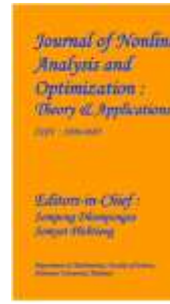
Journal of **N**onlinear **A**nalysis and **O**ptimization
Vol. 11, Issue. 1 : 2020
ISSN : **1906-9685**



TRAFFIC ANALYSER APP USING IOT

DUDEKULA RESHMA, Assistant Professor, reshma.dudekula1993@gmail.com
VIJAYA BHASKAR MADGULA, Assistant Professor, vijaya.bhaskar2010@gmail.com
K BALAJI SUNIL CHANDRA, Assistant Professor, hod.cse@svitatp.ac.in
Department of Computer Science & Engineering, Sri Venkateswara Institute of Technology,
N.H 44, Hampapuram, Rapthadu, Anantapuramu, Andhra Pradesh 515722

Abstract—
The amount of cars and trucks on the road has grown over time. Backlogs in traffic are becoming more common, impacting people's daily lives. Police enforcement by manual means has not been effective, and neither has the use of predetermined fixed times for all situations, such as low and heavy traffic congestion. An approach is put out to efficiently address the aforementioned issues via the use of the internet of things (IoT). With cloud computing, which is based on the internet, many services are able to exchange real-time traffic data, allowing for more effective traffic management. To monitor light densities and provide that data online, this model use an arduino-based circuit system.Rerouting is based on the assumption of traffic density on the lanes of a road, and a network of sensors is used to track the number of cars and the traffic congestion at a junction.

Key words: Internet of Things, Traffic Management System

INTRODUCTION:

The majority of big cities still deal with traffic congestion, even if there have been efforts to lessen it. Engineers, planners, and policymakers in metropolitan areas have recently identified traffic congestion as one of their greatest challenges. This problem leads to overcrowding, wasted time, and sometimes dangerous accidents. It is essential to maximise the use of the current network since there is very little room on the new roadways. Information is gathered in this traffic system by means of an ESP8266 microcontroller and other sensors, such as the HC-SR04 ultrasonic sensor and the DS18B20 temperature sensor. In addition, an Android app that shows the data supplied by the IoT device using Firebase. By "Internet of Things," we mean the network that allows everyday objects to talk to one another online. In the "web of things," internet connection is extended to a wide variety of ordinary objects and gadgets that use embedded technology to communicate and interact with their external world over the web, rather than only to conventional devices like desktops, laptops, computers, and mobile phones (1) An example of a network that uses sensors to monitor physical or environmental variables is a Wireless Sensor Network (WSN), which might include autonomous devices that are geographically spread. A wireless sensor network (WSN) system relies on a gateway to provide dispersed nodes with wireless access to the wired network. Through a process of self-organization, networks are formed by an excessive number of sensor nodes that are randomly distributed inside or near the monitoring region, known as the sensor field. first and Wireless sensor networks find use in the fields of agricultural management, civil structure monitoring, and industrial automation. Wasted time and gas, pollution, and stress are all possible outcomes of traffic congestion, which may be an increasingly global concern. Everyone wants to get where they're going as quickly as possible. This problem gets quite serious if a prominent person visits the town. All traffic comes to a sudden halt, and the public and police resources are used to a significant extent. Dealing with such circumstances, particularly in a large metropolis, may be rather challenging. Congestion, unexpected periods, and other road-traffic problems in India are becoming more noticeable, and the situation gets much worse when traffic grinds to a standstill, even for a short length of time. In the blink of an eye, miles and miles of gridlocked roads occur [2].

I. Literature Survey

Cambridge city is testing a smart traffic management system that uses subsurface queue detectors to monitor traffic and relay that information to a central control unit, which then makes decisions based on that data. Due to networking concerns, the system's centralization will cause it to block. Although the researcher employed optical character recognition (OCR) to identify cars in Pakistan using licence plate recognition, the system would not work due to the wide variety of vehicles on Pakistani roads, including bicycles and donkey carts, which do plates.This section provides a synopsis of the articles that served as references for the final product. This chapter covers a variety of topics, including the Internet of Things (IoT), data processing and machine learning techniques, prediction algorithms, and systems for predicting temperatures.

