

Real time Traffic alert and lights management system for smart city.

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Abstract

A smart city is a very hot topic nowadays. Citizens of India are very excited about it. The government is taking so much initiative for the purpose of providing opportunities to other countries for contributing for the development of digital India and in this mission, the internet of things (IOT) will play very important role like a backbone for the smart city.

Internet of Things will allow devices to communicate to each other over the internet and such communication will result into the generation of high volume, high velocity and variety data which needs to be ingested by IT backbone to provide insights and create alerts to facilitate free-flowing traffic inside the smart city. A smart city will result in huge consumption of electricity unless managed smartly. This research project is aimed at looking at how sensors can be deployed and integrated in smart city IT infrastructure to enable efficient management of traffic and electricity consumption.

Keywords— smart city; IOT; Traffic alert ; IT infrastructure;

I. INTRODUCTION

With the increasing pace of our lives, time is of the essence. One area where time is spent on the road is stuck in traffic jams due to poor traffic management. The effectiveness of (urban) traffic management systems depends largely on its ability to respond to traffic pattern changes, however, conventional traffic control systems, being irrational, cannot do this. Be it traffic jams, up or down, timed signals and only work on those times. This results in an increase in traffic congestion which also leads to greater air pollution, increased safety risk and also a negative impact on human mental well-being. It is only when the response capability becomes an integral part of the traffic control unit, that its responsiveness to changing traffic conditions improves. The responsive control system should have sufficient knowledge of the situation so that we can handle unexpected changes in traffic, such as accidents or car crashes. Smart signal control systems must have the ability to increase traffic by adjusting robots and coordinating performance between each signal in order to maximize human and traffic flow and reduce delays. In order to manage intelligent urban traffic control, we absolutely need a fully functional, real-time traffic management system; we look forward to what will happen in the near future. [1]

With affordability and higher purchasing power, it has become very easy for a common person

to own a vehicle. The number of cars sold last year in India was few times more than cars sold 20 years back. Though this has led to a comfortable lifestyle, it also creates a problem in terms of road congestion and traffic pile up around our cities. So how can we use data and information easy and smooth? Let us look at a scenario.[13]

One of the hallmarks of smart cities is the efficient use of available resources. Sensors can help you make better use of resources by connecting to tell us when and where we will end up. These senses can control, detect, and control unnecessary use and make adjustments according to each need.

A. Water Management

Currently, major cities waste up to 50% of water due to leaks. Since the sensors are plugged into individual pipes, water leaks can be easily detected and repaired before major losses. Apart from this, irrigation systems in public parks can automatically shut down whenever rainfall is available to save water.

B. Energy Management

Sensors also reinforced the concept of “Advanced Metering Infrastructure (AMI)” which supports urban power management. Cities are considering using “Smart Meters” installed in Phase Measurement Unit (PMU) sensors and a communication module that facilitates dual communication between the consumer and the supplier. For service providers, it is helpful to check the status of the meter before sending the repair team in response to a customer call. This test prevents the sending of unnecessary field staff to customer sites. For consumers, it can provide real-time usage information in a way that the user can easily understand. Based on this data, users can change their preferences and make informed decisions about their use without waiting for their energy charge at the end of the month.

C. Smart street lights

In the cities street lights are always on when there is no work in the area (sometimes during the day!). Additionally, it is very difficult for the authorities to find fault again

theft of street lights. With sensors, lights can dim when not needed and authorities can receive a text message almost instantly when there is an error or traffic lights are interrupted.

D. Waste Management

Since the sensors are installed in the rubbish bins, municipal officials may be notified when they are about to fill up. The Netherlands was the first to release "Intelligent Drums" which reported officials with messages whenever the drums were full or there was damage.

Transport Management (Smart Parking)

Traffic can be reduced with sensors that detect where available parking is available. Motorists receive timely information via text messaging so that they can get free parking faster, saves

time and fuel. A similar project is being carried out in San Francisco called SFPark - where parking spans have been set up at 8200 street corners. This concept will be repeated in several other provinces in the coming days.

F. Real-Time Pollution Management

Sensors mounted on poles can monitor city Ambient Air Quality (AAQ). Residents can monitor the concentration of pollution on each city street or they can receive automatic alarms when pollution levels exceed a certain distance.

II. OREGINE OF THE RESEARCH PROBLEM

A. *Need of smart citys*

A smart city (and a very smart city) uses digital technology or information and communication technology (ICT) to improve the quality and performance of urban services, reduce costs and utilization of resources, and effectively and effectively engage with its citizens. Smart city applications are made with the aim of improving urban flow management and allowing real-time responses to challenges [3].

An intelligent city is therefore more prepared to face challenges than one who has a simple 'trade' relationship with its citizens [4].

Smart car control systems are an important feature of smart cities and are used to control traffic and reduce traffic congestion. People need to get to where they need to be on time, emergency teams need to get to their destination as soon as possible. Older robots are more robust and are not subject to ever-changing traffic conditions. Cars waiting in line for robots to turn green continue to consume more fuel and more pollution. At peak times cars and pedestrians need equal opportunities to pass, while at night, there is probably no need to stop according to a pre-designed robot. Compared to older robots, Traffic Control Systems checks what happens in the file

environment and causes lights to respond when needed. Robots at any given intersection will be connected to all other traffic lights in the city, in order to keep traffic jams everywhere.

