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Smart Signalling and Signal Breaking Identifier using RFID and GSM

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Abstract:*In today's traffic signal system the lights (Red,Green,Yellow) have got fixed timings and so signals remain on for longer time when not needed and are not sufficiently on when density is more. To overcome this problem a system is to be designed that will vary the signal timings based on density at signal. Also, another major problem encountered is violation of traffic rules, signal breaking being one of them. So, system is designed to detect the vehicle which breaks the signal and it will send the code number of the vehicle to server unit for further processing through SMS using GSM techniques. The goal of our project is to make a wireless smart traffic signal and anti-signal breaking-system.After the successful completion of the project these features can be added to present traffic signal system to become a completely automatic. This report is description of smart signalling and signal breaking identifier system including information about GSM, RFID system and of the different modules being used for controlling.*

Keywords:RFID, GSM, etc.

I. INTRODUCTION

Business in a megalopolis is veritably important affected by business light regulators. When staying for a business light, the motorist loses time and the auto uses energy. Hence, reducing staying times before business lights can save our society billions of rupees annually to make business light regulators more intelligent, we exploit the emergence of new technologies similar as communication networks. With the ever- adding business demand, traffic has come a serious problem in numerous major metropolises around the world. By regulating the business demand at each crossroad in the network, the thing is to avoid business conflicts and dock the line length at a stop line. Our end is to develop the system at signals. This system will have multifunctional operations. The system will originally measure the position of business viscosity at different signals and consequently change the time detainments for business lightship. the side at which the business is high the signal will remain green for further time. Secondly, it'll also descry the vehicle which breaks the signal. Eventually it'll shoot the law number of the vehicle to garcon unit for farther processing through SMS using GSM ways.

II. METHODOLOGY OF SYSTEM

DESCRIPTION OF BLOCK DIAGRAM AT SIGNAL UNIT:

1. IR Detectors:

IR detectors will descry the business viscosity position. This is a simple yet effective IR propinquity detector erected around the TSOP 1738 module. The TSOP module is generally plant at the entering end of an IR remote control system; e.g., in TVs, CD players etc. These modules bear the incoming data to be modulated at a particular frequency and would ignore any other IR signals. It's also vulnerable to ambient IR light, so one can fluently use these detectors outside or under heavily lit conditions. Similar modules are available for different carrier frequentness from 32 kHz to 42 kHz.

In this particular propinquity detector, we will be generating a constant sluice of square surge signal using IC555 centred at 38 kHz and would use it to drive an IR led. So, whenever this signal bounces off the obstacles,

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the receiver would descry it and change its affair. Since the TSOP 1738 module works in the active-low configuration, its affair would typically remain high and would go downward when it detects the signal (the handicap).

2. Max 232

As the TTL sense of the computer and the microcontroller is not the same, there's a need to use the IC MAX232. This IC converts the TTL sense position to RS232 standard and makes the DTE (Data terminal outfit) and DCE (Data collector outfit) TTL compatible.

3. GSM Module

GSM is our favoured system of communication between the two units. We've used GSM for its high range and low cost compared to other communication norms.

4. LED Panel

The LED panel forms the visual part of the system which will direct the business inflow. The LEDs are controlled by the micro-controller and grounded on its control action.

5. RFID

RFID is used to read a Label information of the vehicle of stoner who have broken the signal. DESCRIPTION OF BLOCK DIAGRAM AT SERVER UNIT

6. TV Display

TV display is used to display dispatches to the public in case of extremities or suggestions for alternate routes. It can also be used to display the general business conditions of the coming signal so that the motorists can decide their routes wisely.

7. PC

PC is used for storing the information regarding the details of stoner (USER DATABASE).

III. SYSTEM BLOCK DIAGRAM

At Signal Unit:

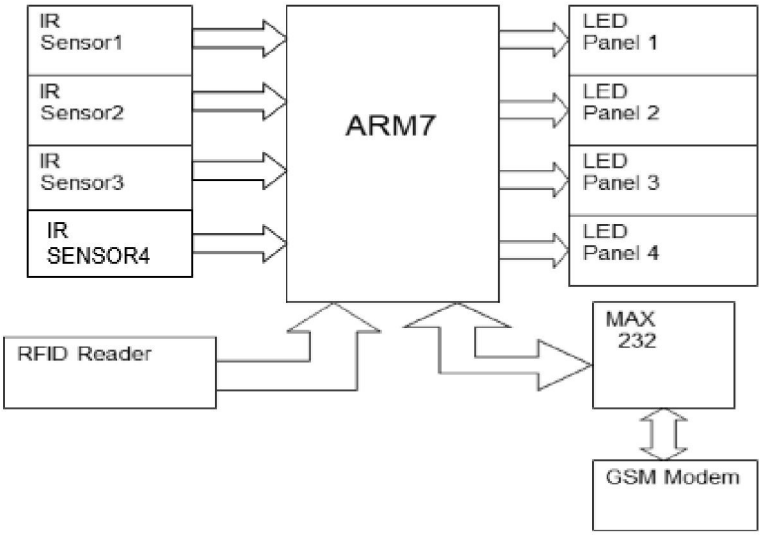

Figure 1: Description of Block Diagram at Signal Unit

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At Server Unit:

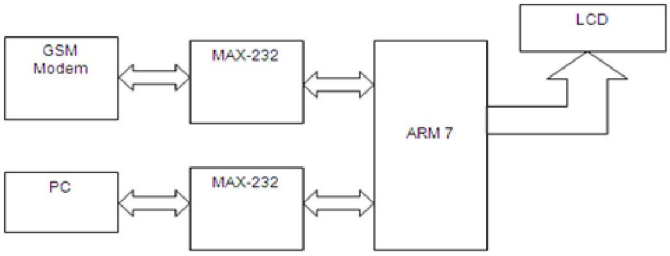

Figure 2: Description of Block Diagram at Server Unit

IV. CIRCUIT DISCRIPTION

The first step of our process is the traffic density measurement which will be done by the IR sensors. The IR sensors placed at different locations on each lane will send the signal to the microcontroller. This information regarding the density of each lane is further passed on to the microcontroller.

As the TTL logic of the Zigbee and the microcontroller isn't the same, there is a need to use the IC MAX232. This IC converts the TTL logic level to RS232 standard and makes the DTE (Data terminal equipment) and DCE (Data collector equipment) TTL compatible.

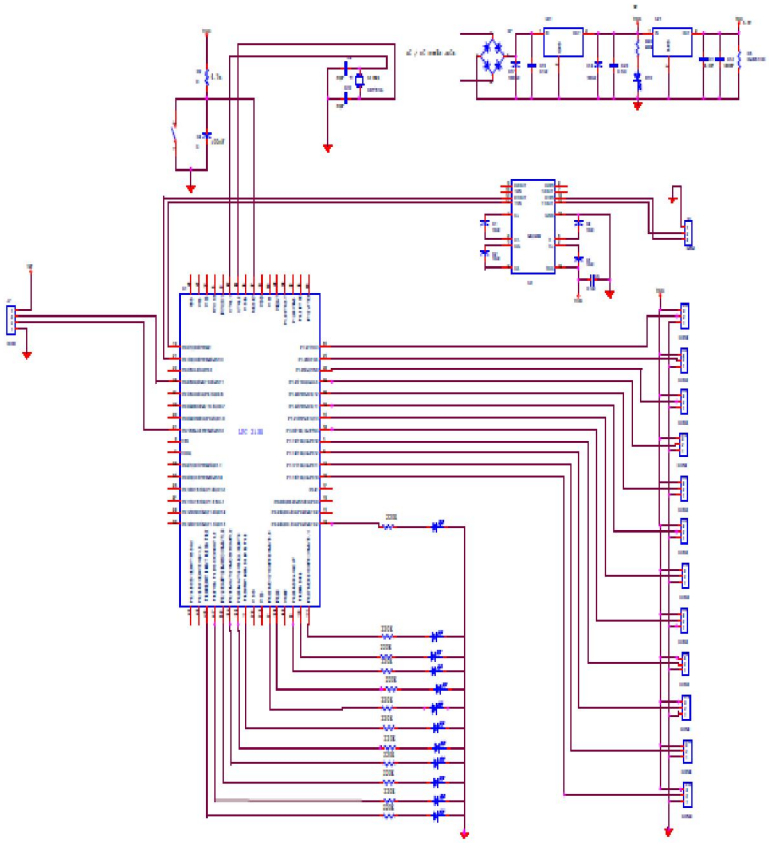

Figure 3: Circuit Diagram at Signal Unit

The microcontroller, after receiving the data from the IR, decides according to program, which of the lanes has the necessity to let the traffic flow faster and which lane can afford to be held for a longer duration of time. In accordance to this, the respective LEDs are made to glow, or are made off, and furthermore, a signal is also sent to the adjacent junction to either lessen or increase the flow of traffic in the particular lane.

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RFID reader interfaced with the microcontroller will detect the signal breaking. Each vehicle will have a tag on it. Whenever the signal is red the RFID will activate and detect the vehicle passing. This signal is transmitted to the server via GSM module to the server.

