iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** IV **Month of publication:** April 2018

DOI: http://doi.org/10.22214/ijraset.2018.4187

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

Microcontroller Based Intelligent Traffic Signal Light Control System

Nikita Shinde[1], Shivani Raut[2], Shweta Satav[3], Dr. G. M.Bhandari[4]
[1, 2, 3] *B.E Student, Department of Computer Engineering, BSIOTR, SSPU, Pune, India.*
[4] *Professor, Department of Computer Engineering, BSIOTR, SSPU, Pune, India.*

Abstract: ***In this paper, we are designing a system that utilize and proficiently manages traffic light controllers is to be had. Aim of the system is the instantaneous adaptive to control traffic light and inform user if any blockage is there. The presented methods for traffic administration and control are not effectively efficient in terms of presentation or performance, cost, support and maintenance. We present a traffic management or controlling system based on new traffic transportation and using new technology for controlling or calculating the traffic sequences. The technique is vigorously adaptive to traffic circumstances on both intersections i.e. multiple as well as single. The simulation projected by us shows the competence of the projected scheme in solving traffic jamming in provisions of the typical waiting time and average queue length on the single intersection and thus in turn efficient universal traffic flow be in command of on numerous intersections.***
Keywords: Embedded System, Micro-controller, IR sensors, RFID, Traffic Control, Blockage.

I. INTRODUCTION

In late decades travel request in urban region has quickly expanded alongside the development of financial movement and populace, notwithstanding, foundation transportation has gradually extended because of constrained space accessible. Alleviating the movement clog in urban street organize has been a urgent issue for both the examination and commonsense operation. A beneficial and reasonable solution may not obtain always by supplying new infrastructure. Hence, use of existing infrastructure via intelligent or smart traffic management seems to be more feasible and calls for implementation and development of improved traffic signal control techniques and method.

A State of serious clog that acquires traffics the system to halt is Gridlock. Such state emerges when neighbourhood line spills back, there by limiting activity development on the whole bearings. In any urban transportation arrange the enactment furthermore development of urban gridlock is affected essentially by movement flag setting. Transportation of merchandise, work, modern items and hardware are the keys factors, which impact the modern what's more, natural improvement of any nation. Movement clog and fumble will brings about long holding up times, loss of fuel and cash. It is hence important to have a quick monetary and effective movement control framework for national improvement. The observing and control of city activity is turning into a real issue in numerous nations. Activity observing specialist needs to discover new strategies for defeating issues that emerge due to consistently expanding number of vehicles on street. Till now the measures taken are improvement of new streets what's more, flyovers amidst the city; structures of a few rings, for example, inward ring street; centre ring street and external ring street; presenting monorails; confining of expansive vehicle in city amid crest hours and furthermore improvement of advanced movement observing and control framework. One approach to enhance movement stream situation of current transportation framework is to apply computerization and insightful control techniques to roadside foundation and vehicles.

II. GOALS AND OBJECTIVES

A. Minimized heavy traffic jams.
B. Minimized traffic, with reduce waiting time.
C. In case of emergency car no stuck in traffic jams.
D. To inform user if any blockage is there.

III. PROBLEM STATEMENT

Today, there is a continuous and vast amount of increase in the jamming level on public roads which leads to traffic jam, especially at rush hours. This is major concern in many countries leading towards a critical situation of congestion. Most of the methods were proposed for solving the illusion of traffic jam. In addition, over the ground sensors like videos, and radars were used. These systems are also high cost and their accuracy depends on surrounding conditions of the environment.

To avoid all this issues we are going to design an embedded system which will continuously check the traffic congestion and accordingly will adjust the time of the signal.

IV. LITERATURE SURVEY

A. An urban traffic control system, which is design based on the real time traffic flow information and the design has combined with traffic control theory, application of single chip computer and ultrasonic technology, design and research of the traffic control system based on traffic. Compared with the traditional control system, the system has the following characteristics: the duration time of traffic signal can be smartly set according to the number of road vehicles; a priority of lane can be assigned according to the actual demand when a vehicle is rarely at night, etc.

