnormal weather conditions vehicles based on radio frequency (RF) transmission and used the Programmable Integrated Circuit Arduino microcontroller to change the sequence back to the normal sequence before the abnormal weather conditions mode was triggered. This system will reduce accidents which often happen at the Intelligent road sign system intersections because of other vehicle had to huddle for given a special route to abnormal weather conditions vehicle. As the result, this project successful analyzing and implementing the wireless communication; the radio frequency (RF) transmission in the Intelligent road sign system control system for abnormal weather conditions vehicles. The prototype of this project is using the frequency of 434 MHz and function with the sequence mode of Intelligent road sign system when abnormal weather conditions vehicles passing by an intersection and changing the sequence back to the normal sequence before the abnormal weather conditions mode was triggered. In future, this prototype system can be improved by controlling the real Intelligent road sign situation, in fact improving present Intelligent road sign system system technology.**

INTRODUCTION

The Internet of Things, or IoT, refers to the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. Many countries in the world are facing the problem at Intelligent road sign system intersection that causes accident between abnormal weather conditions vehicle and other public vehicle. The Intelligent road sign control system in Malaysia specifically has not been equipped with appropriate method when abnormal weather conditions case occurs. This will cause the abnormal weather conditions vehicles such as ambulances difficult to reach the destination on time because of the Intelligent road sign congestion. Moreover, the situation is getting worse when abnormal weather conditions vehicles have to wait for other vehicles to give way at intersections with Intelligent road sign systems. This causes a delay of time and may affect the abnormal weather conditions case. Besides, the collisions with othervehicles from other direction might occur at intersections when abnormal weather conditions vehicles had to override the redIntelligent road sign systems. All these difficulties faced by abnormal weather conditions vehicles can be avoided using this Intelligent road sign system control system based on radio frequency. Due to the problem, literature review for related issue prior to undertaking research project is decisive. The literature review will provide information on the technology available and methodologies used

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by other research counterparts around the world on this topic.

I. LITERATURE SURVEY

1.1 Ganiyu R. A., Arulogun O. T., "Development Of A Microcontroller-Based Intelligent road sign System System For Road Intersection Control", International Journal of Science & Technology Research, Volume 3, ISSUE 5, May 2014.

A Intelligent road sign system control system invented by Carl J. Obeck [5] consists of two-way communication between abnormal weather conditions vehicles approaching a busy intersection with one or more Intelligent road sign systems. The system temporarily pre-empt the sequence of the Intelligent road.

1.2 *Mir RoomiRahil, Rajesh Mahind, SaurabhChavan, TanumayDhar, "GLCD-Touchpad Based Restaurant Ordering & Automatic Serving System", International Journal of Recent Technology and Engineering (IJRTE), 2013*

According to all these papers, a convenient wireless communication between abnormal weather conditions vehicles and the Intelligent road sign system is by using RF. The prototype of this project is using the radio frequency of 434 MHz compared to the range of about 3 kHz to 300 GHz of frequency which have been reserved for the RF theoretically. There are three objectives to be achieved in this project. First is to analyze and implement wireless communication; Radio Frequency (RF) transmission system in Intelligent road sign system control system for abnormal weather conditions vehicles. Second is to design a Intelligent road sign system sequence for abnormal weather conditions mode when receive signal from abnormal weather conditions vehicles. Last objective is to change the sequence back to the normal sequence before the abnormal weather conditions mode was triggered. This project has contributed in implementing the wireless communication by using the radio frequency (RF) transmission of 434 MHZ in the Intelligent road sign system control system for abnormal weather conditions vehicles.

1.3 M. A.A. Parkhi, Mr. A.A. Peshattiwar, Mr. K.G. Pande "Intelligent Intelligent road sign System Using Vehicle Density". YeshwantraoChavan College of Engg., Nagpur. International Journal of Electrical and Electronic Engoneers, 2016.

