

**Real Time Traffic Management and Air Quality Monitoring System Using IoT****Sonal C. Deshmukh, Aditya V. Jagtap, Ganesh M. Mahadik, and Sameer S. Inamdar***Department of Computer Engineering,
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Abstract — *Traffic congestion is severe problem in many cities around the world and because of this traffic congestion problem of air pollution is also arises. To solve this problem we have proposed an architecture for dynamic traffic density management and air quality monitoring system combined with simulation model. Enthusiasm powering this approach is always to lower targeted visitors (traffic) over-crowding along with air pollution. This specific project is concerning real-time targeted traffic managing for staying away from traffic jam associated with targeted traffic and also concerning air quality monitoring for staying away from the polluted environment. System utilizes IR sensor and MQ series gas sensor regarding measuring traffic denseness and polluting of the environment respectively. Procedure lives up to expectations by utilizing clustering method for focused on traffic thickness alongside supports log for nature of air checking. Strategy likewise accompanies a man to search for traffic movement thickness furthermore the air environment with respect to certain area.*

Keywords - *Air pollution, Clustering, Log, Sensor, and Traffic Denseness.*

I. INTRODUCTION

The annual increase of automobile production is about 6% globally. Due to migration of population, urban growth and infrastructural constraints, the road space is not keeping in pace with cumulative automobile increase and thus causing severe traffic congestion everywhere.[15] On account of resource constraints and public resistance, development of new road space either within or outside the city limits is time consuming and costly. Therefore, to ensure seamless movement of vehicles, an effective monitoring and management of traffic movements are essential to overcome the constraints of availability of road space.[1]Transport has a significant impact upon the environment in which we live. In general, these impacts can be divided under four broad headings: local air quality, climate change, noise and watercourse pollution, while the clean air is vital to human health. High levels of fine particulate (PM10) air pollution in 2005 were estimated to have caused 1,031 accelerated deaths and 1,088 respiratory hospital admissions in London. The Mayor's Air Quality Strategy was published in 2002 to deal with local air quality and its impact on health. And The Control of Dust and Emissions from Construction and Demolition Guidance was issued in 2006. By considering all these issues and facts. Recently, natural disasters and extremely abnormal climate situations happen frequently and globally, the culprit of which is the exacerbation of global warming. [20]One of the measure reasons behind global warming is "AIR POLLUTION".[16][18] Human can live or survive without water and food for few days but when it comes to air then surviving for 2 to 3 minutes may seems to be impossible. Air pollution possesses important effect within the attention regarding constituent's ambiance bringing about results including international increased temperatures as well as rains.[11] Air flow air-borne pollutants are additional within the ambiance coming from selection of places which transform the structure regarding ambiance as well as impact the biotic environment.[19] The actual attention regarding air flow air-borne pollutants be dependent not merely within the portions which might be coming from smog places but in addition within the power on the ambiance to be able to both process or maybe dissolve these emissions.[12][17] Our proposed system has gasoline sensors regarding MQ series are utilized for your realizing unwanted gas from the environment as well as employ IR sensor for auto counting to modify the actual vibrant time period regarding targeted visitors indicate. This specific sensor they fit with unique places within the location, sensed info transfer in order to fog up for additional finalizing. Cloud server contains the World Wide Web server as well as directories. Cloud server provides the storage space as well as finalizing capability. Cloud outlets as well as functions auto wood as well as gasoline polluting of the environment wood. Consumer might be look at the oxygen polluting of the environment while using targeted visitors thickness within the Google android starting phone. We are generating the actual TEXT MESSAGE or Electronic mail attentive for substantial gasoline emission in that place from the mobile and that is related through Bluetooth. In addition to collection the exact variety for valuations in order to every un wanted gas, should the benefit regarding gasoline will be meet or exceed compared to the distinct variety then the program will about to create the actual the attentive.

II. MOTIVATION OF THE SYSTEM

Our environment is changing drastically because of these drastic changes we all are facing lots of the problems such as health problem, imbalance into the environment cycle and lots more. The main reason behind environment change is pollution. Pollution occur due to different types of pollutants. Among of these pollutants most of the pollutants expelled into environment by vehicles. We found that most of the vehicles expels the pollutants during traffic. Vehicles are one of the largest sources of the pollution worldwide. Any vehicle burns most of its fuel when it is on signal than while it is travelling. Traffic jam are bad for air also. It affects quality of air severely. By considering all these facts we decided to design such system that will manage traffic according to density of vehicles in traffic and automatically maintain air quality good. So motivation behind this proposed system is today's dense traffic and air pollution.

