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DEVELOPING OF TRAFFIC MANAGEMENT SYSTEM THROUGH IOT

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Abstract: As the number of cars on the road increases exponentially, so does traffic congestion in big cities. At the same time, the infrastructure for road transportation does not change. Conventional traffic signaling is still widely used in most cities, whether it is manually operated or timed. Since IoT may address a lot of problems right now, in this article we will cover IoT-based traffic management systems and how they work in the context of a city or a road, as well as their benefits and drawbacks. According to the findings of the research, an IoT-based traffic management scheme has both benefits and drawbacks, and may be tailored to meet specific needs and put to good use.

KEYWORD: Traffic management System, Internet of thing

1. INTRODUCTION

To produce communityassessment for service they provided, the administration must work on several areas of smart city explanations, such as smart health care, smart structureorganization, smart traffic organization, smart space solutions, and smart transportation.IOT has changed the way smart metropolises are thought about. The physical organization of a city is ready with smart devices in a smart city environment, and these devices continually provide multidimensional data in various locations, which are then processed to give the infrastructure intelligence. At the end of the day, intelligence is used to better societal and economic conditions.

Congestion is a major problem that develops as cities expand, hence smart transportation infrastructure is critical to smart city projects. An integrated approach to smart traffic management incorporates adaptive traffic sign controls with highway organization, emergency management facilities and roadside devices like roadside units. To prevent or reduce any societal issues resulting from traffic congestion, these systems gather real-time traffic data and take the appropriate steps. With real-time traffic maps, residents may save time and effort by choosing the most efficient route.

2. Our Projected System

In this part, an Intelligent Traffic Administration Framework (Fig.1) has been presented. Although Traffic Control Scheme Supervisory Computer Control Scheme (TCS SCCS) is a major module in the proposed architecture, it also comprises sub-modules like video and peripheral devices. During peak hour traffic, the Traffic Control System regulates and controls the flow of vehicles on the road. Using video cameras, it detects too much traffic and sends an alert to the traffic controller officer in charge of STMS, informing them that the "traffic limit has been reached" and preventing any further cars from incoming that route.

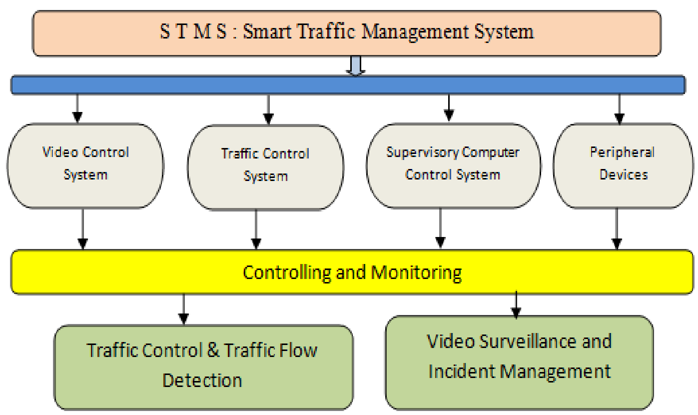

Fig.1.Block diagramoftheproposedsystem

There are a lot of functional components and a controlling system in the proposed scheme, as exposed in Fig. 1. As a result, the following cars would be directed to use a different route, and traffic would be controlled. Using this traffic management system, the right signal is sent and received in appropriate time at events, ensuring efficient transmission and continuous communication. With the help of intelligent peripheral devices, events are captured and detected, responses are sent to control points, and necessary information is sent back to the central processing unit (CPU). This module's other significant task is the installation of CCTV cameras at high-traffic intersections to cover all possible scenarios.

3. Intelligence Computation and Data Analytics

Smart data analytics have been employed in the suggested system to manage the congestion situation delicately and regulate the congestion with the introduction of dynamic mobile agents. In order to avoid traffic jams, the following technique has been devised:

Step 1- The traffic signal sensor device transmits to the central server the total number of vehicles that are transiting, crossing, or waiting for a given kind of traffic within a specified time period.

Step 2- For the aforementioned real-time sensor data, we employ the STMS supervisory computer control system and its mobile agent, which are both linked to the GIS road mapping.

Step 3 – A broadcast message is sent to all traffic controllers' agent computers through mobile agent service when the degree of congestion exceeds a predetermined threshold value. This message directs all incoming two and four-wheeler passengers to an alternative route.

Step 4 – When the degree of congestion falls below the threshold, the traffic computer controllers get another broadcast message to continue managing the vehicle system effectively.

4. Practical Mechanism

This section explains the model's functional mechanism. Fig. 2 depicts a situation in which traffic is very congested. The primary traffic control device is located in the middle of the road. That is all for this particular traffic situation at that particular city traffic light. Every traffic point has an STMS controller similar to this one. Due to the high levels of congestion at this distance, two signal point nodes, SP1.3 and SP1.4, have been installed. Then, at a distance of 1 kilometer from the traffic post's center, two more signal point nodes, designated SP 1.1 and SP 1.2, are deployed to begin managing traffic from a greater distance. Mobile Agent controls and monitors each smart vehicle included in this model once it enters the STMS VANET zone since each vehicle's micro controller chip is incorporated in the PCB. In the suggested scenario, the STMS controller receives traffic status information from the C1 video camera, which gives input to the video control system. We used a traffic capacity of 1000 to 2000 cars for simulating the city of

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Bhubaneswar, INDIA, since this traffic model was created for a particular traffic spot there named Khandagiri square.