The Intelligent road sign system system designed by Levi L. Rose [1] used only for abnormal weather conditions vehicle. Sensor is used to transmit signal that has been installed in every abnormal weather conditions vehicle to the receiver which has been placed at every Intelligent road sign system intersection. When abnormal weather conditions vehicle reach at the Intelligent road sign system intersection, the signal code will be sent information of frequency modulation to the receiver. The receiver demodulates the received code and the red Intelligent road sign system will trigger at all the junctions. Thus, abnormal weather conditions vehicle will have special route from other vehicle to reach the destination. The Intelligent road sign system system designed by M. R. Smith et al [2] provided early warning of the approaching an abnormal weather conditions vehicle to find a way out from Intelligent road sign congestion and lead the abnormal weather conditions vehicle to the destination. The abnormal weather conditions vehicle also may take control of Intelligent road sign system at an intersection. A transmitter placed on an abnormal weather conditions vehicle transmits a signal to the receivers positioned at the Intelligent road sign systems whenever it is on abnormal weather conditions mode. The received signal is then processed by a master controller which in turn pre-empts the sequence of the Intelligent road sign system to control the Intelligent road sign flow at the intersection which taken by the abnormal weather conditions vehicle. The master controller also provides an output which display signs to indicate that there is an abnormal weather conditions vehicle to the other road users from other direction at the Intelligent road sign system intersection. Additionally, thedisplay system indicates whether the abnormal weather conditions vehicle has passed through the intersection or not.

1.4Dinesh Rotake, Prof.SwapnilKarmore "Intelligent Intelligent road sign Signal Control

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System Using Embedded System". G.H Raisoni College of Engineering, Nagpur. Innovative Systems Design and Engineering, 2012.

Ms PromilaSinhmar, 2012 [4] propose multiple Intelligent road sign system control and monitoring system. The system is based on microcontroller. The system contains IR sensors are mounted on the sides of roads respectively. The IR sensors network sense the vehicle passed through it. Microcontroller controls the IR system and counts the numberof vehicles passing on the road. The vehiclecount is stored in microcontroller memory. Based on a different vehicle count, the microcontroller takes decision and updates the Intelligent road sign system delays as a result. Administrator sitting on thecomputer can command system 40 (microcontroller) to down-load recorded data, update system delays, erase memory, etc. Thus administrator of a central station computer can access Intelligent road sign conditions on any approachable Intelligent road sign systems and nearby roads to reduce Intelligent road sign congestions to an extent.

1.5PayalGupta,DhananjayV.Gadre, Tarun Kumar Rawat, "Real Time Intelligent road sign System Control System(Hardware and Software Implementation)". International Journal of Electronic and Electrical Engineering, 2014.

Shilpa S. Chavan, 2009 [5] introduced Intelligent Intelligent road sign System Controller, which consist of infrared sensor mounted on the road to detect the vehicles, this acts as an input to the ITLC unit. This input signal indicates the length of vehicles on each road. The controller generates output signals for Red, Green and Orange Signal and monitors their timings, taking into consideration the length of vehicles on each road. The same information is transmitted to the mobile user which will request for congestion status. If a vehicle driver at junction sends SMS on GSM mobile phone to ITLC unit, the driver will get a message indicting congestion status of the road. The microcontroller that used is AT89c51.

II. EXISTING SYSTEM

In existing system the Intelligent road sign congestion problem and provided an abnormal weather conditions path for the abnormal weather conditions vehicle where the radio transmitter and antenna placed on the abnormal weather conditions vehicle. The radio will transmit the signal to theother vehicle that nearby. The radio receiver had been placed at four junction Intelligent road sign system will receive the abnormal weather conditions signal from abnormal weather conditions vehicle that passed by the junction. The first signal code contains a frequency for abnormal weather conditions vehicle while the second signal code contains a frequency for other vehicle. The transmitted signals provide miscellaneous Intelligent road sign system pole in normal condition or abnormal weather conditions. When the receiver received the signal from abnormal weather conditions vehicle transmitter, Intelligent road sign system system for abnormal weather conditions vehicle will be activated. As part of the invention, the Intelligent road sign system control system will inform the abnormal weather conditions vehicle which it has received the transmitted signal. The stored preset Intelligent road sign patterns may in one representation is responsive to manual intervention from a dispatching centre or to time-of-day conditions. The Intelligent road sign system control apparatus may be operated under control of data or voice transmitted from the abnormal weather conditions vehicle's regular two-way voice communications system to a central control station.