Objective Of Literature Survey:

• to discuss the Internet of Things in light of enhanced methods of information and communication. • To learn more about wireless sensor networks as they pertain to collecting traffic data • To study up on sensors and microcontrollers and how to collect data from them and display it on a digital phone

Survey on Traffic Information System:

A method for estimating traffic density using the cell transmission model was suggested by Laura Munoz et.al. This takes into account non-uniform cell lengths, utilises cell densities as a state variable instead of cell occupancies, and permits a crowded situation to be

preserved at the end of the motorway segment that was modelled farther down the road. More leeway in highway partitioning is achieved by using cell densities instead of cell occupancies, which allows for the incorporation of unequal lengths.

A method for estimating traffic density using video was suggested by M. Vargas et al. Adaptability is key for video-based systems that aim to monitor urban traffic. They should have algorithms that can identify both moving and briefly stopped cars, which is particularly crucial in metropolitan areas.

Using differential approaches to identify and count automobiles in a daytime setting, H.S. Mohana et al. came up with a replacement method. It is possible to estimate the traffic flow by counting the number of pixels in the frame that are either objects or backgrounds. Variation in traffic density due to the presence of cars inside the picture is the main principle applied. This work aims to provide and verify a simple differential algorithm that can recognise and count vehicles. When putting a system in place to identify and count vehicles, traffic flow estimate is crucial [4].

A method for estimating traffic density using an online support vector machine classifier was suggested by Thanes Wassantachat et al. tying up has major consequences for the natural world and the economy. Better traffic flow, shorter travel times, and less environmental impact are all possible outcomes of removing bottlenecks. Reducing the value of human resources and tie-up delays, automatic assessment of traffic congestion status is thus implemented. The stoplight controllers may find an effective traffic solution with this automated judgement.

In order to gather information on the number of vehicles and their classifications, Guohui, Zhang, and colleagues

http://doi.org/10.36893/JNAO.2020.V11I01.480-486

suggested a method called Video-based Vehicle Detection and Classification (VVDC). Unaccelerated video pictures may be used by the suggested method to identify and categorise cars. The capability to gather real-time traffic data using unrecognised security cameras increases the prototype VVDC system's utility.

In their presentation, Dragoi et al. laid forth a model for controlling a vehicular ad hoc network that is formed between traffic sensors and vehicles in order to minimise congestion. Wireless traffic lights, or roadside devices, compile data from vehicles over many stretches of road to provide an accurate cost map of the route.

Using a VNSim simulator, they assessed the suggested model. Their testing revealed a significant drop of up to 40% in the typical time needed for the vehicle to reach its endpoint.

Using an AVR micro-controller and a tiny traffic simulator (SUMO), Ahmad et al. created a system to test strategies for controlling lights. The researchers examined the effects on traffic networks and analysed the execution timings of four scheduling algorithms—the shortest remaining time interval (SRPT), the fair SRPT, the minimum destination distance first (MDDF), and the minimum average destination distance first (MADDF)—in SUMO.

The results of their experiments showed that, for SRPT, the execution time is constant and unaffected by traffic intensity; for Fair SRPT, it decreases as traffic intensity increases; for MADDF, it increases rapidly; and for MDDF, it increases with traffic intensity, but not quite as fast as MADDF.

To alleviate traffic congestion in Indian cities, Abishek et al. suggested a WSN-based system. Their goal was to have the traffic lights change to accommodate the ever-changing traffic. The C++ programming language is used to model the suggested system. They discovered that the current system can manage seven percent more cars.

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II. PROPOSED SYSTEM

By supplying traffic information, the planned traffic data system hopes to make the stoplight and its circumstances more efficient and viable for consumers. The central processing unit (CPU), traffic signals, and automobiles all communicate with one another via Wi-Fi in the traffic data system.

Reduced travel time, traffic congestion, pollutants, and fuel consumption are all possible outcomes of the traffic system's provision of commuters with accurate, timely, and dependable traffic information. In this case, the consumer or user will get traffic data collected by sensors using his or her own mobile device. With this data in hand, he or she may choose the fastest and most direct route to their destination. Our sensors are linked to the traffic system, which includes the traffic lights. Using data collected from these sensors, the traffic signals may be adjusted in response to changes in road traffic density. The traffic system provides data such as traffic density, temperature, and live light.

Advantages of proposed system:

• Enhancing traffic safety: Traffic information systems assist with all of the following: unsafe speeds, hazardous weather, and heavy traffic, all of which may lead to accidents and fatalities.