B. In this paper, we propose a novel decentralized traffic light control using wireless sensor network. The system architecture is classified into three layers; the wireless sensor network, the localized traffic flow model policy, and the higher level coordination of the traffic lights agents. The wireless sensors are deployed on the lanes going in and out the intersection. These sensors detect vehicles' number, speed, etc. and send their data to the nearest Intersection Control Agent (ICA) which, determines the flow model of the inter-section depending on sensors' data (e.g., number of vehicles approaching a specific intersection). Coping with dynamic changes in the traffic volume is one of the biggest challenges in intelligent transportation system (ITS). Our main contribution is the real-time adaptive control of the traffic lights. Our aim is to maximize the flow of vehicles and reduce the waiting time while maintaining fairness among the other traffic lights. Each traffic light controlled intersection has an intersection control agent that collects information from the sensor nodes. An intersection control agent manages its intersection by controlling its traffic lights. Multiple intersection agents can exchange information among themselves to control a wider area.

C. This paper presents an adaptive traffic light system based on wireless communication between vehicles and fixed controller nodes deployed in intersections. We present the integrated simulation environment we have developed in order to study the system. We argue that our system can significantly improve traffic fluency in intersections, and has clear advantages over other architectures regarding both cost and performance.

D. In the densely populated urban area traffic control system is the main mechanism to control the flow of vehicular traffic at the intersection. Conventional traffic control system are not capable of handling dynamic vehicular flow. This dynamic vehicular flow creates traffic jams , congestion at the intersection. Vehicular Ad hoc Network (VANET) is a common part of Intelligent Transport System (ITS) which is directly involved in handling these problems and aims to make journey on road comfortable. The urban traffic flow depends on the driver behaviour, and also, it is influenced by traffic control and environmental factor. As the number of vehicles in urban area is increases, the traditional traffic system faces so many problems. This paper describes a working a VANET environment and then a brief study of dynamic traffic system based on radio propagation model. This traffic system uses a clustering algorithm at the intersection. Then we conclude the system working.

E. Vehicular traffic is continuously increasing around the world, especially in large urban areas. The resulting congestion has become a major concern to transportation specialists and decision makers. The existing methods for traffic management, surveillance and control are not adequately efficient in terms of performance, cost, maintenance, and support. In this paper, the design of a system that utilizes and efficiently manages traffic light controllers is presented. In particular, we present an adaptive traffic control system based on a new traffic infrastructure using Wireless Sensor Network (WSN) and using new techniques for controlling the traffic flow sequences. These techniques are dynamically adaptive to traffic conditions on both single and multiple intersections. A WSN is used as a tool to instrument and control traffic signals roadways, while an intelligent traffic controller is developed to control the operation of the traffic infrastructure supported by the WSN. The controller embodies traffic system communication algorithm (TSCA) and the traffic signals time manipulation algorithm (TSTMA). Both algorithms are able to provide the system with adaptive and efficient traffic estimation represented by the dynamic change in the traffic signals' flow sequence and traffic variation. Simulation results show the efficiency of the proposed scheme in solving traffic congestion in terms of the average waiting time and average queue length on the isolated (single) intersection and efficient global traffic flow control on multiple intersections. A test bed was also developed and deployed for real measurements. The paper concludes with some future highlights and useful remarks.

V. NEED OF PROJECT

There is a tough need for the execution of a traffic signal monitoring and control system worldwide. Limited traffic signal controlling systems are accomplished of managing heavy traffic congestion. They are not able to provide significant early warning against these time wasting congestions. Currently typical conventional traffic controllers face various problems.

