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Remote Monitoring For Traffic Control System Using Embedded Technology

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ABSTRACT: Transportation plays a vital role in society. Traffic congestion is a major problem all over the cities. The consequence of traffic congestion is that pedestrian finds it difficult to cross the road. Pedestrian crossing is regulated manually by the traffic police, but due to lack of provision for on- road pedestrian crossing, rate of accidents become very high. Currently pedestrians are using only the elevated path to cross the road. But the elderly person finds it difficult to use that. Hence an idea is proposed to help the elderly people by giving provision for on- road pedestrian crossing in high density traffic areas like near school, hospitals, markets,etc and to reduce the accidents rate. To implement this, here an additional time delay is introduced in the traffic signal for pedestrian crossing in addition to vehicle crossing in all possible direction. Additionally, two parameters are provided, one to track the vehicle which violates the traffic rules and other to clear the traffic for emergency vehicles. All the above said three parameters can be simulated by using PROTEUS software and the system function is implemented using UTLP Kit.

KEYWORDS:RF transmitter and Receiver, LCD display, GSM, Time delay, Pedestrian crossing.

I.INTRODUCTION

Traffic control is an outdoor occupation, night or day for long hours in all weathers, and is considered a dangerous occupation due to the high risk of being struck by passing vehicles. Safety equipment is vitally important. Fatigue is a big issue, as tired TC's may forget to watch their traffic, or may inadvertently turn their "Stop bats" to the "Slow" position. Many drivers are annoyed by the disruption to their route, and some are sufficiently antisocial as to aim at traffic controllers. Other drivers simply don't pay enough attention to the road, often from using their mobile (cell-) phones, or because they are tired from a night shift at work. Not a few are exceeding the posted speed limit.

We already know that the transportation is a backbone of all developing countries. As the number of road users constantly increases, and the resources provided by current infrastructures are limited, hence intelligent control of traffic will become a very important issue in the future. However, some limitations to the usage of intelligent traffic control exist. Reducing traffic congestion has become a major issue within urban environment.

Consider a scenario of highly congested area where many vehicles suchas personal transport, public transport and emergency vehicles (Ambulance, Fire brigade, VIP cars and other rescue) have to wait for long for the change of traffic signals at intersection points. Existing traffic light systems have timers that are set at regular intervals. This leads to the wastage of precious time especially in case of rescue vehicles for emergency conditions. In this existing system, RFID based traffic control system is used to clear the signal only foremergency vehicles, but the disadvantage of using this will increase the waiting time, because the reader sense the signal only when the vehicle crosses it. For pedestrian crossing fly over was only implemented.

To overcome the drawbacks of existing system, for emergency vehicles RFID is replaced by RF transmitter and receiver and for Pedestrian crossing separate timing is provided. Additionally, if anyone violates the traffic rules, their vehicle number is captured by using camera and it will transferred to the control station using embedded technology.

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II.PROPOSED SYSTEM

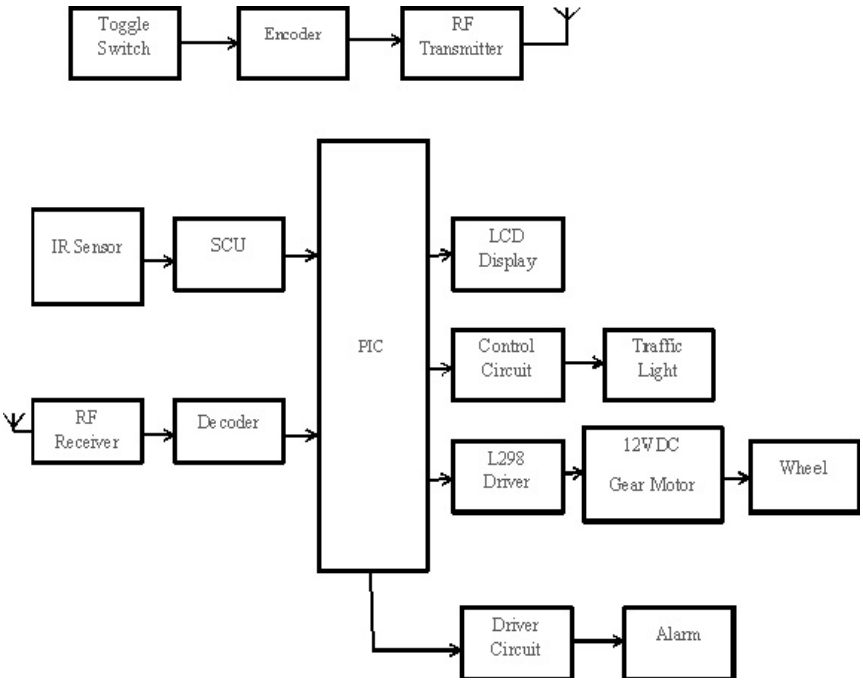

Fig1: Block diagram of proposed system

Fig 1 shows the function of proposed system which is comprises of Processor, IRsensor, LCDdiplay, Camera, DVR, etc… The proposed system controls three parameters namely, on load pedestrian crossing, emergency vehicle clearance, traffic rules violation. For on load pedestrian crossing, the traffic signal system will be working as usual based on the time delay logic. In addition to the existing system, extra signal is introduced for the pedestrians by the proposed system. The pedestrian signal control will be on based on the density of the pedestrian in the one side of the road is sensed using IR sensor. Based on the density level, time delay is given on each side of the road for pedestrian crossing.

