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FABRICATION OF SMART IOT AIR PURIFICATION VEHICLE

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Abstract: With the tremendous increase in the level of population and mechanization pollution has increased many folds. This results in deterioration of individual health thereby by directly affecting health of entire population. An Iot Based Smart Air Filter is proposed which will monitor the level of temperature and humility over a web server using internet. Sensors can be deployed at various locations which can sense and collect the data. The big data can be uploaded on the Google cloud which facilitates monitoring from any part of the globe. The temperature and humility can be displayed on as well as on blynk application which makes environment monitoring easy. Smart Air Filter monitoring and controlling system is proposed in these projects, which enable us to monitor and check real time quality or the air temperature, humidity in specific region through IOT. In this project we can also control the quality of air pollution by using air filtering.

Keywords: Smart Air Filter, Smart Industrial IOT.

I. INTRODUCTION (HEADING 1)

In this day and age, air pollution is certainly an issue of significance. To keep itin control and provide a better quality of life for all, air quality should be monitor and control. In this project we can measure air quality by using “Raspberry pi”, temperature and humidity sensor, gas sensor, dust sensor. Sensors have been used to detectthe presence of harmful gases/compounds, which are continually transmitted to a controller. Air quality monitoring and controlling system is proposed in this project, which enable us to monitor and check real time quality or the air temperature, humidity in specific region through IOT. In this project we can also control the quality of air pollution by using air filtering which absorb the carbon in the air and produce a fresh air.

IoT enabled air purifier using ionization is a technology that can help everyone to lead a happy and healthy life with lost cost compared to all other available air purifiers like air purifiers with HEPA(high efficiency particulate air)filters and electrostatic air purifiers. Hak-joon-kim, Bangow Han, Chang Gyu woo, Yong-jim Kim, GI-Teak Lim, Weon Gyu Shin “air cleaning performance of a novel electrostatic air purifier using an activated carbon fiber filter for passenger cars,”Nov-2017 according to this article it was developed for passenger cars .They developed a novel electrostatic air purifier using a carbon fiber brush charger combined with a metallic collection rod and an activated carbon fiber (ACF) sheet to improve the indoor air quality of passenger vehicles. The ACF sheet was used to apply electrostatic forces to move charged particles toward a collection rod and simultaneously adsorb gas. The cylindrical air purifier (diameter: 100 mm, length: 190 mm) was composed of a conductive brush charger and an electrostatic collection rod for particle removal, as well as an ACF filter for gas removal. The flow rate of the device was approximately 209-360 L/min. The novel purifier was tested in a 1-m 3 chamber with particles 0.3 μm in diameter and three gases: ammonia, acetic acid, and acetaldehyde. The gas cleaning performance of the purifier was compared with that of a commercial purifier with a high-efficiency particulate air (HEPA) filter, activated carbon pellets, and alumina balls. The clean air delivery rate (CADR) of the novel electrostatic air cleaner was 0.219 m 3 /min, 35% higher than that of the HEPA filter. The CADRs of the ESP air cleaner for the test gases were 0.25, 0.19, and 0.19 m 3 /min, respectively, indicating that the novel ESP air cleaner reduced the gases 308%, 204%, and 327%, respectively, faster than the commercial purifier. This paper studies a novel negative ion generator for air purifier application. The proposed circuit can use the battery as an input dc voltage to produce dual-output high voltage, increasing the negative ions in air, improving.

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II. PROBLEM STATEMENT

During past decades, as result of civilization and urbanization there is a huge growth in Polluting industries, open burning of refuse and leaves, massive quantities of construction waste, substantial loss of forests and vehicles (particularly diesel driven cars) on roads that give rise to health endangering pollution. Therefore, it is necessary to regularly monitor and report the hazardous impacts from air pollution. To monitor the quality of air, a new framework is proposed that monitors the parameters of the environment around us such as CO2, CO, presence of smoke, alcohol, LPG, temperature and humidity with the help of micro Controller.

III. LITERATURE SURVEY

This paper presents a network for both indoor and outdoor air quality monitoring. The sensor response is strongly dependent on parameters such as temperature, humidity, and cross influence of the other gases. For the calculation of several air quality values two types of sensor data processing architectures are implemented using JavaScript and Lab VIEW Web publisher technologies. The first one is a neural network algorithm implemented in JavaScript in the embedded server (Web sensor) and represents one of the main novelties of the work. The second software architecture is implemented in the network PC and performs tasks like sensing nodes data reading through TCP/IP remote control, air pollution events detection and gas concentration estimation based on neural network inverse models of gas sensors and data logging and Web publishing of air quality data. [3]

