STUDY ON DUST MONITORING AND DETECTION USING INTERNET OF THINGS

[1]M.RAMKUMAR, [2]A.A.R.SENTHILKUMAR, [3]K.VENGATESAN, [4]B.NARMADHA, [5]Y.VINITHA DEVI

[1]Assistant Professor/CSE, [2]Associate Professor/CSE, [3]Associate Professor/CSE, [4]Assistant Professor/CSE, [5]Student
[1]Computer Science and Engineering,
[1,2,4 ,5] Knowledge Institute of Technology, Salem, India.
[3]Sanjivani College of Engineering, Koapargaon

Abstract:In the daily scenario, people facing many illnesses due to unwanted pollution of air, smut. Nowadays most of the people working in the industries, organizations are unaware of dust levels and they also not even know about toxic gas which is presented in the air so we are implementing this idea with the help of internet of things technology used to find dust levels and toxic gases in air it is used to help people to know about the environment polluted or not. The premises of this research idea are to prevent people affected by allergy in cause of dust present in the environment. Measuring air quality by finding its density was an existing idea. We are using dust sensors to find out dust particles presented in the air. Moreover we are also finding the toxic substances presented in the air using gas sensor and also it measures temperature and humidity presented in the air. In addition to that our schema is about sending information to people about dust alert present in the workplaces. With the help of the message, management can pass it to workers so that they can clean that area.

***IndexTerms*–Dust Sensor, Gas Sensor, Temperature, Humidity Sensor.**

INTRODUCTION

The Internet of Things refers to the connection of devices to the Internet. Cars, kitchen appliances, and even heart monitors can all be connected through the IoT. Internet of Things provides the ability to transfer data over a network. It is a machine to machine communication. The IoT allows objects to be sensed and controlled remotely across existing network infrastructure. This enables small changes to make big impact, to become more efficient and to make smarter products. IoT utilizes existing and emerging technology for sensing, networking, and robotics. And as the Internet of Things grows in the next few years, more devices will join that list.

The technology which helps us interacts with things around us in various ways. The things can be systems, machines or static objects. Unlike M2M which is used for machine to machine communication for mere monitoring and control applications, IoT is used for wide variety of applications. The applications of IoT are enormous viz. interacting with text books using QR code printed on it, smart meters, home router, TV, light control, A/C control, finding where which movie is running using NFC. IoT has covered all the industries right from energy, manufacturing, healthcare, telecom and transportation.

Though there are numerous advantages of IoT for the user there are many security aspects which need to be taken care by the user of IoT enabled devices. There are three main aspects such as connectivity, remote management and security. The concept of clouds and mobile app has pioneered the existence of IoT.

As mentioned any device, system, person referred as things can be remotely controlled using applications running on smart device (can be smart phone, remote controller etc.). Only need to have IP address assigned to each IoT things. There is no common protocol stack finalized for IoT things. In general First each things should have physical layer to connect with the medium either wired or wireless (wifi, WiPAN, LTE, GSM etc.). Second, each should have layer to interface with backhaul network as per technology the device will be developed for. The third is basic IP address interface. These three basic layers comprise the IoT protocol stack. Things can be either controller or things directly. In the case of controller, it controls the things.

RELATED WORK

The literature review plays a very important role in the research process. It is a source from where research ideas are drawn and developed into concepts and finally theories. It also provides the researcher a bird's eye view about the research done in that area so far. Depending on what is observed in the literature review, a researcher will understand where his/her research stands. Here in this literature survey, all primary, secondary and tertiary sources of information were searched.

In the existing system, it was used to monitor the air quality which is flow on the environment and also it measures temperature and humidity presented on the environment. This technology measures only the air quality on the surrounding

environment and it generates message through wireless sensor network and passed to the workers about current air quality of the place where the sensor is placed. By using this technology we can get information about air pollution of particular place detected through air quality sensors. Mainly has following two drawbacks such as Monitors only the air quality and it cannot detect dust molecules.

MODULE DESCRIPTION

KIT CONNECTION

Intel Galileo Gen 2 kit is compatible with Arduino Uno shields and it is designed to support 3.3V or 5V shields, following the Arduino Uno Revision 3, including 14 digital input/output pins, of which 6 can be used as PWM outputs. In addition to that, each of the 14 digital pins on the Galileo kit can be used as an input or output, using some of the functions like pinMode(), digitalWrite(), and digitalRead().

This kit has 12 of the 20 Arduino shield pins which are connected directly to the Quark X1000 SoC to allow significantly faster GPIO performance on those pins. Galileo Gen 2 employs an NXP PCA9685 PWM driver IC with 12-bit resolution, allowing for more fine-grained control on the PWM duty cycle.

There are 6 analog input pins used in the kit. Each of the 6 analog inputs, labeled A0 through A5, provides 12 bits of resolution (i.e., 4096 different values). By default they measure from ground to 5 volts.