III. REALATED WORK

Getting precise details about current in addition to near-term long term traffic flows of hyperlinks within a traffic multilevel has numerous apps, which includes traffic projecting, auto routing devices, auto routing, in addition to blockage managing. A major problem throughout getting traffic flow details instantly can be of which the vast majority of hyperlinks isn't built with traffic sensors. Another trouble can be of which components impacting traffic flows, for instance mishaps, public functions, in addition to road closures, are often sudden, recommending of which traffic flow projecting is usually a challenging process. [2] The system uses the microcontroller and microcontrollers placed on the board. The traffic signal adjusts on the board. This system is use fix time of interval for each signal. [10]. The vehicle detection system requires four components: a sensor to sense the signals generated by vehicles, a processor to process the sensed data, a communication unit to transfer the processed data to the BS for further processing, and an energy source [3] .intelligent traffic light system will be composed of two components(or subsystems): a monitoring system and a control system will able to integrated together to aid the traffic light system to take the intelligent decisions efficiently[4] [5]. According to the Health Organization, over several. 6 million people pass away yearly as a result of air pollution. Substantial amounts of air-borne pollutants really are a significant cause of Conditions for example asthma, bronchitis, and chronic obstructive pulmonary illness.[6][7] Matter pertaining to air-borne pollutants depends on the way popular that they in addition to the authorized and regulating framework on the location by which that they are present. Essentially the most popular air-borne pollutants contain sulfur dioxide and monoxide, risky natural and organic materials, ozone, oxides regarding nitrogen, sulfur dioxide, and cause. A number of key air-borne pollutants can easily socialize in order to create second air-borne pollutants, which can be created as a result of the change within chemical sense of balance inside the ambiance. Blends regarding air-borne pollutants (smog) can easily intensify active asthmatic conditions for example asthma and bronchitis and/or enhance the danger regarding asthmatic difficulties, specifically upon "smoggy" days to weeks. Raised because ranges make a difference to the central tense method and could impair rational progress within young children. Quite a few scientific tests url air flow air-borne pollutants, for example particulate matter (PM), ozone nitrogen dioxide, and sulfur dioxide and monoxide (CO), to boosts within quick demise and medical admissions for those who have active cardiovascular system and lung illness. [13] The system suggested in this article consists of local Traffic routing for every intersection junction according to instant sensor Systems. The particular features a central microcontroller at just about every junction which gets facts from very small. [14] Issue pertaining to air-borne pollutants is determined by exactly how prevalent they're, as well as the legal in addition to regulating platform of the locale by which these people can be found. By far the most prevalent air-borne pollutants include carbon dioxide monoxide, unstable organic materials, ozone, oxides regarding nitrogen, sulfur dioxide, in addition to cause. Several key air-borne pollutants can certainly socialize to form extra air-borne pollutants that happen to be generated as a result of this adjusts in substance harmony in the surroundings. Combos regarding air-borne pollutants (smog) can certainly magnify present the respiratory system conditions including asthma in addition to bronchitis and/or improve the danger regarding the respiratory system problems, specifically on "smoggy" days to weeks. Increased cause degrees can impact this middle anxious process and may damage cerebral development in young children. A lot of studies web page link oxygen air-borne pollutants, including particulate make any difference (PM), ozone, nitrogen dioxide, in addition to carbon dioxide monoxide (CO), for you to boosts in un controlled demise in addition to medical admissions for those who have present center in addition to lung ailment. The machine suggested here requires local Site visitors routing per intersection junction depending on sensor Networks. The actual suggested process incorporates a middle microcontroller with every junction which receives files through teeny sensor nodes area on your way.[8] The sensor nodes have sensors that can detect the presence of vehicle and the transmitter wirelessly transmits the traffic density to the central programmable microcontroller. The Microcontroller makes use of the proposed programmed algorithm to find ways to manage and regulate traffic in a systematic manner efficiently [9]. In our proposed system we are using IR sensor and MQ series sensors for collecting the traffic density data and air quality data. After obtaining data from these sensors analysis of this data is done and clustering method is applied to obtain required result.

IV. ARCHITECTURE

In this system, we are using Infra-red Sensors and Gas Sensors for sensing the surrounding environment. By using Infra-

red Sensors we will get Vehicle count. We are also using MQ Series Gas Sensors which monitors air quality and gives the concentration of different gases in ppm. These sensors give output in analog format, but to process data we need data in digital format. Therefore to convert it into analog data into digital here we are using Analog-to-Digital Converter. We are also using signal conditioner for amplifying signal, removing noise and it also converts data into suitable format. Micro-controller helps in controlling traffic signal lights, counting vehicles and also it transfers sensor data towards the Server via Communication Device.