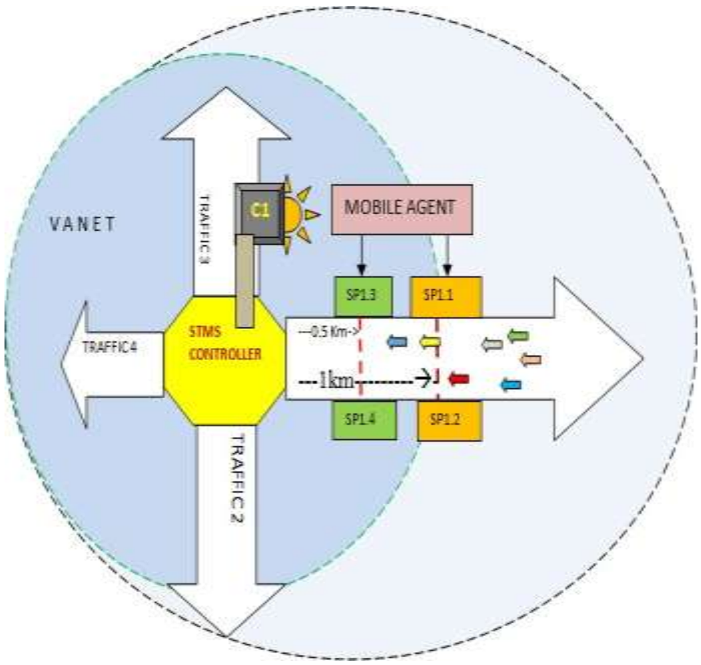

Fig.2. Basic functional diagram of the proposed STMS approach

At peak times of the day, such as between 9 a.m. and 10 a.m., traffic is at its worst. For assessment of congestion and its avoidance by mobile agents, the suggested system's flow chart is shown in figure 4. The flowchart shows that when a smart vehicle enters a VANET-configured zone, the sensor devices first assess its weight to compute the density of congestion that the vehicle may generate. Once traffic congestion reaches its maximum capacity, the suggested system executes the algorithm. This allows the overall vehicle count to be calculated regularly for each car.

5. Projected STMS for Path Alteration

During times of congestion, the mobile agent provides users with two levels of control. If a smart vehicle's driver decides to wait until traffic is less congested, STMS with the STOP and WAIT version is employed at the second signal point (SP 1.3) within a half-kilometer of the suggested

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model (fig. 3). VANET network setup records the location of the stop signs and the amount of time that people wait.

Both the mobile agent and the central traffic post are linked by two sensor locations SP1.1 and SP1.3, which are each one kilometer away. When the mobile agent detects a traffic jam within a kilometer of the traffic post, the SP1.1 sensor instructs the vehicle's driver to select between diverting the path or stopping and waiting, depending on whether or not there is more space available. To redirect an oncoming vehicle's path, send a divert signal together with the relevant Otherwise, SP1.1 verifies that the vehicle's microcontroller is configured correctly and, if necessary, takes action. Calling the proper emergency mechanism, prioritizing human operators, and having them take safeguards to assist combat crime or any other sign of a criminal assault are all part of this process. After that, it moves the vehicle in the direction of SP1.3 by pushing it ahead. Because this is a one-way system, SP 1.2 and SP 1.4 perform the same duties on the opposite side of the roadalternative route number, depending on its answer.

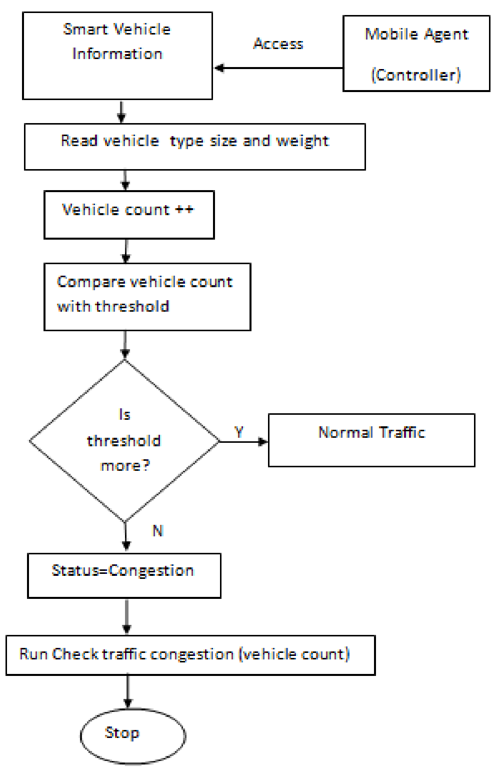

Fig.3. Flowchart of traffic mobbing and prevention process

6. NUMBER PLATE DETECTION

Popularity of license plates is a method of identifying a vehicle. This mission's only goal is to discover the most environmentally friendly way to get the virtual photo's registration information. There are usually three phases to this process. No matter how long or which way around the license plate is oriented, the first step is to locate the registration code. In the second stage, characters are segmented, and in the last step, the popularity of the characters is determined by the registration code's popularity. As a result, this mission reveals the fundamental notion behind a slew of algorithms needed to determine an individual's popularity using the registration code. Car identification techniques include things like using popular license plates. This mission's only goal is to discover the most environmentally friendly way to get the virtual photo's registration information. There are usually three phases to this process. No matter how long or which way around the license plate is oriented, the first step is to locate the registration code.