VI. PROPOSED WORK

After reviewing literature and understanding the global need, the paper is modified and a new technique is built that gives best result like predicting the traffic flow on road of the junction and increasing the time delay for red light having heavy traffic flow. System will provide notifications of congestion on heavy traffic flow to the drivers via their android device on demand. This may help the drivers to make decisions on whether to opt that route or not. First, all sensors sense various parameters and send it to ADC for analog to digital conversion. After signal conditioning these digital signals are forwarded to micro controllers, then micro controller have task to convert this digital data into user define format and send this data to server with the help of serial communication. Further if there is any type of blockage then by pressing one button admin can inform to user that blockage is there on that particular lane or road.

VII. SYSTEM ARCHITECTURE

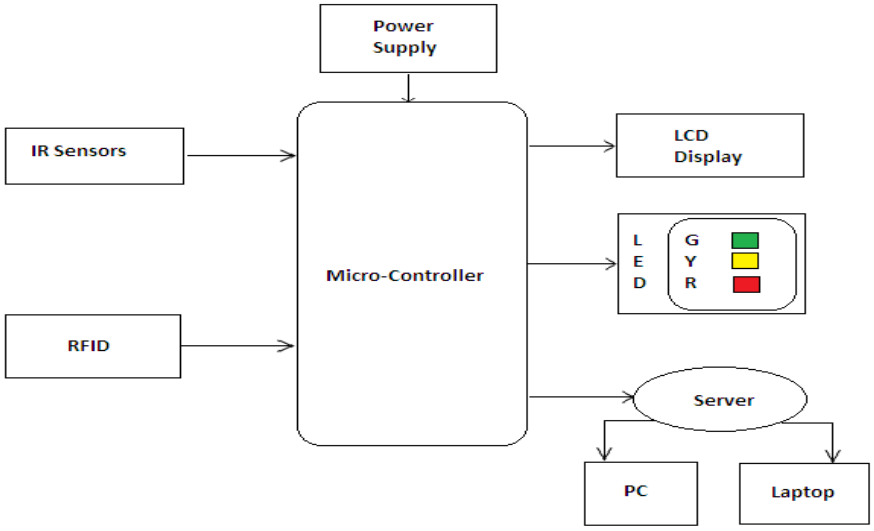


Fig1: System Architecture

The fig. consist of power supply, microcontroller, IR sensors and RFID. LEDs connected to microcontroller from all four sides. The microcontroller used is AVR. All the control operations are performed by microcontroller. Power is supplied with the help of power supply circuit(5v dc). When supply is given traffic lights operate normally with green light delay of few seconds. Density is sensed by IR sensors connected on all four sides. Normally output of sensors is high, when obstacle comes in its path output gets low. Microcontroller then automatically increases the delay of green light so that traffic passes. RFID is used to make a way for Ambulance. When a registered RFID-Tag comes in contact with RFID module automatically signal of that particular lane will get turn ON and others will be OFF for particular time period and as soon as ambulance passes automatically signal will switch to its original lane where it was stopped.

VIII. ALGORITHM

1) Start
2) Microcontroller Initialization
3) LCD Initialization
4) GPIO Initialization
5) RFID Initialization

6) Signal start
7) Detect serial port
8) Read data from serial port
9) Check serial data
if(data != null)
then
update data to database
10) Login validation
11) Request to server
a) Verify user
b) Show data route data
c) Give send feedback
d) View feedback
e) delete feedback
alert blockage
12) Server read table data from database
13) Response to request
14) Update user screen
15) .if (RFID tag detected)
then
a. Pause all other signals except ambulance route signal
b. when ambulance passes starts paused signal
16) Measure traffic densities at all 4 routes
17) allot timing with respect to traffic densities
18) repeat steps 6 to 13