All the above operations will be carried out continuously. For Emergency vehicle crossing, if any emergency vehicle comes at any side of the road it is detected using RF transmitter and receiver. A RF transmitter is placed in the emergency vehicle and RF receiver is placed in the signal pole at each side. The RF transmitter transmits the signal from the distance of 200m to the receiver. When the receiver receives signal it displays the message in the LCD display for 5 sec to alert the people and the signal on that side will be switched to green and others to red.

In order to avoid road accidents the third parameter is used to capture the people who violate the traffic rules. If any vehicle crosses the road after the red signal it will be sensed using IR sensor. The sensed signal is send to the processor and it will capture the number plate of the vehicle using camera and the message will be sent to the control station using GSM.

III.RESULT

Proteus 8 is a single application with many service modules offering different functionality (schematic capture, PCB layout, etc.). The wrapper that enables all of the various tools to communicate with each other consists of three main parts.

Fig 1 it shows the result for traffic clearance during the arrival of emergency vehicle. The output from the RF receiver (push button switch) is given to the PIC in order to change the corresponding road side signal. For example if switch 1

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is pressed, the road 1 changed to green signal and others changed to RED signal. The LCD displays the command "EMERGENCY" in the display.

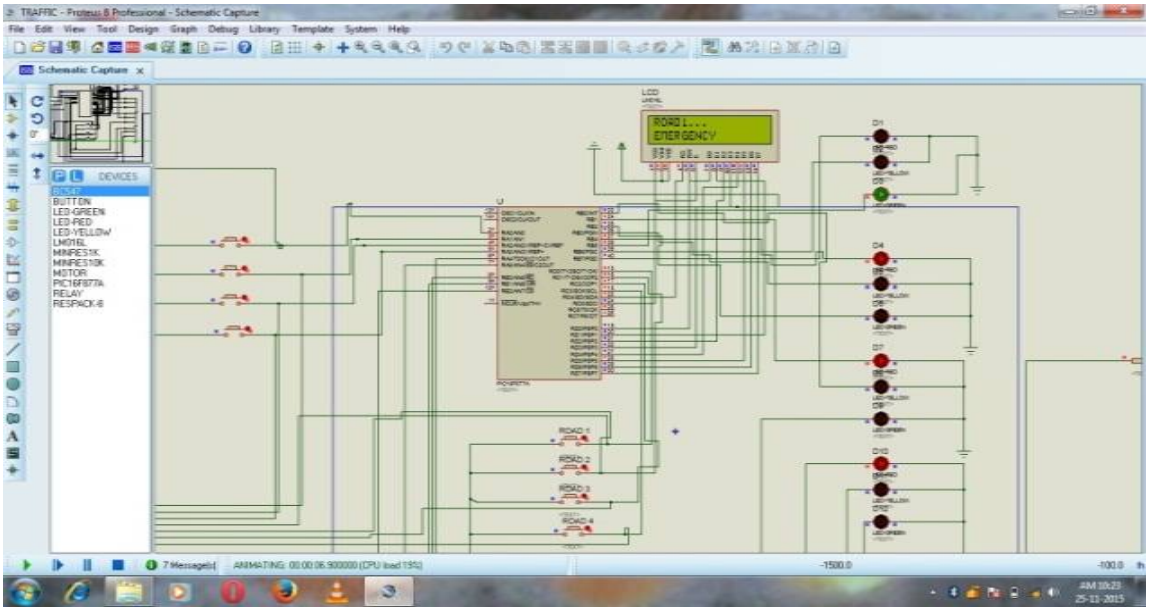

Fig 1: Simulation output for emergency vehicle

The simulation result for pedestrian crossing is shown in fig 2. At the time of pedestrian crossing all the road signals are in RED for the given time period of 5 sec and it will be displayed in the LCD display.The simulation result for traffic violation is shown in the fig 3.The violation of vehicle is monitored by IR sensor and it is given to the controller. Based on the output from the controller the corresponding road is displayed in the LCD and the vehicle number is captured by the camera. Here, for simulation purpose camera is replaced by rotating wheel.