• Preventing harm to infrastructure and safeguarding public health: Heavy trucks, especially when backed up by traffic, may place a significant pressure on road networks. There will be no traffic delays and less stress for the general population due to the traffic system's management of the traffic.

• Traffic control: In this case, a network of several adaptive junctions decreases wait times and keeps traffic flowing smoothly by adjusting the timing of light changes based on actual traffic conditions rather than a predetermined timetable.

• Collecting traffic data: Accurate traffic planning is almost impossible without comprehensive data about patterns of road usage. The commuters need to use the traffic reports to plan out their route in advance. Users and drivers are able to get traffic data using the traffic data system's mobile app.

To meet functional requirements, the system must include traffic sensors that can detect traffic signals and provide the consumer with that information. The user's digital phone will be notified of the current temperature at the real traffic location. The individual's device's live stoplight light must also be specified by the system. When there is a discrepancy between the predicted and real traffic positions, the system is required to provide an alert.

Needs That Aren't Practical:

• Price: compared to other traffic information systems, this method is quite inexpensive. Max. capacity for storage: The vast majority of the systems need a lot of room to save the data, yet keeping the data throughout this traffic isn't exactly a glamorous undertaking. In terms of storage, it's efficient. Reduced pressure on users inside the hold up and no health repercussions are the results of this technique's ability to provide data in the right manner at the right time, which has an environmental impact.

• Safety: Users' own devices are given access to traffic information using this method. Users will be installing the software, thus it's important that the system is safe enough to prevent unauthorised alterations or problems.

Hardware Requirements:

• **Processor**: i3
• **RAM** : 4GB
• **Microcontroller** : ESP8266 NodeMCU
• **Devices**: Mobile and Laptop
• **Sensors** : Ultrasonic HC-SR04 , DHT11 temperature and humidity,LEDs. Jumperwires,Breadboard

Software Requirements::

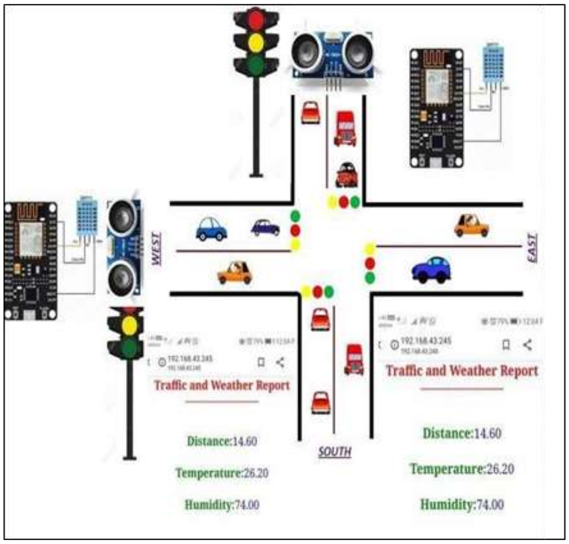
•**Operating System:** Windows 10
• **Software**: Arduino IDE 1.8.12 ,Android Studio, Firebase
• **Programming Language**: Arduino, Java
•**Drivers** : Silicon USB Port
•**Additional Libraries** : ESP8266 Json file for Board Manager, DHT header file, Firebase libraries

Proposed System Architecture:

Three characteristics, namely temperature, traffic signals, and traffic distance, are used by the suggested system. The environment is sampled for these four characteristics by means of the corresponding sensors. The receiver receives the data remotely and then transmits it to the system via the port. The user's cellphone will get the data that has been gathered.

Developed nations already use sophisticated traffic data systems (TIS) widely because of how important they are for managing and controlling traffic on roads. In order to help commuters plan their travels and get instructions while they're on the road, it broadcasts traffic information using information and communication technology (ICT).

Here are some examples of the kind of information that TIS may provide: • meteorological conditions (such as temperature and humidity), • traffic signals, • the optimal route to take, and • information regarding the density of traffic.



By informing commuters of accurate, timely, and dependable traffic conditions, we may affect their travel behaviour, which in turn reduces travel time, traffic jams, emissions, and fuel consumption. Here we see the use of mobile devices to collect data about traffic via sensors. We will use this data to our advantage by avoiding traffic and selecting the fastest route possible [6].