IX. RESULTS

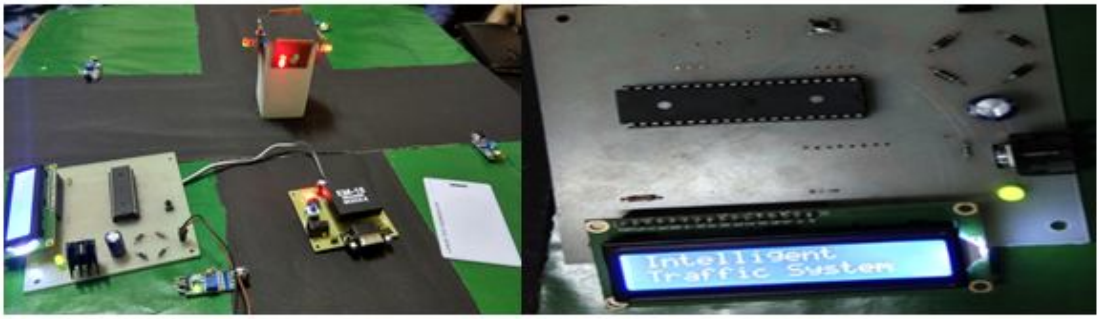


Fig2. Proposed System

Fig3. Initial Count and Increased Count of Vehicles

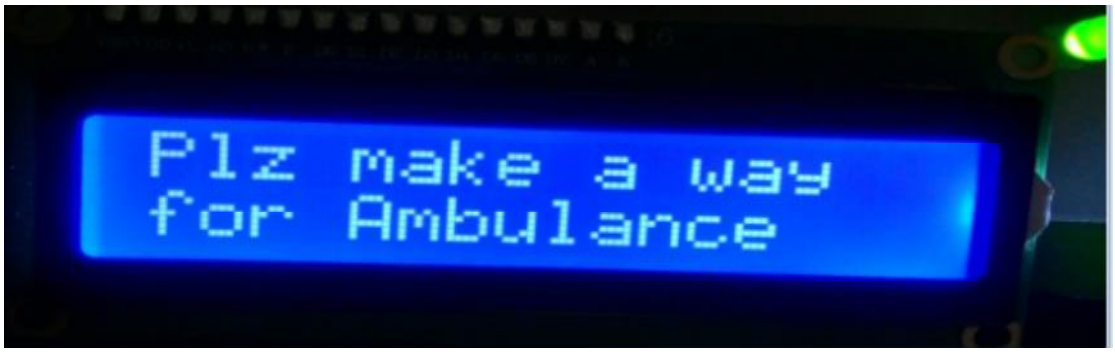


Fig4. When RFID tag comes in contact with RFID module.

