Review Paper on Modern Traffic Control System

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Abstract - **In the current context of smart city, specifically in the industrial and market zones, the traffic scenario is very congested most of the time particularly at the peak time of business hours. Not only it causes travelling delays, it also contributes to environmental pollution as well as health hazards due to pollution caused by vehicle fuels. To keep away from such severe issues many radiant urban communities are right now implementing smart traffic control frameworks that work on the standards of traffic automation with prevention of the previously mentioned issues the research works reviewed adequately demonstrate the multiplicity of approaches possible to tackle traffic management problems in specified contexts. Clearly dynamic systems using real time data and predictive models are better than the commonly used static systems which are insensitive to changing traffic conditions.**

1.INTRODUCTION

We all have experienced traffic congestions and jams sometime or other. It is an arduous daily experience for commuters who go to schools, offices, and other places every day. To ensure reaching their workplace, they need to start much earlier and return home very late. This leaves practically no time to attend to children or other family matters. Daily experience of such types leads to mental strain, frustration, and psycho-social problems. Adjustments on food habits, absence of active life with no exercise leads to physical health problems too. Thus, the effects of traffic congestions on people are many and serious. With people buying more cars and bikes for their convenience, the density of the traffic has also increased. In India, the average time wasted by a person at a traffic signal is more. In most of the places traffic signals are either monitored manually or with the help of timers. Manual monitoring requires the traffic policemen, which is equivalent to inadequate application of manpower. On the other hand, the timers are allotted based on the average traffic and is not automated- for example if 30 seconds for the green signal is assigned for a road, it stays 30 seconds in both heavy traffic as well as no traffic situations. This wastes a lot of time of the commuters. Due to lack of patience, people skip traffic signals which results in accidents these ITLs is to gather the traffic information such as traffic density of

2.DEFINITIONS OF SOME TERMS

- Traffic congestion on roads has been increasing rapidly over the years.[1] Traffic congestion defined by Definitions.net (2018) as a condition on the road networks that occurs when the vehicle capacity of the road is nearing saturation. When vehicles are crowded on the road, traffic slows down resulting in traffic jams with vehicles stopped for varying periods of time. Now, the road is oversaturated with vehicles. Slower speed increases travel time and leads to vehicular queueing.
- Traffic control systems are traffic management methods using automated electronic traffic controls.
- Adaptive traffic control system (ATCS) is a traffic management strategy in which traffic signal timing changes, or adapts, based on actual traffic demand. This is accomplished using an adaptive traffic control system consisting of both hardware and software.

How A Typical Traffic Control System Will Look?
[3] In a survey of current methods, Nellore and Hancke (2016) noted that traffic management systems (TMS) using wireless sensor networks (WSNs) are becoming popular as they help to avoid congestion, ensure priority for emergency vehicles, and reduce the

average waiting time (AWT) of vehicles at intersections and WSNs, RFIDs, ZigBee, VANETs, Bluetooth devices, cameras and infrared signals are increasingly being researched.

3. A SMART CITY FRAMEWORK FOR INTELLIGENT TRAFFIC SYSTEM BY VANETS

Intelligent Traffic Lights (ITLs) that are set up on crossroads of a city as the job of information and also report these traffic statistics to individual vehicles which are near these ITLs. In case an accident has occurred these ITLs will send collision related information to the vehicle so that the driver can select alternate route to avoid congestion near the site of accident. [2] Every vehicle has its own GPS installed on-board. Every vehicle will transmit its exact location which will be used to calculate the traffic density. The system architecture consists of three modules.

1. Warning Message Module: This module determines if any traffic accidents have occurred and warns the driver about the same. The information gathered by this module is sent to the next module i.e., Traffic density calculation Module.
2. Traffic Density Calculation Module: This module calculates the traffic density on each road.
3. Decision Making Module: The above two modules gather their information and send it to the Decision-Making Module where appropriate decision is made to provide a congestion free path to vehicles

An infrared based intelligent traffic system.
The proposed system consists of three components:

1. Transmitter module: [4] The transmitter module consists of a microcontroller which stores unique ID of every car. The microcontroller transmits a base pulse which turns on the driver and the data of every car is transmitted by the IR transmitter.
2. Receiver Module: IR Receiver in the receiver module receives the data transmitted by the IR transmitter. The receiver module also consists of a microcontroller which decodes the received data and helps store it in the EEPROM.[5]
   The received data can then be displayed on the LCD display which is provided in the system. Also, two switches are provided which help in the manual viewing of the data stored on EEPROM.

3. LCD display: LCD display can be used for viewing the unique ID number of every car.

4.COMPARATIVE STUDY OF ALL THE METHODS

All the methods that are reviewed in this paper have a common architecture as shown in table 1which includes:

1. Choose an input method to acquire data.
2. Acquire traffic parameters (such as traffic flow rate, number of vehicles).
3. Determine traffic density.
4. Update traffic parameters in database.
5. Traffic Flow Control.

All the methods that are reviewed in this paper use different techniques to determine the traffic density and change the traffic light based on different criteria. [6] In use of VANETs provide easy mobility of vehicles on the road by providing easy communication between vehicles and roadside units but use of specific hardware on the vehicles proves to be a drawback of this system. Similarly, infrared based system is cost-effective and cheaper, but the system is not flexible as receiver and transmitter have to be in direct line of sight of each other. Also, large areas require multiple emitter panels to be installed which can add up to the overall cost of the system.

5.CONCLUSION

In this paper, various traffic management techniques have been studied. The survey of various traffic management schemes concludes that different techniques having own advantages and disadvantages. s. The research works reviewed here adequately demonstrate the multiplicity of approaches possible to tackle traffic management problems in specified contexts. Clearly dynamic systems using real time data and predictive models are better than the commonly used static systems which are insensitive to changing traffic conditions. New methods definitely have significant edge over the current ones in reducing wait times and fuel consumption and thus pollution, giving way to emergency vehicles, reducing accidents, and ensuring orderly and smooth traffic flow even during peak hours.

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