The ideal portable device is to have embedded sensors installed on subjects, e.g., a vehicle, a person, or an animal. Sensor device is an innovative integrated sensor system using novel design polymer modified tuning fork sensors. The device encompasses sample collection and transport, sample conditioning with interferon's removal and sample air zeroing capabilities for baseline establishments, thus enabling it to form a standalone and portable unit. Ambient air is being drawn into the device either through the particle filter (detection mode) or the zero filters (calibration mode). The filtered air is then subsequently passed through the interfere filter for sample conditioning and then introduced to the tuning fork sensors inside a sensor cartridge. The responses of the sensors will subsequently be digitized and transmitted wirelessly to a user interface device, such as a cell phone or a less portable device, such as a laptop or desktop computer. Bluetooth technology, a widely available wireless communication standard, is employed in the wireless communication of the device; enabling high flexibility in user interface selection. [4]

This paper proposes vehicular Wireless sensor networks (VSN) architecture to monitor microclimate based on GSM short messages and geographic information of vehicles. They show prototype to monitor the concentration of carbon dioxide (CO2) gas in areas of interest. CO2 gas is a critical index of air quality and global warming. In our prototype, a vehicle is equipped with a CO2 sensor, a GPS receiver, and a GSM module, which form a ZigBee based intra-vehicle wireless network. Each of such vehicles thus serves as a vehicular sensor. These vehicular sensors roam inside the area of interest and periodically report their sensed data through GSM short messages. The reported data is collected by a server, which is integrated with Google Maps to demonstrate the result. [5]

The proposed wireless sensor network air pollution monitoring system (WAPMS) comprises of an array of sensor nodes and a communications system which allows the data to reach a server. The sensor nodes gather data autonomously and the data network is used to pass data to one or more base stations, which forward it to a sensor network server. The system send commands to the nodes in order to fetch the data, and also allows the nodes to send data out autonomously. The development of the system is to help the government to devise an indexing system to categorize air pollution. [6]

This paper proposed an urban air quality monitoring system based on the wireless Sensor network (WSN) technology and incorporated with the global system for mobile communications (GSM). The system consists of sensor node, a gateway, and a back-end platform controlled by the Lab VIEW program through which sensing data can be stored in a database. The proposed system can provide micro-scale air quality monitoring in real-time through the WSN technology. [7]

This paper describes MAQS (Mobile Air Quality Sensing), a personalized mobile sensing system for IAQ (indoor air quality) monitoring. MAQS estimates human-dependent air quality factors (e.g., CO2 and contagious viruses) using CO2 concentration, and estimates other air quality factors (e.g., volatile organic compounds (VOCs)) using air exchange rates. MAQS integrates smart phones and portable sensing devices to deliver personalized, energy efficient, IAQ information. [8]

In proposed work they use a MiCS-OZ-47 sensor from e2v to sense the ozone concentration in the atmosphere based on the measured resistance of the sensor's tin dioxide (SnO2) layer. Digital communication is achievable over the board's RS232-TTL interface, which is directly connected to an off-the-shelf HTC Hero Smartphone providing a USB Mini-B port. They show that it is feasible to use Gas Mobile to create collective high-resolution air pollution maps. This is essential to obtain widespread acceptance of participatory sensing equipment. [9]

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They present a wireless sensor network (WSN) for monitoring indoor air quality, which is critical for people's ease, health, and protection because they spend a large percentage of time in indoor environments. The network they propose consists of several sensor nodes organized as ZigBee network, cluster-tree configuration. The pyroelectric infrared sensor (PIR) board is connected to the sensor board over GPIO pins to provide the information about the people presence. They used a commercially available sensor MiCS-5121 from e2v technologies. It is a sensor that detects VOC (including CH4) and CO. A main apprehension in such networks is energy efficiency because gas sensors are power-hungry, and the sensor node must operate unattended for several years on a battery power supply. [10]

The system consists of several distributed monitoring stations that communicate wirelessly with a backend server using machine-to-machine communication. Each station is equipped with gaseous and meteorological sensors as well as data logging and wireless communication facility. The backend server collects real time data from the stations and converts it into information delivered to users through web portals and mobile applications. Data over four months has been collected and performance analysis and assessment are performed. [11]

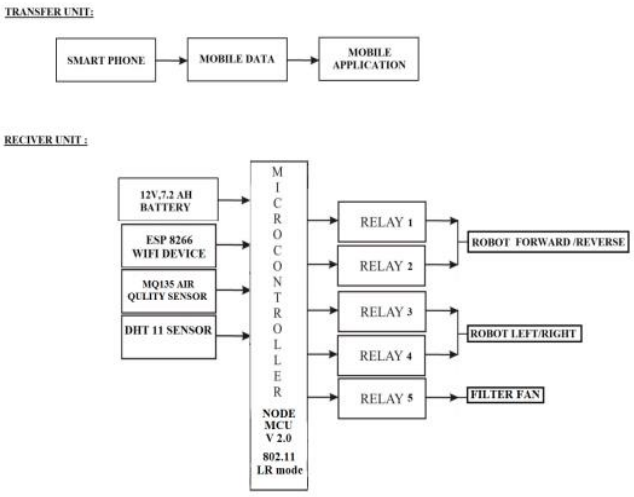
The proposed outline comprises a set of gas sensors that are utilized on stacks and infrastructure of a ZigBee WSN and a central server to support both short-term real-time incident management and a long-standing strategic planning. This architecture would use gas sensing capable motes made by Libelium. These motes use the ZigBee communication and provide a real-time low cost monitoring system through the use of low cost, low data rate, and low power wireless communication technology. They also introduce a simple but efficient clustering protocol dubbed hereafter "Clustering Protocol for Air Sensor network" (CPAS) for the proposed WSN-AQMS framework. CPAS proves to be efficient in terms of network energy consumption, network lifetime, and the rate at which data is communicated. [12]