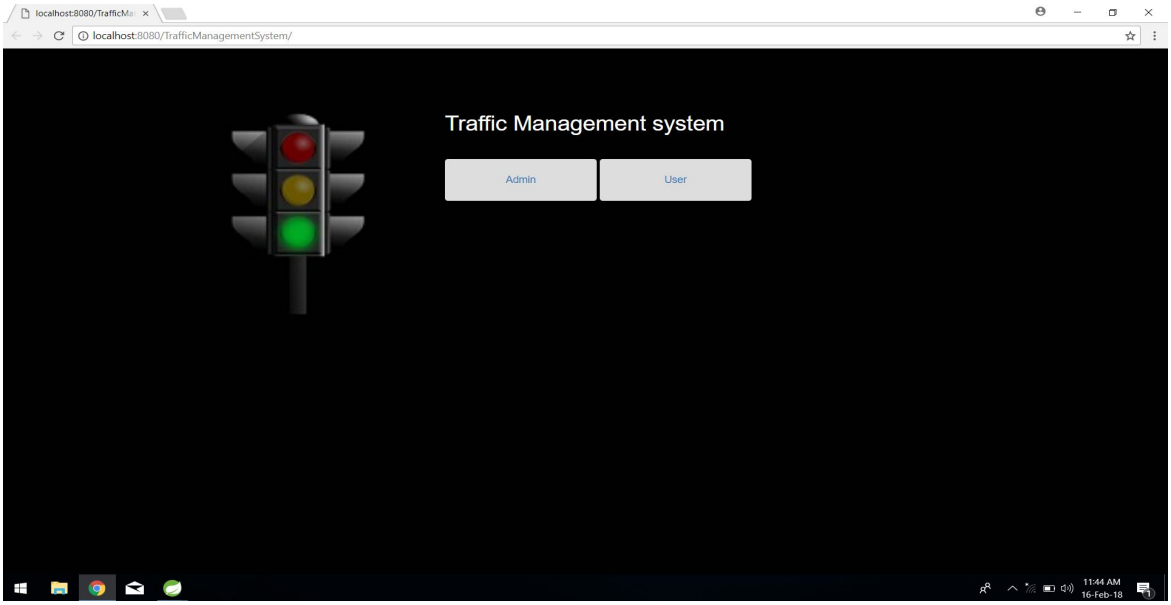


Fig5. Combine Login Page for Admin and User

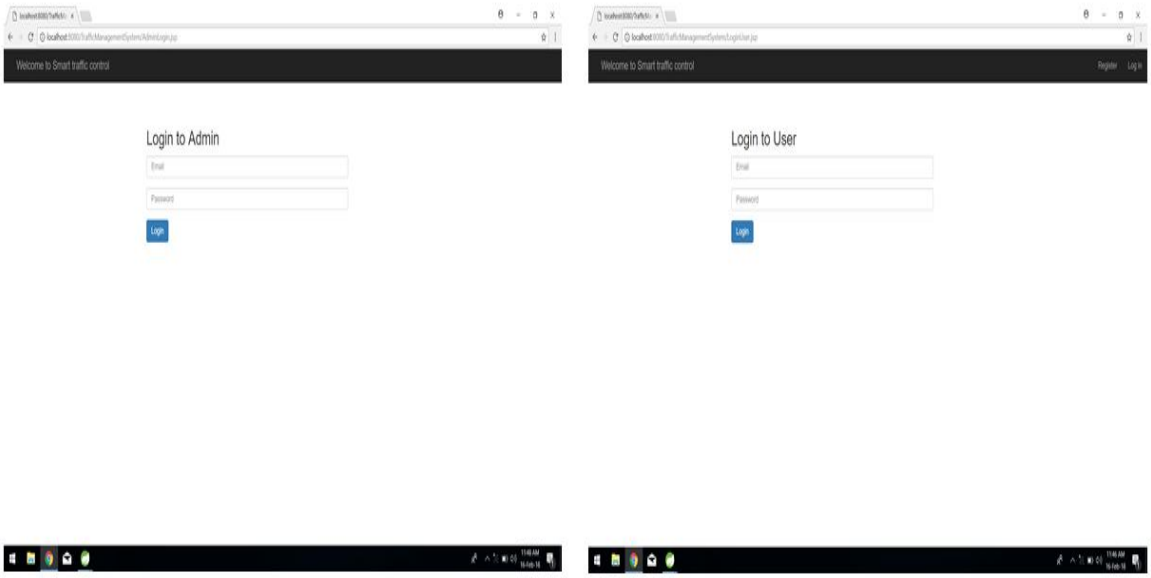


Fig6. Separate Login page for Admin and User

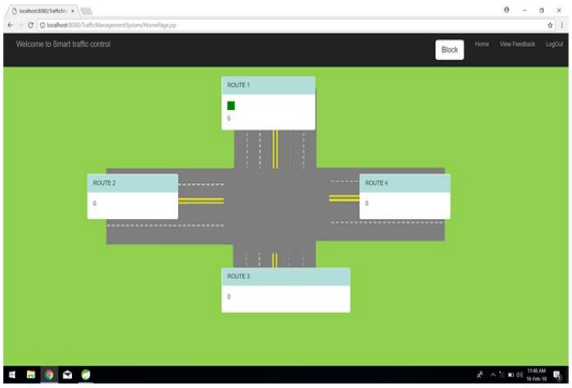


Fig7. Traffic flow

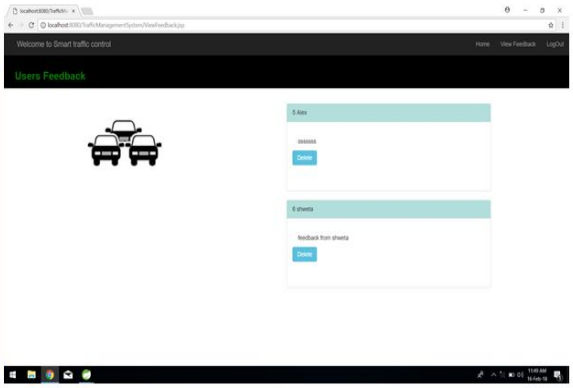


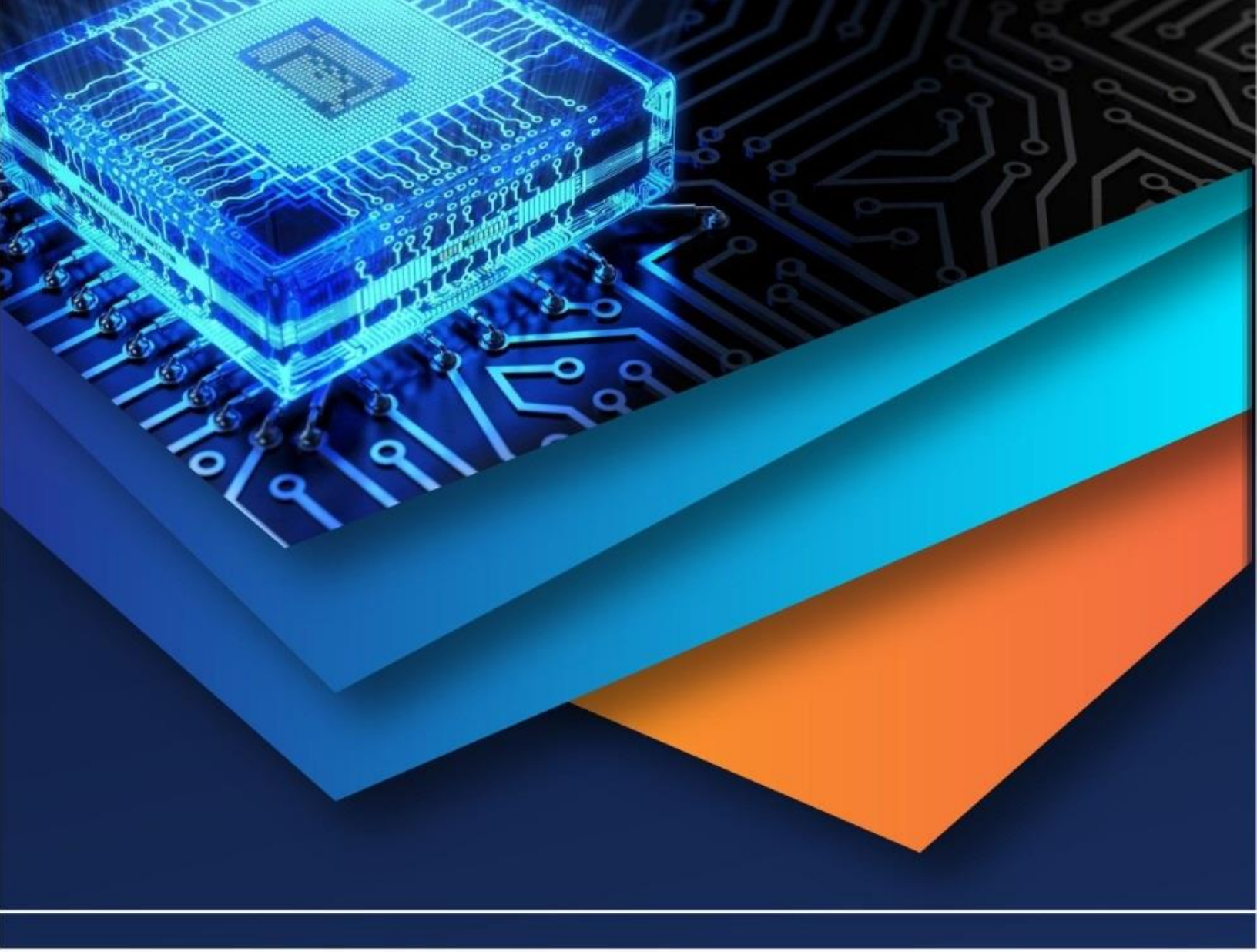
Fig8. User Feedback page

X. CONCLUSIONS

A different technique is to be build which gives the best results to achieve a good understanding of the traffic light control and alert users in congestion situations. System includes not only monitoring and controlling of the traffic signal but also it provides an alert to the user regarding blockage condition if any. System not only monitors the traffic but also intelligently control the timer setting in demand to avoid jam situation and traffic congestion. Also by pressing a single button admin can indicate user if there is any blockage on road so that user may change his route. It permits the users to relate with the system via mobile portable devices smart phones. Hence we come to a conclusion that Real time intelligent traffic light monitoring and control system is a more advances technique that can provide us best feature.

