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Smart Traffic Lights System

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Abstract:- Road traffic jam becomes a significant issue for extremely jam-pawn ked metropolitan cities in Asian country like, Delhi, Bangalore, Chennai, etc. Failure of signals, law social control and dangerous traffic management has light emitting diode to traffic jam. One in every of the foremost issues with Indian cities is that the prevailing infrastructure cannot be distended a lot of, and therefore the choice on the market to North American country is healthier traffic management. Traffic jam negatively impacts on the setting and therefore the overall quality of life. Emergency services area unit one in every of the foremost services that gets tormented by traffic congestions. Folks tend to ignore speed limits and have a tendency to leap traffic signals. Thus it's currently the time to effectively manage the traffic jam downside. Numerous strategies exist already to unravel this downside like Infrared Sensors, Video Analysis, Inductive Loops, unhear able Sensors, Dynamic Timers, etc. The matter with the mentioned strategies isn't solely the installation value however the upkeep is additionally terribly high. To scale back the traffic defaulters and facilitate management the increasing quality of traffic, this paper has return up with the answer of "Intelligent Traffic Light System". This method makes the utilization of RFID (Radio Frequency Identification) technology to implement the Intelligent Traffic Light management. It needs less time to put in, it's value effective and might add most of the climate.

Keywords:- *Raspberry Pi. RFID Sensors. RFID Tags.*

I. INTRODUCTION

Traffic congestion on road networks is slower speeds, increased trip time and increased queuing of the vehicles. Excessive vehicles on the road, results in traffic congestion. In the metropolitan cities traffic congestion has become a major problem. Therefore, we are making use of smart sensor networks to build an intelligent traffic light system which uses the recorded time stamp of the vehicle and evaluates if a vehicle violated the traffic light while the signal was red.

Wireless sensor networks are small sensor node devices that communicate with each other to perform the required task. The constraints in their designs effect the design of a wireless sensor network, leading to protocols and algorithms that are different from their counterparts in other types of systems. The proposed system will help reduce the accidents which occur due to jumping traffic lights in India. As reported in the findings of an eight-year study conducted by the National Highway Traffic Safety Administration (NHTSA), there were on average 1,578 fatalities each year resulting from two-vehicle traffic crashes at intersections controlled by traffic signals. Approximately 51% of those fatal crashes were caused by drivers who ran red lights. The studies show that one serious road accident in the country occurs every minute and 16 die on Indian roads every hour and surprisingly two wheelers account for 25% of total road crash deaths. Studies also show that Tamil Nadu is the state with the maximum number of road crash injuries.

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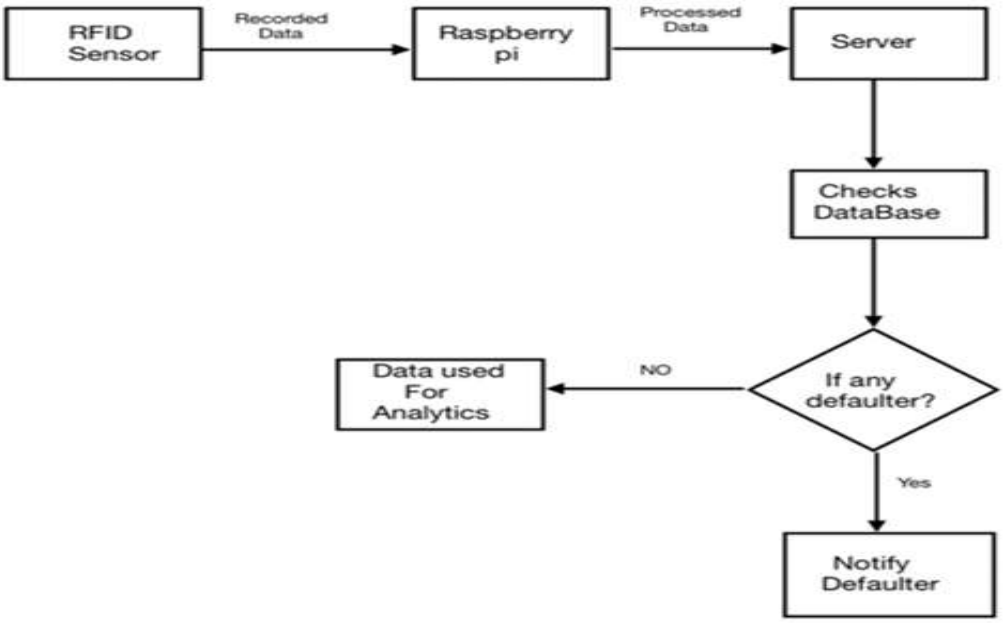