In the proposed model sensors to measure the percentage of pollutants present in the particular areas of the city. By using Bluetooth manager the collected data will send to server. Then we apply ID3 data mining algorithm which is useful for calculation of the percentage of pollutants. With the help of data mining algorithm, we will give future predictions to the particular area in the city and can also provide alarm to highly polluted area. [13]

In the proposed system a method for detection and analysis of exhaust gases produced by the gasoline vehicles. The method is predicated on infrared multi wave lengths absorption within range of one.3 – 2.3 μm and can be implemented by using multi-waves array of light emitting diodes (LEDs). Projected approach permits many absorption spectra to be coated by one light-emitting diode absorption line. Simulation was in serious trouble a 6-element multi-wavelengths light-emitting diode array. They demonstrate that the tactic is very relevant for the appliance to open-path detectors wherever the radiation supply and also the receiver settled at a distance of tens of meters from each other. [14]

The concentration of most important air pollutant gases from the air are sensed by using the commercially available gas sensors. Each of those detectors is correctly labeled as per the quality strategies, and these gas sensors are then incorporated with the wireless sensor motes exploitation multi-hop knowledge aggregation algorithmic program. Air waste material knowledge is collected from the developed check beds within the kind numbers, and this knowledge is formed obtainable on the net through the mixture of sunshine weight middleware and a web interface. [15] Wasp mote along with the gas sensors board allows monitoring the parameters to determine the quality of air we breathe. Air pollution monitoring with Wasp mote is simple and economical due to its features of wireless communication among the sensors. [16]

IV. BLOCK DRAWING



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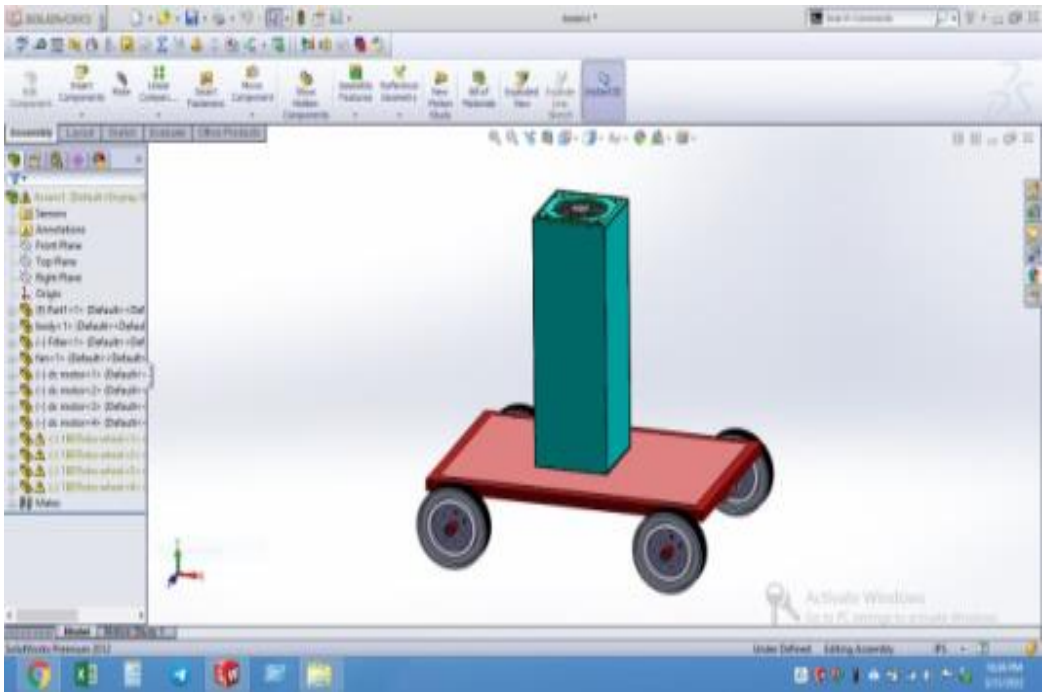
V. MECHANICAL SETUP



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