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Advanced Traffic Management System and Control of Street Light

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ABSTRACT

Traffic congestion is a growing problem worldwide causing time / fuel waste, pollution and even stress. In Indian road-traffic, the problems like congestion, unpredictable travel time are taking a serious shape which is also chaotic and noisy. In order to prevent the loss of electricity in street lights which is unnecessarily used, we deploy light sensors and motion sensors which can minimize the wastage of electricity.Various approaches have been proposed to reduce traffic jams. Recently, researchers have started to employ connected vehicle technology which is difficult to implement on roads. In this project, we present a low cost innovative technology for smart roads. We are implementing "Smart traffic" by using ultrasonic sensors, light sensors, motion sensors, and IOT devices.

KEYWORDS: Traffic congestion, IOT devices, Raspberry Pi, Ultrasonic sensors, Light sensors, PIR sensors.

INTRODUCTION

The Internet Of Things(IOT) is the network of physical objects-devices, vehicles, buildings and other items-embedded with electronics, software, sensors and network connectivity that enables these objects to collect and exchange data.[1]The IOT allows objects to be sensed and controlled remotely across existing network infrastructure,[2]creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit;[3][4][5][6]When IOT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate between the existing internet infrastructures.

The Smart street light provides a solution for energy saving which is achieved by sensing an approaching vehicle using the PIR sensors and then switching ON a street lights ahead of the vehicle. As the vehicle passes by, the trailing lights switch OFF automatically. Thus, we save a lot of energy. So when there are no vehicles on the highway, then all the lights remain OFF.

LITERATURE SURVEY

India is the second most populous Country in the World is a fast growing economy. It is seeing increased no of road congestion problems in its cities. Infrastructure growth is slow as compared to the growth in number of vehicles, due to space and cost constraints Conventional traffic light system is based on fixed time concept allotted to each side of the junction which cannot be varied as per varying traffic density.[1][2] Some time it will be not provide sufficient time to pass vehicles because traffic signal time is pre define. Nowadays traffic problem are increasing because of the increasing number of vehicles and the limited resources provided by the current infrastructures. Due to this, there is a need to wait more time in front of the signals. We propose a system for controlling the traffic light by image processing. The system will detect vehicles through capture camera images instead of using electronic sensors embedded in the pavement. A camera will be installed alongside the traffic light. It will capture image sequences. The image sequence will then be analyzed using digital image processing for vehicle detection, and according to traffic conditions on the road traffic light can be controlled.

R. Priyasree [7] proposed a system for reducing the power consumption of lightning and hence reducing the insufficient wastage of financial resources. This is done by dimming the street lights during the less traffic hours. PIR sensors have been used for this purpose. The paper also discuss about reducing the fatal crashes and road accidents caused due to the consumption of alcohol. This is done by using skin sensors which are placed in vehicles doors and using breath sensors inside the vehicle. Death rates during the driving in such a case can be reduced up to a great extent. One can also detect the amount of alcohol taken by the driver and if it exceeds certain level, the driver will not be allowed to enter into the vehicle.

PROBLEM DEFINITION

In traffic junction, we can see red, orange and green lights along with the displaying timer. The traffic as to wait for a fixed period of time to make a move. For example, one as to wait for a fixed period of time even though the traffic is more in that particular lane. This leads to "TRAFFIC JAM" which is a major problem – the society is facing.

Along with, another added problem that our country is facing is "SCARCE OF ELECTRICITY". Street lights are always switched ON at midnights. For example, even if there are no vehicles moving at midnight, street lights are glowing which is not actually necessary. Improper utilization of street light, electricity is used unnecessarily which is a "NATIONAL WASTE".

EXISTING SYSTEM

Conventional traffic light system is based on fixed time concept allotted to each side of the junction which cannot be varied as per varying traffic density. Junction timings allotted are fixed. Sometimes higher traffic density at one side of the junction demands longer green time as compared to standard allotted time. For example when there is a huge traffic on the one side of the traffic signal, it should be cleared as soon as possible. But in our existing traffic system, one should has wait until their turn comes even if there is a heavy traffic in that particular lane.

The existing work is done by using HID lamps. High-intensity discharge lamp (HID) presently used for the urban street light system is based on the principle of gas discharge, thus the intensity is not controllable by any voltage reduction method as the discharge path is broken.

HID lamps are a type of electrical gas discharge lamp which produces light by means of an electric arc between tungsten electrodes housed inside a translucent or transparent fused quartz or fused alumina arc tube. This tube is filled with both gas and metal salts. The gas facilitates the arc's initial strike. Once the arc is started, it heats and evaporates the metal salts forming plasma, which greatly increases the intensity of light produced by the arc and reduces its power consumption. High-intensity discharge lamps are a type of arc lamp.

Disadvantages of Existing System:

- HID lamps consume more power.
- The life time of the HID lamps is very less.
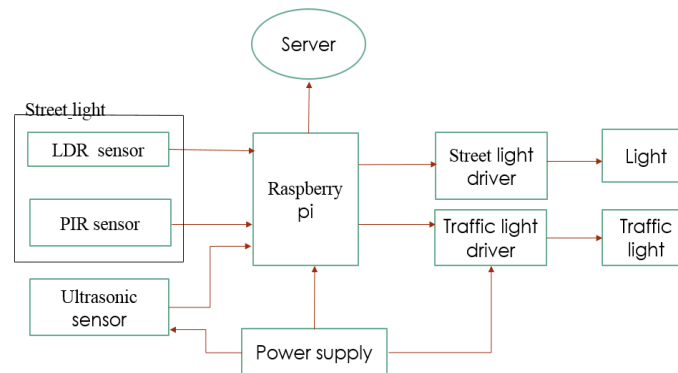- It cannot be used in all outdoor applications.

PROPOSED SYSTEM

Fig 1: Block Diagram

    When there is a huge traffic on the one side of the traffic signal, it should be cleared as soon as possible. But in our existing traffic system, one should wait until their turn comes even if there is a heavy traffic in that particular lane. To avoid this we can provide a sensor which is capable of analyzing the traffic intensity. This can be used to clear the traffic as soon as possible before causing a traffic jam. Ultrasonic sensors are used to detect the traffic intensity which gives a signal to RASPBERRY PI 2 about the traffic intensity and this will be able to clear the traffic.

In this system, sensors are used to prevent loss of energy by the unnecessary usage of street lights at midnight. At nights street lights are switched ON even if there are no travelling vehicles. So, in order to overcome this, sensors are used for street lights and when a vehicle pass through the sensors, the street light is switched 'ON' and when the vehicle passes the particular street light, the next street light will be switched 'ON' automatically and the previous lights are switched 'OFF'. This is continued throughout the street thereby saving the energy.

IMPLEMENTATION

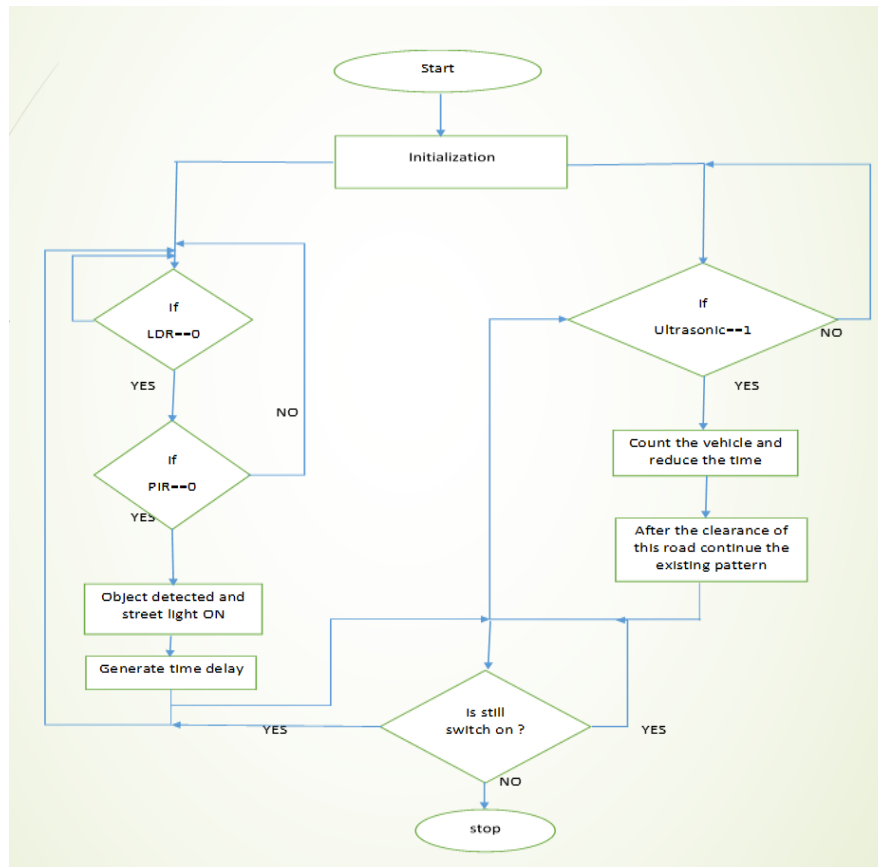Below figure shows the flowchart of the hardware implementation.

Fig 2: Flowchart for Traffic management and control of street light

The below figure shows the hardware setup of the system. It consists of Raspberry Pi, Ultrasonic sensors, LDR sensors, and PIR sensor.
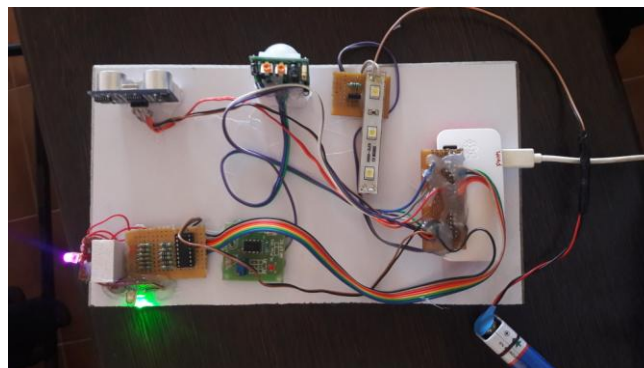

Fig 3: Hardware Setup

Fig 3. shows the working of traffic signals and ultrasonic sensors with Raspberry Pi . If there is traffic congestion in a particular road it will be detected by the two ultrasonic sensors and the signal will be sent to the Raspberry Pi. The Raspberry Pi will turn this signal green thereby releasing the traffic congestion. And the PIR sensors

CONCLUSION AND FUTURE SCOPE

Road traffic congestion is a central problem in most developing countries. Most urban areas have poorly managed traffic networks with several traffic hot-spots or potential congestion areas. In this paper, we study the problem of road traffic congestion in high congestion hot-spots in developing regions. Ultrasonic sensors are used to detect the intensity of the vehicles which sends the signal to RASPBERRY PI about the traffic congestion. Our hope is that localized de-congestion mechanisms are potentially easier to deploy in real-world settings and can enhance the traffic flow at critical hot-spots in road traffic networks. We believe that this represents only a first step in the development of low-cost, deployable strategies for alleviating congestion in developing regions. The future work lies towards generating electricity by developing smart speed breakers in roads. We can also implement charging system for electric vehicles in traffic signals by deploying induction coil. The paper discussed a means to detect and curb congestion in a localized setting. Although, the solution is feasible to affect local congestion, it is still not able to curb the congestion extending for miles due to the localized focus of the approach.

This paper presents an idea of reducing power consumption in the existing street light systems. The proposed system PIR sensor are employed in either side of the roads to detect the vehicle. As soon as the vehicle is detected, with the help of a Raspberry Pi, the streets light will be switched ON and else, they will be in dim state. Thus, a lot of energy can be saved during the operating hours of the street lights.

REFERENCES

[1] Shabbir Bhusari, "Traffic control system using Raspberry-pi", Global J ournal of Advanced Engineering Technologies ISSN (Online), Volume 4, Issue 4- 2015, pp 413-415.

[2] K.Vidhya, A.Bazila Banu, "Density Based Traffic Signal System", International Journal of Innovative Research in Science, Engineering and Technology, Volume 3, Special Issue 3, March 2014, pp 2218 – 2223.

[3] S.Lokesh, "An Adaptive Traffic Control System Using Raspberry PI", International journal of engineering sciences & research Technology, IEEE conference June 2014, pp 831-835.

[4] Dietmar P. F. Möller, "Cyber-Physical Smart Traffic Light System", Clausthal University of Technology, Institute of Applied Stochastics and Operations Research, IEEE 2015, pp 546-551

[5] Soufiene Djahel, "Reducing Emergency Services Response Time in Smart Cities: An Advanced Adaptive and Fuzzy Approach", IEEE 2015, pp 978-986

[6] Artur Ziarmand, "Smart Road Infrastructure", IEEE 2013, pp 13-17.

[7] Design and fabrication of automatic street light control system, M. A. Wazed, N. Nafis, M. T. Islam and, Vol. 5, No. 1,June 2010, pp 27-34.