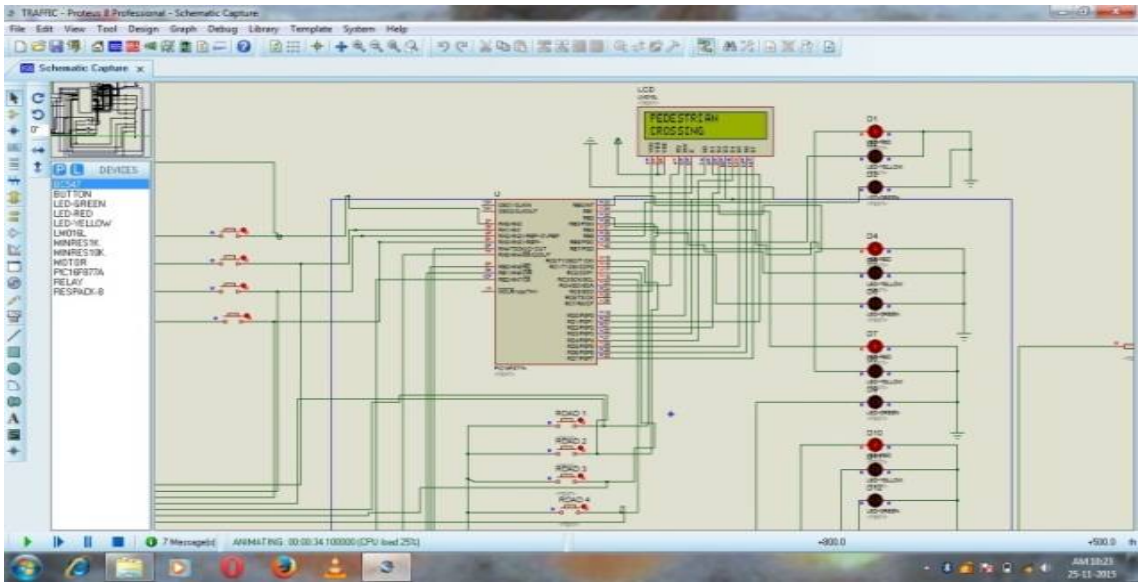

Fig 2: Simulation output for pedestrian

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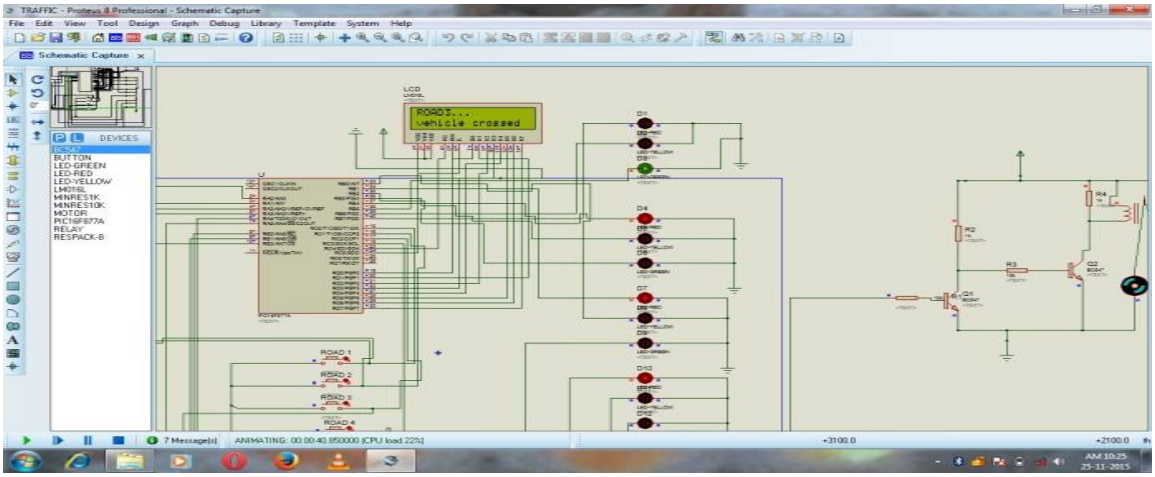

Fig 3: Simulation output for rules violation

The proposed system is implemented using Unified Technology Learning Platform(UTLP) kit. The ARM8 processor in the UTLP kit is used to automate the traffic system along with pedestrian crossing time delay. The status of the roads are displayed in the LCD.