Fig 1

II. EXISTING METHODOLOGY

A. Video Analysis

Video analysis is nothing however inserting of a sensible camera with variety of sensors, a processing unit and a communication unit. The traffic is ceaselessly monitored employing a sensible camera, it films the traffic and keeps the footage safe for additional use. The video captured is then compressed so that its transmission bandwidth can be reduced. The raw video data is helpful in gaining the scene description, this is called as video analysis. This description is additional wont to reckon traffic statistics. This collected knowledge includes frequency of the vehicles, average speed of the vehicles. The issues related to video analysis square measure– (a) the price of the complete system is sort of high (b) the system is affected in case of significant fog or rains (c) not adequate night vision.

B. GSM Mobile Interface

The standard was developed by the beige Telecommunications Standards Institute for the define of the protocols for second-generation cellular networks. Its first preparation was in European country in Gregorian calendar month 1991. As of 2014, it become the world customary communications. It's currently operative in 193 countries and territories with over ninetieth market share. The second generation was originally introduced as a substitution for first generation, and therefore the GSM customary originally delineated a digital, circuit-switched network that was optimized for full duplex voice telephone. This was distended over time to include data communications, at the start by circuit-switched transport, so bit by bit by packet data transport via GPRS (General Packet Radio Services) and EDGE (Enhanced information rates for GSM Evolution, or EGPRS). Afterward, the 3GPP developed third-generation (3G), followed by fourth-generation (4G) LTE Advanced standards. The world system for mobile communication is a trademark that is hand by the GSM Association.

C. Dynamic Time Interval

The conventional traffic light control system provides fixed time interval for traffic lights, which means irrespective of the traffic density the traffic light will work according to their assigned time intervals . This causes unnecessary waiting time. The proposed system provides dynamic traffic light that will minimize the waiting time of vehicles and also manage the traffic density at the intersection efficiently. This minimizes the unnecessary waiting timing of the vehicles and removes congestion from roads, also allows smooth flow of the traffic.

D. Infrared or Ultrasonic Sensors

The conventional traffic light control system provides fixed time interval for traffic lights, which means irrespective of the traffic density the traffic light will work according to their assigned time intervals . This causes unnecessary waiting time. The proposed system provides dynamic traffic light that will minimize the waiting time of vehicles and also manage the traffic density at the intersection efficiently. This minimizes the unnecessary waiting timing of the vehicles and removes congestion from roads, also allows smooth flow of the traffic.

III. BACKGROUND

A.Internet of Things

The Internet of things (IoT) is a network of physical devices which are embedded with electronic devices or software. IoT consists of sensors, actuators and connectivity which help these devices to collect, exchange data and connect to cloud based services. It helps the internet to reach beyond the standard devices that have been there since 1990s such as desktops, laptops, PDA, smartphones, etc. It allows dumb devices (devices which cannot connect to the internet) to interact with humans or other internet

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based devices. This helps us to do more tasks, automate more things and make lives easy, For Example, connecting a coffee making machine to a raspberry pi and enabling an alarm so that the coffee makers automatically starts making coffee at a given time. With the increase in its usage, IoT has become an important part in Medical, Data Collection, Machine Learning, etc.

B.Cloud Computing

Cloud computing is used for delivering information technology services in which resources are recovered from the Internet with the help of web-based applications. Cloud based storage makes it possible to save the information on a remote database rather than keeping files on a branded hard drive. If an electronic device has access to the internet, it has access to the data and the software programs stored on the cloud.

Cloud computing is shared medium of computer system resources that can be configured and higher-level services that can be swiftly made accessible with minimal management effort, often over the Internet. Cloud computing relies on the basic idea of sharing of resources to achieve consistency. Advocates note that cloud computing allows companies to minimize the expenditure on IT infrastructure. Cloud computing allows enterprises to gear up their applications and make them run faster, along will low maintenance and easily manageable, and that it enables IT firms to more rapidly adjust resources to meet the ever-growing demand. Cloud providers typically use a "pay-as-you-go" model, which can result in unexpected operating expenses.

IV. RELATED WORK

The increasing population of India has lead in increase of traffic on roads. The excessive traffic on the roads is the major cause of congestion which leads to impatient drivers and then road rash and outcome of it is increasing number of accidents. One of the major reasons for accidents is the waiting time, the conventional traffic light systems provide a fixed time interval for the traffic lights due to which congestion occurs. In order to remove this problem the systems with dynamic time intervals have been built.