In the second stage, characters are segmented, and in the last step, the popularity of the characters is assessed using the registration code as a guideline. The goal of this mission is to reveal the fundamental notion of multiple algorithms needed to execute individual popularity from the registration code during Template Matching. The above-mentioned rule function aided in increasing the registration code's individual popularity more quickly. There are many phases involved in this approach of determining a person's popularity including Image Processing, Defragmentation, Resizing, and Character Localization. Tollbooths in India often use a car-type device with a prominent display. However, owing of widespread fraud and inconsistencies at tollbooths, sales to such businesses have plummeted.

To keep an eye on the drivers, some tollbooths use a fiber optic sensor-based device to categorize an automobile based on its location in the past and then add up the results. It is a costly, time-consuming device that requires a lot of upkeep. To find a low-cost and eco-friendly way to upgrade one of these devices, we plan to examine a wide range of structures. Some tollbooths use a fiber optic sensor-based device to categorize cars and tally the results with the guide entries in order to keep track of operators. Classify a vehicle on a regular basis and add up the results with the guide entries. It is a costly, time-consuming device that requires a lot of upkeep. We want to examine several architectures that may be utilized to upgrade one of these devices with a low-cost and environmentally friendly option. However, India's social situation is distinct due to problems such as poverty, unemployment, and a diminished respect for authority figures. This eliminates the option of stopping at a highly automated toll booth. In India, the company wants a self-driving car-type device, but not to reduce or eliminate human involvement or labor, but to ensure that human interaction no longer leads to financial malpractices. Specifically, the company wants a device that operates inside the legacy and only does cross-testing at the guidance. In addition to the primary concerns of high cost and maintenance, the fiber optics-based device has a large number of intrinsic flaws, as previously indicated. Although an IR curtain device decreases the cost significantly, it is still rather costly and low-cost alternatives are required.

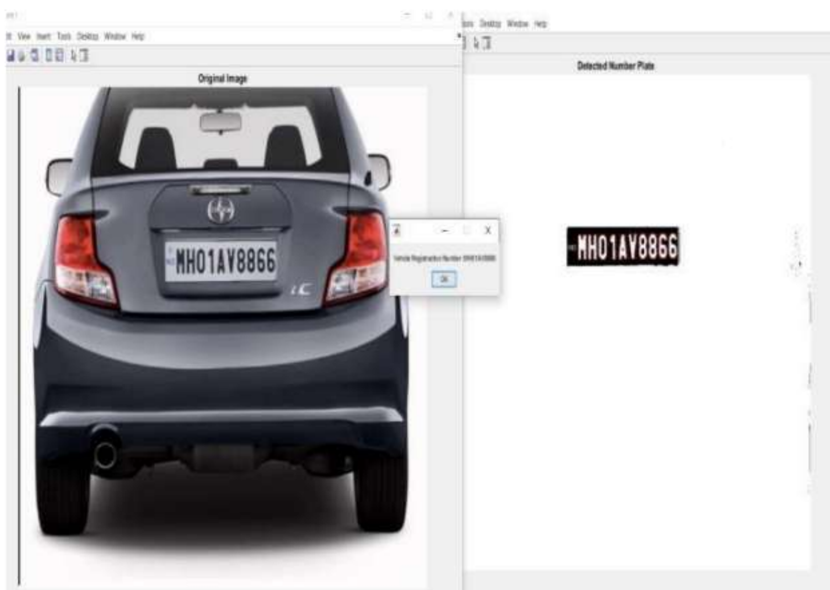

Fig. 4: Number Plate Detection

7. CONCLUSION

Congestion in the transportation sector is a major concern in nations that are still growing these days. As a result, fuel costs increase, and pollution in the air results. Combining computer vision with Internet of Things (IoT) technologies makes it easier to create intelligent traffic-control systems. Drivers may get real-time updates on the condition of the roads through a website thanks to a few well-designed traffic system networks. Using IoT-based smart roads, commute times may be shortened, as can road safety and the number of accidents. These systems may be put into action by any number of different, sophisticated algorithms. The installation of these devices is less expensive, and since they are mobile, traffic congestion is lessened as a result. The automated method cuts down on the amount of time drivers spend waiting at traffic lights and helps keep roadways less congested. It also ensures the safety of those walking along the street. In this research, we suggest a feasible arrangement that enables offloading for continuous traffic on the board in haze-based IoT frameworks, hence restricting the typical response time of the framework. We first create a model of haze hubs based on vehicles traveling left and right, and then scientifically prepare a solution to the haze-enabled offloading problem.

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