Disadvantages

- Avoidance of road signs or speed limits by the drivers.
- Cause more accidents.
- Failure system in more countries.

III. PROPOSED SYSTEM

This system was designed to be operated when it received signal from abnormal weather conditions vehicles based on radio frequency (RF) transmission and used the Programmable Integrated Circuit Arduino microcontroller to change the sequence back to the normal sequence before the abnormal weather conditions mode was triggered. This system will reduce accidents which often happen at the Intelligent road sign system intersections because of other vehicle had to huddle for given a special route to abnormal weather conditions

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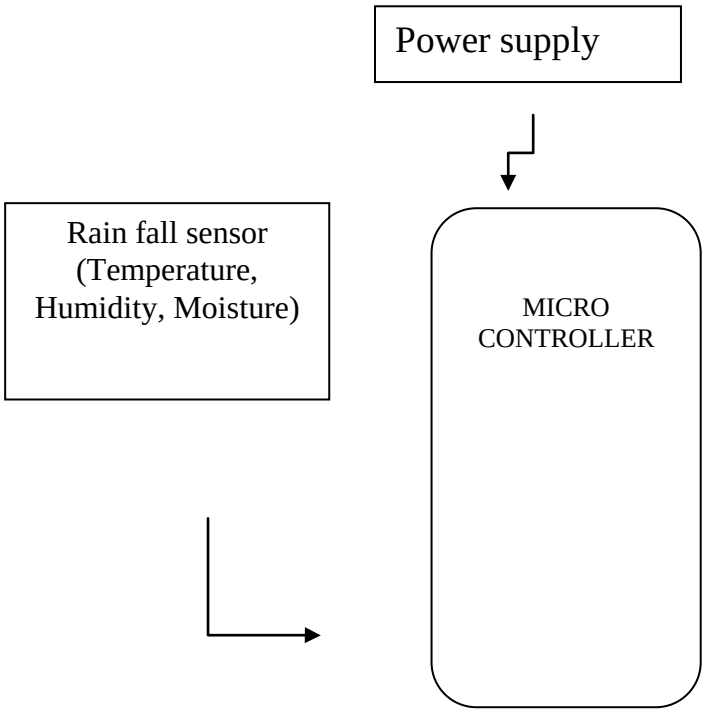

4.1 ARDUINO

Arduino is a computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardwareand software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL),[1] permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself kits.

The project's board designs use a variety of microprocessors and controllers. These systems provide sets of digital and analoginput/output (I/O) pins that may be interfaced to various expansion boards ("shields") and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, for loading programs from personal computers. The microcontrollers are mainly programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

The Arduino project started in 2005 as a program for students at the Interaction Design Institute Ivrea in Ivrea, Italy, aiming to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats, and motion detectors.

4.2 Power

The Arduino ESP can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can beconnected by plugging a 2.1mm centre-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector. The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts. The power pins are as follows:

VIN.- The input voltage to the Arduino board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.

5V.- The regulated power supply used to power the microcontroller and other components on the board. This can come either from VIN via an on-board regulator, or be supplied by USB or another regulated 5V supply.

3V3 - A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.

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GND. Ground pins.

4.3 PROTEUS

Proteus PCB design electronic circuits can computer-aided design and circuit boards are designed.

ISIS (Intelligent Schematic Input System)

The ISIS Intelligent Schematic Input System (Intelligent Switching input system), is the environment for the design and simulation of electronic circuits. The component library includes claims more than 10,000 circuit components with 6000 Prospice Simulations models. Own components can be created and added to the library.

ISIS includes a base VSM engine with support for the following functions:

- DC / AC voltmeter and ammeter, oscilloscopes, logic analyzers
- Analog signal generators, digital pattern generator
- Timer functions, protocol analyzers (including RS232, I2C, SPI)

VSM (Virtual System Modeling)

The VSM Virtual System Modeling provides a graphical SPICE circuit simulation and animation directly in the ISIS environment. The SPICE simulator is based on the Berkeley SPICE3F5 model.

It can microprocessor-based systems can be simulated. With the VSM engine can interact during the simulation directly with the circuit. Changes of buttons, switches or potentiometers are queried in real-time and LED indicators, LCD displays, "Hot / Cold" Wires displayed.