The lot-based control system relies heavily on traffic signals. Our sensors are linked to the traffic signals. Using data collected from these sensors, the traffic signals may be adjusted in response to changes in road traffic density. Commuters will get data on traffic density and light timing, as indicated before. The smart traffic lights will be very beneficial for cities in many ways. Configuring hardware:

At its heart, this gadget is a microcontroller that can receive and transmit data. The sensors are connected to the system by use of an Arduino NodeMCU Esp8266 microcontroller.

connected to it with the use of a breadboard and cables. Listed below are the sensors that will be used to track the traffic:

Designing the User Interface (UI): • The program's job is to facilitate data transmission between the user and sensors via the tip.

A graphical view is provided to the user while they monitor the sensor. The data is shown using the Android app.

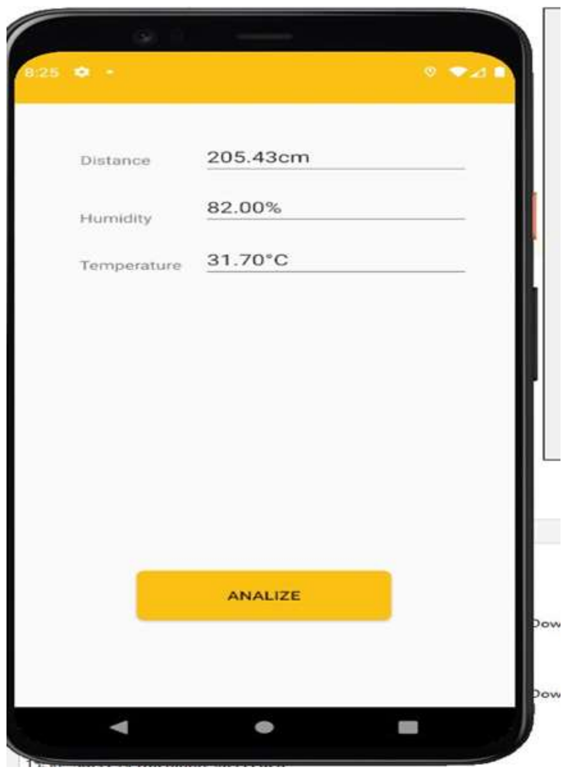
Android Studio was used to create the app. Presenting traffic statistics to the user is the primary role of the user interface. The sensors were validated by the results' output. At a traffic signal, the user may get the current temperature, light level, and distance travelled.

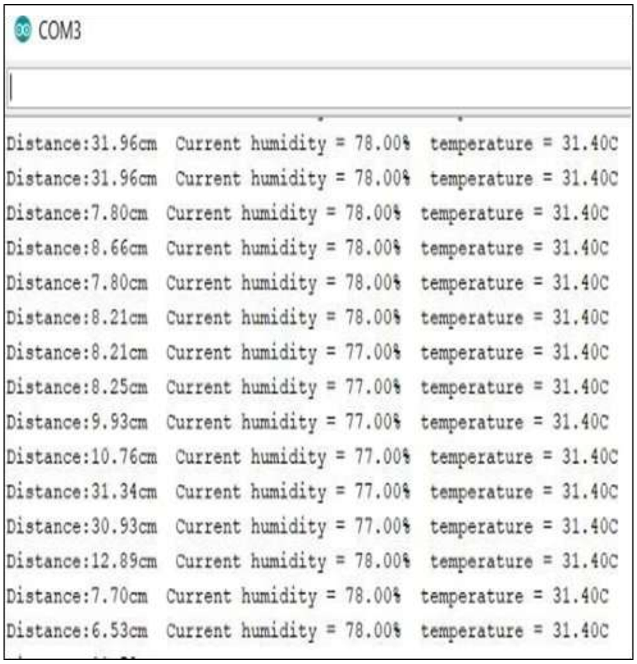
III. RESULTS

User Interface using Graphics

• Images of the Obtained Outcomes:

• Temperature, traffic signal, and density data • Several sensor readings shown on the serial monitor





IV. Conclusion

The sensors used in this project typically gather data related to the following parameters: humidity, temperature, traffic signals, and traffic density. data sent wirelessly from the sensors to the driver's Android mobile device. The data display device will show the driving force the data collected by the sensors. The driving force may access these parameters using this feature by verifying the info values as needed. Data trends are tracked and documented appropriately. Automated procedures will be implemented to disseminate data collected from the various sensors.

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