On receiving this signal, the microcontroller transmits the signal to the PC in which the database is maintained of all the users. The microcontroller will give the Tag no i.e., user id and appropriate fine will be charged.

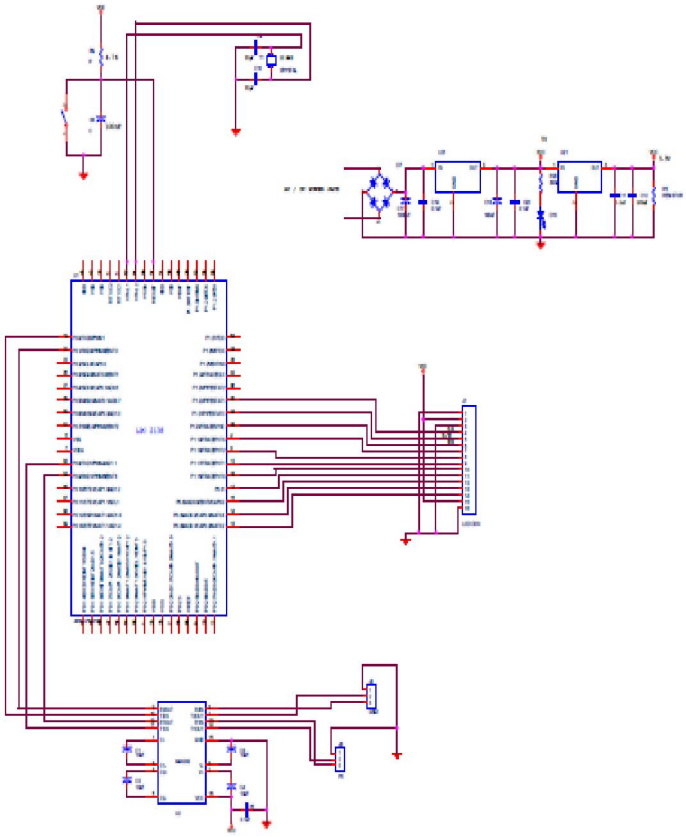

Figure 4: Circuit Diagram at Server Unit

V. HARDWARE TESTING

STEP BY STEP TESTING OF VARIOUS MODULES:

- First IR sensor circuit was tested, IR rays are continuously transmitted on detection of any obstacle, and these rays are reflected back and sensed by the TSOP sensoroutput of the sensor. Output of the sensor then goes high.
- Next working of RFID was checkedwhen the reader is made on it continuously checks for any tag in its fieldwhen a tag enters the field reader accepts the tag number and sends it to the microcontroller interrupt pin. Microcontroller then displays this tag number on lcd to which it is interfaced.
- When GSM is interfaced to the controller LCD displays “GSM Connected”. The information id transmitted to the control room (RTO Office) modem via the GSM interfaced with the signal unit controller the transmitted information is displayed on the screen.
- On reception of tag number, computer in RTO office checks the database and the identity of the respective person is retrieved. Corresponding SMS is sent on the mobile number.

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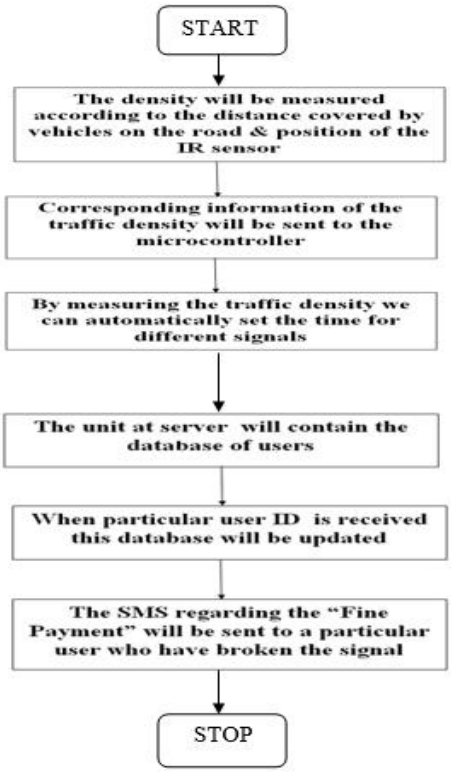
VI. SOFTWARE TESTING: FLOW CHART



VII. CONCLUSION

- The entire project helped us in understanding various concepts related to wireless communication,Embedded system design.
- Throughout, the project tried to touch every field the device can be related to, be its designing,Programming involved, circuitry, construction, working and application.
- In a nutshell, considering the current scenario, this technology is both very essential and necessary i.e., it certainly suffices to the demands of the modern-day world, by reducing one of the main problems weare faced with today, that of traffic congestion and signal violation.

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