- The projected system calculates the traffic density exploitation IR sensors and additionally maintains dynamic temporal order slots with totally different levels. As we all know the standard systems area unit capable in handling the variable flows approaching the junctions. A significant upgradation is needed in terms of traffic congestion, diminish troubles with transportation, cut back traffic volume and thud the waiting time. This method works in removing all these issues by the utilization of a PIC microcontroller that not solely controls numerous operations however additionaly monitors the traffic volume exploitation IR sensors. It additionaly permits communication through a wireless handheld portable device with the traffic master by the means that of XBee transceivers. This method is additionally capable of evaluating the traffic density using IR sensors placed on either sides of the roads. The information which is collected through it proves useful in managing the time to be dedicated to the inexperienced light-weight. The current design can be further advanced by proving useful for controlling an intersection with double roads.

- This system proposes dynamic temporal order at the junction, not like the standard traffic system that is predicated on fastened time concept. In practical scenarios traffic density at one facet is higher that demands longer inexperienced time as compared to plain assigned time, however because of fastened timings it is not possible. Whereas durring this system raspberry pi is employed as a microcontroller that provides the signal timing based on the density. For calculating the density of the traffic an image is captured which is further converted to a grey scale image and its threshold value is calculated based on which the number of vehicles present in the image are calculated. The drawback with this system is that the loop detectors and pneumatic sensors used to detect the density of the traffic are too expensive and require a lot of maintenance. Also factors like changing weather conditions and unattended vehicles considerably affect the traffic density estimation. The density of the vehicle can be created by using mat lab tool by comparing all the sides of an image which was given because the input however in real life the application is not feasible.

- The proposed system works on a microcontroller that acts because the brain of the system. It contains inaudible sensors on the facet of the roads, and at the side of this the system additionally contains switches to regulate the spot light manually. As the traffic passes against the sensors, they get activated and also the microcontroller uses the device network to work out the level of jam in the road. Along with the working of the microcontroller the effects of the temperature and humidity were studied too. The operating is controlled by a robust microcontroller whose outputs square measure connected to relays which offer the ability required to drive traffic light and jam level displayer circuit. The space adjustment evaluated by ultrasonic sensor gets the trigger from the microcontroller and gets back the echo. It consists of a manual mode and a auto mode. Increasing the number of sensors increases the accuracy level. In case of emergency vehicles like police car or ambulance the manual mode comes in handy where the user evaluates the situation whereas when in auto mode, the delay is determined by the controller according to the sensors present.The system tends to solve the problems of high density traffic and also its accuracy levels are not affected by humidity and temperature and thus giving accurate results. The employment of the Arduino microcontroller with arduinoC provides an acceptable platform for implementation. Several totally different feature are often supplementary like operating with GSM to provide services to the users.

V. CONCLUSIONS AND FUTURE WORKS

The projected work targets on Smart Traffic Lights System exploitation RFID which may minimize the drawbacks of the prevailing system like high implementation price, dependency on the environmental conditions like extreme precipitation, fog etc. The projected system aims at managing the excessive impediment so prune traffic defaulters. It additionally works on less price than the prevailing system and is additionally simply manageable.

Furthermore, the study presents the issues in metropolitan areas caused by congestions and thus, the connected issues. Congestions developed a drag, that not solely affects the surroundings however additionally the economy worldwide. Congestions even have a negative impact on the condition of a country, on the atmosphere and eventually the overall quality of life. Also, by detection the traffic defaulters the traffic rules are about to be unbroken in mind by all which may facilitate among the systematic flow of the traffic. The projected system is exaggerated by exploitation different powerful communication network.

REFERENCES

[1]. 21st Century operations Using 21st Century Technologies. U.S Department Of transportation Federal Highway Administration.2008J. Clerk Maxwell, A piece of writing on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.
[2]. William Beaty. Jan 1998. Traffic Waves ―Sometimes one driver will
[3]. immensely improve traffic‖. http://www.amasci.com/amateur/traffic/traffic1.html K. Elissa, “Title of paper if known,” unpublished.
[4]. MD.Hazrat ALI, Syuhei KUROKAWA, et al,“Autonomous Road Surveillance System proposed Model For Vehicle Detection and Traffic Signal Control “in Procedia Computer Science 19(2013)
[5]. R. WEIL, J. WOOTTON AND A. GARCIA-ORTIZ” Traffic Incident Detection Sensor and Algorithms “Mathl.Comput.Modeling Vol.27
[6]. M. Young, The Technical Writer’s Handbook. Mill Valley, CA: University Science, 1989.
[7]. R. WEIL, J. WOOTTON AND A. GARCIA-ORTIZ” Traffic Incident Detection Sensor and Algorithms “Mathl.Comput.Modeling Vol.27