While solutions are still being developed, some major cities such as New York and Singapore have already adopted some form of traffic control systems, while others such as New Delhi are in the process of being developed, in order to significantly improve the well-being of their entire city. Although the first and most important concern for a smart road system is to reduce delays, estimates that time spent by motorists waiting for green lights to be reduced by more than 28% with the introduction of smart robots and that CO₂ emissions are cut by about 6.5%. In addition, such a system can also reduce car crashes and driver frustration, an important asset in trying to improve the well-being of the community [5] [1]

B. *Relivent work*

To create an unambiguous traffic control model that can make accurate traffic forecasts. This model applies to a wide range of road conditions, signal permits and provides a framework for implementing a flexible vehicle control system [1]. The hybrid method, acquired through Structured Systems Analysis and Design Methodology (SSADM) and Fuzzy-Logic based Design Methodology has been used to create a non-invasive system that combines

traffic congestion in Nigeria with positive results [2].

III. SIGNIFICANCE OF THE STUDY

Smart city calls for automated management of traffic system and efficient use of electricity to keep low carbon index and achieve Green status.

Apache Hadoop, an open source platform, has become de-facto standard for Big data processing and this research objective is to build a system architecture which can be scaled for Big data. It will allow to ingest traffic sensor data in real time and provide proactive alerts to manage the traffic flow smoothly helping avoid long traffic congestions.

IV. OBJECTIVE

- Build architecture of smart Traffic and Lights management solution
- Compare performance of Hadoop as platform with traditional platforms like J2EE for implementation
- Better user experience
- Save time spent in traffic enabling residents of smart city to spare time for leisure

V. METHODOLOGY

- Formation of the system and problem identification
- Configuration and programming for Infrared and thermal sensors and integration into Hadoop platform
- Proposed Performance of the framework with the help of different platforms like Hadoop, J2EE
- Best framework which will provides fast response time rate.

A. *benefits*

Helping Cities Maintain Safer Roads

More than 25 percent of road congestion is not recurring, according to the Federal Highway Administration. Instead, it is caused by road accidents. As a result, early detection and successful response creates safer roads, less traffic, and smoother flow. The Cisco Smart + Connected Traffic solution integrates IP cameras, sensors, applications, and Wi-Fi Cisco Smart + connected Wi-Fi infrastructure to provide real-time traffic visibility to traffic management authorities in real time. The solution provides insight into urban vehicle patterns so that traffic authorities can make better decisions and long-term plans.

1) City Benefits

- More efficient traffic flow
- Less pollution and other environmental impacts

- More efficient use of budget
 - Better visibility into traffic conditions
 - Better infrastructure investments
- 2) *Transportation Department Benefits*
- Automated incident detection and quicker responses
 - Better-informed operational decision making
 - Improved planning and resource allocation
 - Greater collaboration among response agencies
 - More effective operations
- 3) *Citizen Benefits*
- Improved road safety
 - Less congestion, reducing frustration and fuel costs
 - Better driving and commuting experiences

B. *Features*

1) *Traffic Monitoring*

View color-coded, live traffic conditions on a map, including overlays of camera feeds. Prioritize camera feeds based on high-incident areas. Make it easier for citizens to report traffic hazards and incidents.

2) *Incident Detection and Management*

Use video feeds and analytics to verify and detect traffic incidents, traffic flows, and violations. Create incident records and collect all data regarding the incident lifecycles.

3) *Administration*

Easily configure and manage sensors, video infrastructure, and policy rules.

4) *Analytics*

Report traffic incident distribution over time, day, and location to aid planning. Identify areas with recurring traffic and flow issues.

Cisco has teamed with AGT International, a global leader in city solutions, to offer the first Smart+Connected Traffic solution that focuses on traffic incident management. Please read the At-a-Glance brochure (linked below) to find out more about this solution.

d. *Smart Cities-*

SMART STREET LIGHTING[17]

- Smart LED lighting - Remote ON/OFF Control, On Demand Lighting.
- Environment Sensing Systems - Sensor modules including but not limited to Pressure Sensors, Water Level Detectors, weather monitoring and Humidity sensors.
- Emergency Sensing and Activating Systems - Alarms, Sirens, Alert Messages.
- Digital Signage – HDMI Displays, Advertisements, News, Emergency Alerts.
- Push to Talk Services – Routing to Emergency lines (Medical Services, Fire Stations, Police Stations)
- CPS (Connected Placement Speakers)- Public Announcements, Alerts, Advertisements etc.

Cities	Traffic Departments	Citizens
• More efficient traffic flow • Fewer accidents, clearer roads, and improved road safety • Cleaner environment due to reduced emissions • Improved planning and resource allocation • Increased attractiveness to businesses and workers	• Higher traffic situation awareness • More effective operations • Automated incident detection and quicker response • Better coordination of resources • Optimized budget	• Better commuting experience • Shorter travel time • Less frustration and stress due to lost time and productivity • Lower fuel costs

Fig: Benefits of traffic management [6][7]

VI. CONCLUSION

As now also we are able to solve the problem of traffic management rather real time traffic management but with the help of the proposed archicture / framework or you can say methodology you can able to get the result in a fast manner and that will be the beneficial for the everyone like traffic departments and citizens .

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