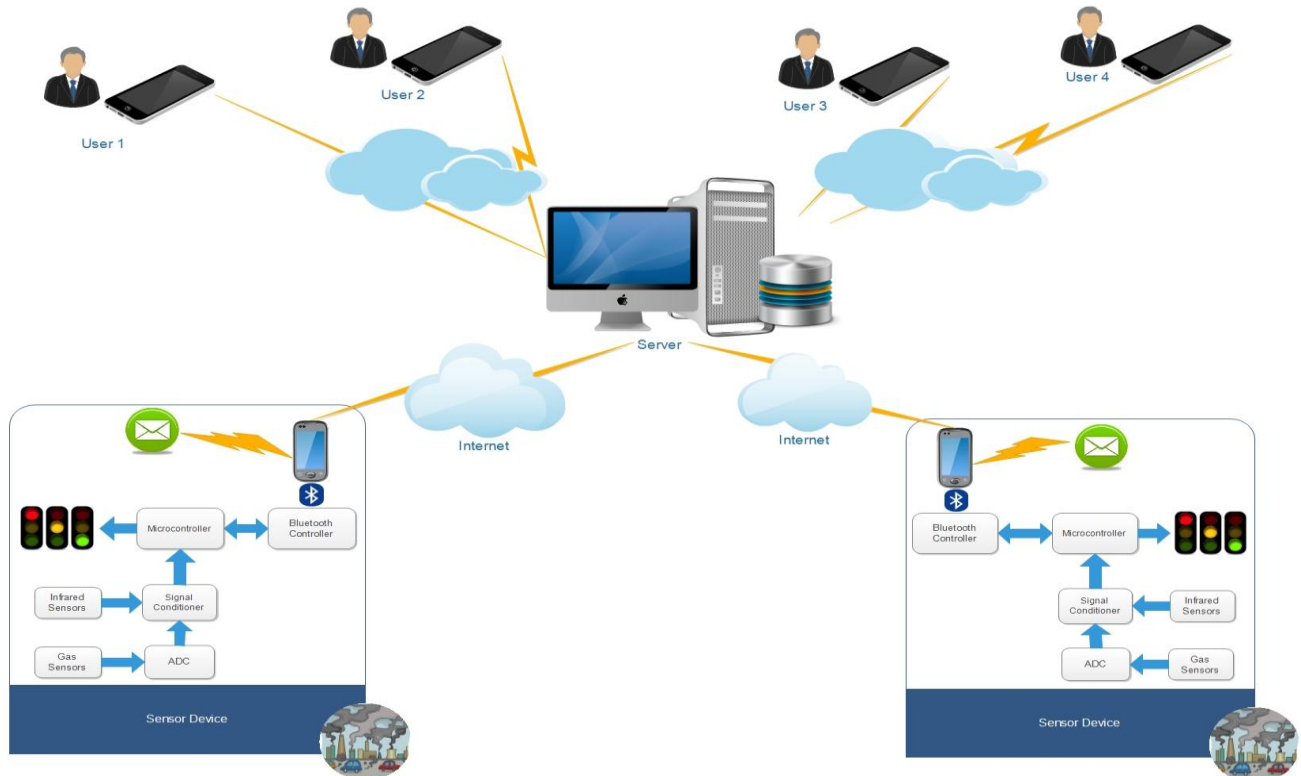


Figure 1. System Architecture

Here communicating device is a Smart Phone. It also sends alert Email/SMS, if the gas concentration in air reaches to dangerous level to corresponding authority. These levels are set by Administrator. After particular timespan it sends vehicle count and gas concentrations of different gases to the Server. Server receives data from different nodes and does processing on it. Air quality is directly stored in Repository for future use and on vehicle count we apply k-means clustering algorithm from which we get traffic density in the form of Low/Medium/High (i.e. $K=3$), which will later use displaying traffic density to user & from traffic density, we calculate traffic signal time and that time is send to the node to adjust Traffic Signal Time. Micro-controller present in the node adjusts the time according to received data. End user will interact with our system using Android Application. This application will communicate with the Server via Internet. End user will login to the system and provide location to which user want to see traffic density and air quality.

V. CONCLUSION

We are going to design a system in which Traffic Signal Time will be adjusted dynamically, due to which Air Pollution get will reduce and also designing Gas alert System for unhygienic Gases. Mobile users having internet can retrieve this information for their use. Awareness of people is more beneficial to air pollution can prevent them various diseases. Traffic can be managed for avoiding congestion. . Appropriate Traffic Management reduces air pollution and increases hygiene of air. Generating the Alert for Unhygienic Gases which exceeds their limit than safe. In other words, generating alert and Managing Traffic both are helpful in reduction of air pollution.

VI. FUTURE WORK AND SCOPE

One of the technologies that gives Accurate reading for the estimation of vehicle count Ultrasonic waves sensors are little bit costly and robust for any medium through which waves can passed. For the further extension for more accuracy, there

will be use of ultrasonic wave's sensors. As the RFID tag and Reader more reliable for the use of measuring vehicle density. In the smart city each vehicle having RFID tag and at the traffic signal reader would be more communicative in nature for exchanging their messages .On the basis of data for Vehicle density and air quality ,there could be prediction for future using Various Predication Algorithm. That would be useful in taking future decision for reducing many problems. We can take weather condition on weather sensor vehicles moving speed can be defined accurately and because of that the calculated effective green will be more accurate. From weather sensors we can obtain weather condition, so because of that vehicle's moving speed can be accurately defined and calculated effective green will be more accurate.

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