Proteus 7.0 is a Virtual System Modeling that combines circuit simulation, animated components and microprocessor models to co-simulate the complete microcontroller based designs. This is the perfect tool for engineers to test their microcontroller designs before constructing a physical prototype in real time. This program allows users to interact with the design using on-screen indicators and/or LED and LCD displays and, if attached to the PC, switches and buttons.

One of the main components of Proteus 7.0 is the Circuit Simulation -- a product that uses a SPICE3f5 analogue simulator kernel combined with an event-driven digital simulator that allow users to utilize any SPICE model by any manufacturer. Proteus VSM comes with extensive debugging.

Advantages

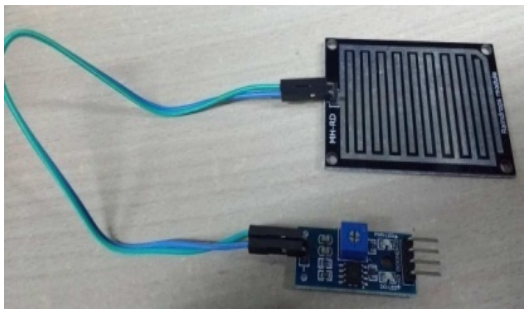
- Controls the speed of the car by its own.
- Not dependent on instructions by the driver.
- Avoids more accidents
- Rules will not been voilated.

IV. SYSTEM ARCHITECTURE

V. MODULE DESCRIPTION

Rain sensor module

A rain sensor is one kind of low-cost electronic sensor which is used to detect the rainfall or water drops. It works as a switch. Normally the switch is open condition. This sensor is consists of mainly two parts, one is Sensing Pad and another one is the Sensor Module. When rainfall or water drops fall on the Sensing Pad surface, then the switch will be closed. The Sensor Module reads data from the sensor pad and processes the data and converts it into a digital/analog output.



Speed limiter module

When the vehicle does not senses the rainfall it speed will not decrease and it goes normally no action is performed. when the vehicle senses the rainfall that means it enters into the speed limiting. when ever it enters the transmitter module just send an information

that contains how much speed a vehicle can go during the rainfall.

VI. IMPLEMENTATION

In outcome, the sensors were wired to a microcontroller board in the experimental setup, and the GSM/GPRS module was turned on to transfer data to the specified database server. To maintain a constant voltage, the positive and negative terminals of each battery were linked in the same way. The prototype brain, along with the a fore-mentioned sensors, is the microcontroller, which is in charge of controlling the inputs. Executing the control law is the duty. The rain sensor connects to the microcontroller. When the sensor senses the rain then the speed of the car automatically decreases to the limit that has been set.

VII. RESULT

In outcome, the sensors were wired to a microcontroller board in the experimental setup, and the GSM/GPRS module was turned on to transfer data to the specified database server. Four parallel-connected batteries were used to build the EV. Just the vehicle is propelled by the electric motor. To maintain a constant voltage, the positive and negative terminals of each battery were linked in the same way. The prototype's brain, along with the aforementioned sensors, is the microcontroller, which is in charge of controlling the inputs. Executing the control law is the MOSFET's duty. The rain sensor connects to the microcontroller. When the sensor senses the rain then the speed of the car automatically decreases to the limit that has been set.

VIII. CONCLUSION

As a conclusion, this project have achieved the main objective stated earlier which is analyzing and implementing the wireless communication; the radio frequency (RF) transmission in the Intelligent road sign system control system for abnormal weather conditions vehicles. The prototype of this project is using the frequency of 434 MHz compared to the range of about 3 kHz to 300 GHz of frequency which have been reserved for the RF theoretically. Besides, the functionality of this project proved that the other objectives have been successfully attained which are designing an abnormal weather conditions sequence mode of Intelligent road sign system when abnormal weather conditions vehicles passing by an intersection and changing the sequence back to the normal sequence before the abnormal weather conditions mode was triggered. The sequences for this project have been developed using the programming in the microcontroller PIC 16F877A. In future, this prototype system can be improved by controlling the real Intelligent road sign situation and the study can be done by investigating the length, reception and transmission issue for the system to be operated with this Intelligent road sign system system.

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