REFERENCES

[1] Zhijun Li, Chunxiao Li, Yanan Zhang and Xuelong Hu, Intelligent Traffic Light Control System Based on Real Time Traffic Flows, School of Information Engineering, Yangzhou University, Yangzhou, 978-1-5090-6196-9/17/$31.00 ©2017 IEEE
[2] J Malik Tubaishat, Yi Shang and Hongchi Shi, Adaptive Traffic Light Control with Wireless Sensor Networks Department of Computer Science University of Missouri – Columbia Columbia, MO 65211-2060, IEEE 2007.
[3] Victor Gradinescu, Cristian Gorgorin, Raluca Diaconescu, Valentin Cristea "Politehnica" Adaptive Traffic Lights Using Car-to-Car Communication Victor Gradinescu, Cristian Gorgorin, Raluca Diaconescu, Valentin Cristea "Politehnica" University Bucharest Computer Science Department 313 Splaiul Independentei Bucharest.
[4] Sanjay S. Dorle, Pratima L. Patel, Professor, Department. Of Electronics, G. H. Raisoni Design Approach for Dynamic Traffic Control System Based on Radio Propagation Model in VANET.
[5] Khalil M. Youseph, Jamal N. Al-Karaki And Ali M. Shatnawi Intelligent Traffic Light Flow Control System Using Wireless Sensors Networks, Department of Computer Engineering,Jordan University of Science and Technology Irbid 22110, Jordan.
[6] Chunyu Y. Yong Cao, Zaiqing Nie and Jie Zhou with Ji- Rong Wen — Design of intelligent traffic light controller using Embedded Systems, International Conference On Emerging Trends In Engineering And Technology, vol.2, 2012.
[7] Zhang Yuye & Yan Weisheng, (2009) "Research of Traffic Signal Light Intelligent Control System Based On Microcontroller", First International Workshop on Education Technology and Computer Science,pp301- 303.
[8] Ahmed S. Salama, Bahaa K. Saleh & Mohamad M. Eassa (2010) "Intelligent Cross Road Traffic Management System (ICRTMS)", 2nd International Conference on Computer Technology and Development, pp27- 31.
[9] Stefan Peelen, Roelant Schouten, Merlijn SteingrÄover, "Design and Organization of Autonomous Systems: Intelligent Traffic Light Control".
[10] Wen and Yang,(2006) "A dynamic and automatic traffic light control system for solving the road Congestion problem" WIT Transactions on the Built Environment (Urban Transport). Vol. 89, pp 307-316.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY