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Analysing the Traffic System Controlling Using Smart Sensor

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ABSTRACT— In recent connation in modern city, particularly in densely populated areas, traffic conditions are extremely congested all of the time, especially during peak hours on working days. For a thriving rate of population growth, the clash of modern and public of urban affront several cruxes, leading to inflow peaks in congested places. Furthermore, which causes roaming baulks and allows for the contamination of conveyance kindling by ambient pollution and human infections. Several prosperous municipal sects have recently completed smart traffic system structures that provide effort criteria to influx mechanization as well as inhibition among previously detected problems in order to avert comparable intense matters. The key concept is to quickly collect vehicle jamming data, as well as to implement a fleeting substitution strategy for automobiles and travellers, which includes a network-based vehicle data scheme and the efficient placement of vehicles on accurate transportation routes. Here, an improved traffic mechanism with an observational base is to be projected with existing criticism that works on rapid data broadcast and comparable processes. With an influx network result, portable mediator cantered supervisor implements blockage rheostat functionality to homogeneously unify transportation stream while avoiding cramming to nifty transportation region, revealing additional distinct topographies such as mishap prevention, offence, chauffeur elasticity, and traveller safety. Preteens is used, which has stimulating benefits for better execution, managing postponement, and avoiding various undesired incidents for a better range of intense swarming.

Keywords— Traffic System Controlling, Smart Sensor, WSN Network, VANET

I.INTRODUCTION

The final elements of the program include integrating freight indications with transportation regulator cores, as well as an electronic highway design for the city that is backed by smart figuring influence of information incurred for strategic section (Rath, 2018).

Here, basic competition is based on actual practice in real time, resulting in cybernetic influx data and adequately smearing this with some rudimentary vehicle movement. Information gathering apparatuses collect data from the Supervision Organization (Rath, 2018), as well as GIS charting within actual time periods, to provide convenient data for chauffeurs and to help the reduction of transportation mobbing. Furthermore, basic traveler data such as calling in on various locations, bays zones, and detachment is expected with actual time depend on enormous electronic monitors mounted inside towns centers arrival spots for directing chauffeur in the direction of individuals location, which aids in conserving combustion energy and saves valuable hours spent examining numerous calling in on locations.

Since the atmosphere has become contaminated with a large amount of sterile, modern civilization in towns (Rath, 2018) has been achieved. Since the system is gaining great popularity in technology with adorned highway transportation monitoring and regulation schemes, the expected transportation scheme is pre-arranged with cybernetic influx condition. Because it has a grid link with transportation as well as system arrangement, the difficulties faced in modern cities for transportation overloaded problems are well clarified by this procedure. As a result, anticipated data on street disorder as well as road information is concentrated in organized transportation, and intellectual verdicts may be chosen as an adequate condition before an unruly occurs (Rath, 2018).

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Furthermore, VANET in modern cities aids in the reduction of issues such as overcrowded roadways, accidents, offenses, car park complexities, and other public-related issues. Because of the overall advancement in broadband technology, its applications in transportation are vast, and transportation is being transformed into a modern flood retrieved by intelligent traffic processes. Traditional operational arrangements and chauffeurs have been replaced by modern ones, which include a wealth of practical information for obtaining electronic signs from supervisors and, as a result, perceiving drives and their job. VANETs enable changeable connectivity within automobiles and traffic monitoring systems, as well as infrastructures based on wireless intermediates that do not require a static frame. The proposed transportation overloads elucidation in current town customs and improved procedural clarity with the challenges influencing information logic created by transportable mediator aggressively with VANET advancement to modern towns. The term "portable mediator" refers to a set of software packages that are built to free up and improve communication between cybernetic workstations, customers, and service providers, as well as between supervisors and external devices. It is sovereign and re contractible while in use, allowing it to be dressed up as a provision alongside an implementation scheme.

Transportable mediators are commonly used in directory applications, electronic autographs, and the creation of an on-demand system. According to the circumstance of challenging mission controlled under mediator, outrun of the transportable mediators focused programs is greatly harmed. The difficult part is deciding on an algorithm that is simple to run and connects platforms. Within the context of a modern town, projected implementation, mobile mediators are used to implement the overload regulator logic to programmed transportation monitoring schemes. This is how the report is laid out. Section 1 focuses on the introduction, while Section 2 defines a lengthy literature review of the associated zone with close solicitation details. Section 3 provides a full picture of the predicted model under VANET, as well as a detailed classification of the practical purpose for numerous portions that run inside the arrangement. The arrangements' security and dependability properties are also stressed. Section 4 concludes the report with more developments in this replica.

II. LITERATURE REVIEW

Smart sensor based IOT device is not only used for traffic system it is now used in every spare in life. For example, we can say it is used in Covid Patient health monitoring, smart ICU management system, smart home, automobiles, data centre monitoring and other vital sectors (Sharif et al., 2021) . We will see immersive uses of IOT device around us, when 5G network will be fully implemented. Smart devices and automation process along with neural network and artificial intelligence will significantly reduce human efforts and time also.

Our paper we will review different smart sensor-based traffic system models and trying to find out their strong and weak point. Many researchers still trying to find out some best possible solution to make a smart traffic system for them smart cities.

Janak, Dr. Mandalapu, Dave reviewing some paper where they focused on traffic control and monitoring system – for better traffic management (control, tracking and monitoring) using a computer system. Where they are talking about various system of traffic monitoring system (Trivedi et al., 2017).

Prof. Zen, Adarsh, Prajwal, Rohan, Shubham, Shubham Raut are discussed some automatic traffic control and monitoring system which help reducing accident in walker crossing related work on their paper (Raut et al., 2020).

In a review paper Dr. R. Vidya and Ms. T. Kaviyarasi review infrastructure smarter roads and implement their technology on a broader perspective (Fagnant & Kockelman, 2014).

Aditi, Pradeep Singh and Yashwant Singh wrote a review paper on how smart intelligent transport system progress day by day (Zear et al., 2016). Where they discuss on systematic analysis on ITS.

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Abhijit Sharma; Rituparna Chaki; Uma Bhattacharya have published a paper for reviewing applications of wireless sensor network (WSN) towards develop an efficient system to control and manage smooth traffic flow (*Applications of Wireless Sensor Network in Intelligent Traffic System: A Review | IEEE Conference Publication | IEEE Xplore*, n.d.).

III.OVERVIEW OF SMART SENSING MODEL TO CONTROL TRAFFIC SYSTEM

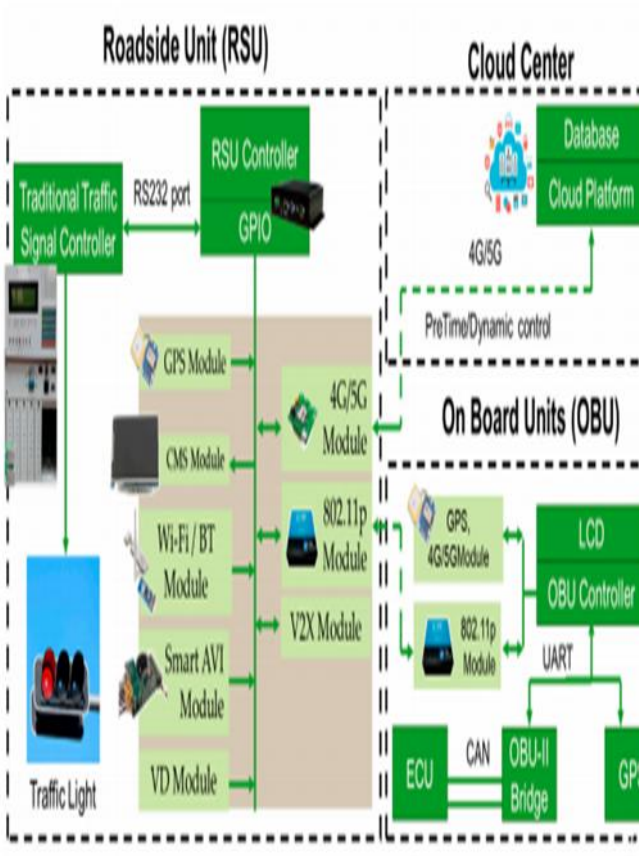

Fig 1: Proposed architecture

The On-Board Unit (OBU) is responsible for receiving and responding to real-time information, such as eco-driving tips and course re-routing. The system is designed with an on-board computer that communicates with a variety of modules, such as an 802.11p V2X interface, GPS, mobile communication (4G), and an OBD-II interface, among other features. We employ a cloud centre as a central database that serves as a management tool for all of the RSUs and OBUs in the organization. It is necessary to develop a five-stage state transition diagram for the Roadside Unit controller in order to integrate multi-modal transportation applications into a Roadside Unit controller in STSC state transition (Lee & Chiu, 2020).

It was proposed that an algorithm known as the Host RSU algorithm be used to regulate how the RSU should be managed in the presence of an approaching emergency vehicle.

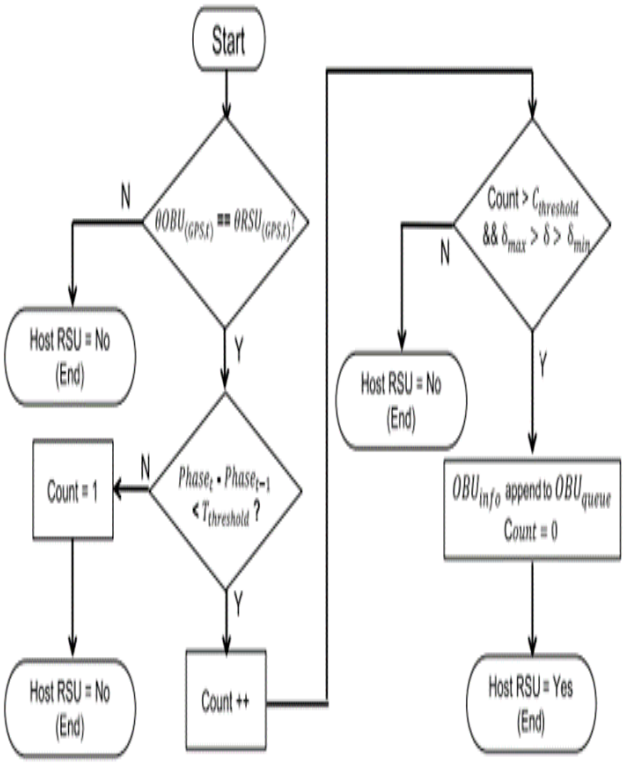

Fig 2: Host RSU algorithm

After analysis, their system we found their approach is very good to develop a system for smart traffic system. But we think their emergency vehicle signal pre-emption scenario is not properly explained. we think they need some upgradation on it.

Yasar Abbas Ur Rehman, Adam Khan, Fazal Muhammad and Muhammad Iqbal proposed an intelligent traffic control system using image sensor (Abbas et al., n.d.). They proposed

a system control traffic light based on technique of digital image processing.

In their proposed system, morphological image processing in used for detection of vehicles and the removal of background noise. They system will detect type of vehicles and control the traffic light according to number of vehicles of both sides. Their system consists with personal computer, web cam, wooden board, LEDs, and pointer cable. They take images 640 x 480 resolutions in RGB format having depth of 24. Then they remove the noise from the image and process it. They successfully detect the vehicles.

After analysis, their system we do not think it will work for mega cities. They take toy car for their experiment. We think it will face difficulty when the system run on road.

Chandana K, Dr. S. Meenakshi, Cyana, Meghana N and Navya proposed a Traffic management system (TMS) for congestion control and warning used of IoT (K et al., n.d.). They use cloud for store traffic data and based on data they calculate required time to clear the traffic on a particular road based on the density of traffic. They proposed an algorithm for their system.

The ultrasonic sensors used in the smart sensor deployment produce outputs that show the density of traffic. Timers were used to pre-define the signal cars that would travel down the line. If the density of vehicles crosses the line in less than 50 seconds, the timer for the line switches to green, yellow, and red. The way their system operates is dependent on cloud data. When the red light is on, the system displays the amount of time that has elapsed. When the density is yellow, the information is uploaded to the cloud. When the light becomes green, the reverse counting process will begin. They also have a feature that allows users to request emergency cars. The way their system operates is dependent on cloud data. When the red light is on, the system displays the amount of time that has elapsed. When the density is yellow, the information is uploaded to the cloud. When the light becomes green, the reverse counting process will begin. They also have a feature that allows users to request emergency cars.

Following an evaluation of their system, we concluded that their technology is suitable for monitoring traffic systems. Controlling traffic lights, on the other hand, is not as simple as it appears.

```
1.)  // Description: Compute time_ duration
     // Input: vehicle's weight
    // Output: total time period will be computed
Step1: if ( signal == RED)
Step2: if (a>30 && a<=60)
          count ← count+1
        else if(a>60 && a<=90)
          count1← count1+1
        else
          count2 ←count2+1
        end if
Step3:c← count/2+ count1/2 + count2/2
Step4:TD= (count/2)*2+ (count1/2)*4+ (count2/2)*8
end if
End of algorithm
2.)  // Description: Uploading vehicle details
     // Input:
//   Output: Traffic density details will be displayed
Step1: if (signal == YELLOW)
Step2: Uploading density details to cloud
End of Algorithm
3.)  //Description:  Display time period
     //Input:
     //Output: Displaying the time duration
Step1: if (signal == GREEN)
Step2: green signal appears
Step3: display time_duration
step4: while (time_duration --)
        end while
End of Algorithm
```

Fig 3: Algorithm

IV. ANALYSIS & RESULTS

The placement of smart sensors yields traffic density data via ultrasonic sensors. The signal trucks with the line were predetermined by timers. The timer for the line switches to green, yellow, and red if the cars density crosses within 50 seconds. Their approach is based on data from the cloud. When the indicator is red, the system displays the time spent waiting. When the density is yellow, the data is uploaded to the cloud. Reverse counting will begin when the light turns green. Their system also has a feature that allows users to request emergency cars.

After reviewing their system, we believe it is suitable for traffic monitoring. However, regulating traffic signals is not as simple as they claim.

The outcome article delves into the constantly changing traffic control and monitoring management signal. Smart traffic monitoring saves fuel, reduces commuter time, reduces pollution, and improves commuter discipline in a healthy city. The density and distance are measured by a smart sensor based on the number of cars and the distance range. When traffic is dynamically controlled, it allows for better monitoring and accident prevention, as well as time savings, reduced fuel costs, and smooth traffic control.

V. CHALLENGES & FUTURE SCOPE

In our capacity to test multiple technologies for accuracy is limited by our limited financial resources. Besides There is currently no structure in place to provide for emergency vehicles such as ambulances. Smart sensor traffic monitoring is a relatively new technique in the field of traffic control. This traffic control technology is both efficient and cost-effective.

There is a risk of hacking and security issues with any security or privacy system. RPM has been integrated with a security mechanism to ensure the integrity and privacy of the vehicle's record. The traffic management system is a challenging system to implement; regulatory policy and reliability testing can help with the deployment of new technologies. The budget for government deployments is limited (*Intelligent Traffic Systems: Implementation and What's Down the Road? | Cleantech Group*, n.d.). Monitoring of the distance location of smart sensing devices on roads, vehicles, and other transportation infrastructure is performed. When the vehicle is driving at a high rate of speed, it detects an obstruction. Because of the lengthy processing period, we did not receive a response in time before the event took place. We reduce the number of accidents by using several types of sensors in conjunction with an algorithm for multi-source data interaction to provide improved vehicle response times in driving circumstances while also increasing maps (Guerrero-Ibáñez et al., 2018). The sensor for this model was problematic because different heat, weight, and light sensors have varying restrictions depending on whether it is day or night.

Future work includes the development of an Internet of Things-based traffic monitoring system. On the roadside, a display unit and a traffic signal light have been installed. The deployment of a system in real time, includes the inclusion of IoT security features (Ray, 2018; Sarrab et al., 2020). The programming must be extended to include a complete end-to-end process that includes a centralized communication system.

Overall, the security of IoT integration, communication with display units, and traffic signals will be explored in more depth during the research. There is currently no structure in place to provide for emergency vehicles such as ambulances. Internet of Things (IoT) foundation Smart sensor traffic monitoring is a relatively new technique in the field of traffic control.

VI. CONCLUSION

Multiple feature components of smart sensors are used in the smart traffic monitoring system. Optimization is traffic using smart sensors to be more efficient, allocating time modifying every traffic signal, and counting the number of vehicles on the road path. This paper provides an excellent answer for a rapidly growing traffic flow in major cities. These papers have some limitations, as they fail to smoothly moderate traffic.

Morphological image processing is used in their proposed method to detect cars and remove background noise. They technology will detect vehicle types and adjust the traffic light based on the quantity of vehicles on both sides. Their setup includes a PC, a webcam, a wooden board, LEDs, and a pointer cord. They capture photos at a resolution of 640 x 480 pixels and a depth of 24 pixels in RGB format. They then process the image after removing the noise. They were able to locate the automobiles.

The traffic monitoring system is controlled using a smart sensor control technique. Our study focuses on real-time traffic control and monitoring, as well as how to tackle the problem with the help of a smart sensing device. Smart traffic monitoring saves fuel, reduces commuter time, reduces pollution, and improves commuter discipline in a healthy city. To collect, store, manage, and monitor traffic data, we use

technology such as Smart sensor android application, RF transmitter and receiver. Finally, smart sensors play an essential role in traffic monitoring systems by increasing the efficiency of information transmission, improving traffic conditions, increasing traffic safety, and lowering management costs. After analyzing their system, we discovered that their approach to developing a smart traffic system is quite good. We, on the other hand, believe that their emergency vehicle signal preemption scenario is inaccurately depicted. We believe that it can be improved in some ways.

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