Fig 4. Output for Pedestrian

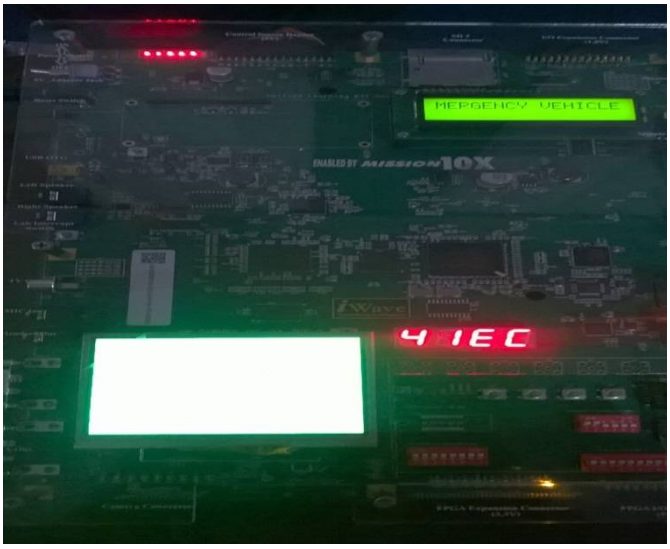

Fig 5. Output for Emergency Vehicle

If key 1is pressed it shows the output of “Pedestrian” in CLCD and the corresponding colour “RED” is indicated in GLCD. It is similar to all the roads. This shown in fig 4.
If key 2 is pressed it shows the output of “Emergency Vehicle” in CLCD and the corresponding colour “GREEN” is indicated in GLCD. It is similar to all the roads. This shown in fig 5.
If key 3 is pressed it shows the output of “Rules Violation” in CLCD and the corresponding colour “YELLOW” is indicated in GLCD. It is similar to all the roads. This shown in fig 6.
If key 4 is pressed it shows the output of “Invalid Key” in CLCD and the corresponding colour “BLUE” isindicated in GLCD. It is similar to all the cases. This shown in fig 7.

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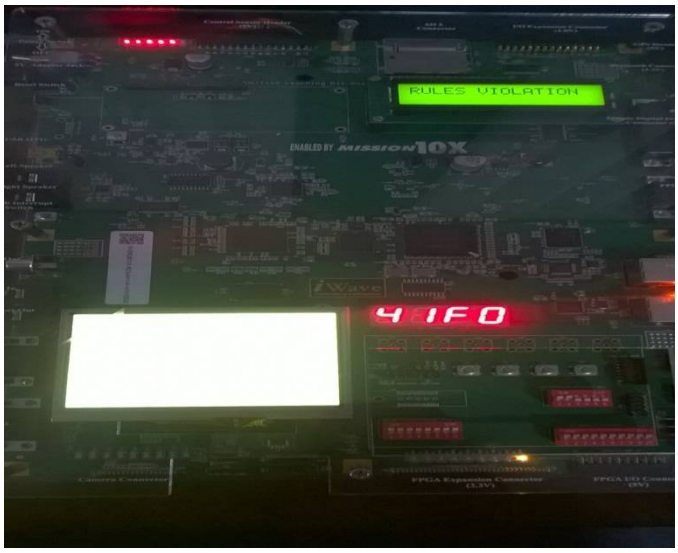

Fig 6. Output for Rules violation

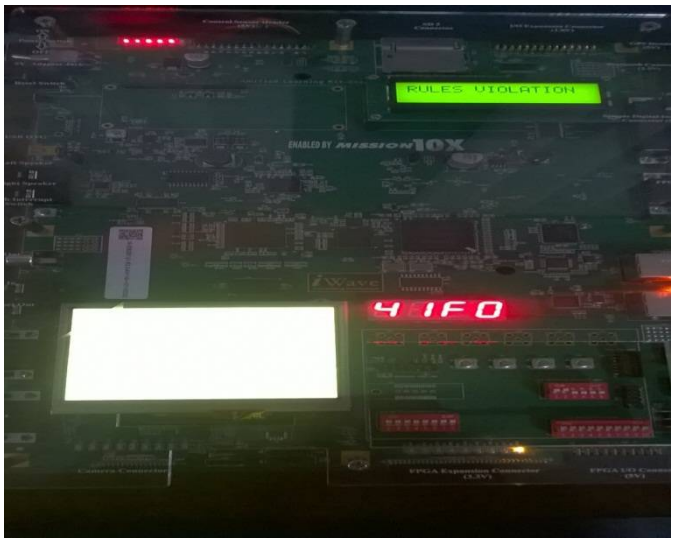

Fig 7. Output for Invalid key

IV.CONCLUSION

The system function is simulated using PROTEUS and implemented using UTLP. This shows that the method can provide a safe, secure and efficient way of public transportation system. This method gives the solution to avoid accidents during pedestrian crossing in highly congested area and to give importance for emergency vehicle to save human life. Here provision is also given to help the authority to find the people who violate the rules.

To improve this further, few additional parameters like over speed, over load, mobile phone usage while driving can also be included for better performance. Implementation of such a real time model will be greatly helpful to optimize the traffic control system in urban areas.

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