The Galileo Gen 2 uses a Texas Instruments ADS108S102 ADC, which allows for a 4x increase in ADC sampling performance in Linux. I2C* bus, TWI, with SDA and SCL pins that are nearer to the AREF pin. A4 or SDA pin and A5 or SCL are the TWI pins that support TWI communication using the Wire library.

In the Intel Galileo kit, the Dust sensor, Gas sensor and the Temperature & Humidity sensor are connected to the analog and digital pins.A bread board is used to connect the ground and power supply pins of the sensors and the kit.

DETECTING DUST MOLECULES IN HUMAN PRESENCE

The Intel Galileo Gen 2 is connected with dust sensor. Dust sensor is used to identify dust present in air. When the environment is filled with dust, the sensor will start detecting the flow of dust particles present in air. The amount of dust reaches the threshold value it generates the alert messages to the user.

The pin connections are made as follows. Initially, the analog pins from A0 to A5 are used for Dust sensor. Any pin, among those five pins can be used for this sensor. If A0-A5 is used for Dust, then any of the remaining pins can be used for Gas sensor.

SENSOR DETECTION

The Intel Galileo kit is connected with gas sensor and GSM module. The MQ-6 gas sensor is used to detect Liquefied Petroleum Gas (LPG). If the MQ-6 sensor detects gas leakage, it checks for human presence. If gas leakage occurs in human presence, the system just delays for two to three seconds and detects the gas leakage again. Temperature & Humidity sensor is used to identify the level of temperature so that we can know about dust level along with temperature. The GSM module is used to send the SMS and call to all the family members. Each and every activity which is taking place in home will be sent as message to the family members. GSM is a mobile communication modem. GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose.

SCREENSHOTS

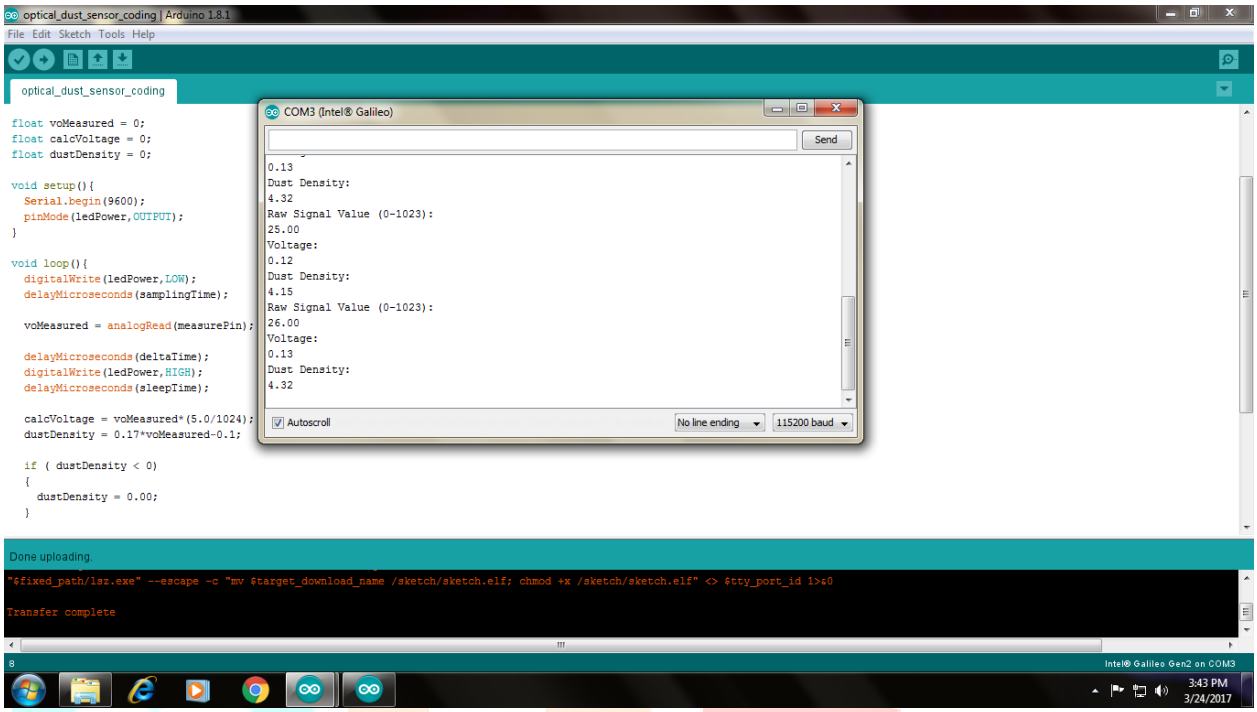

Figure 1: Dust Sensor

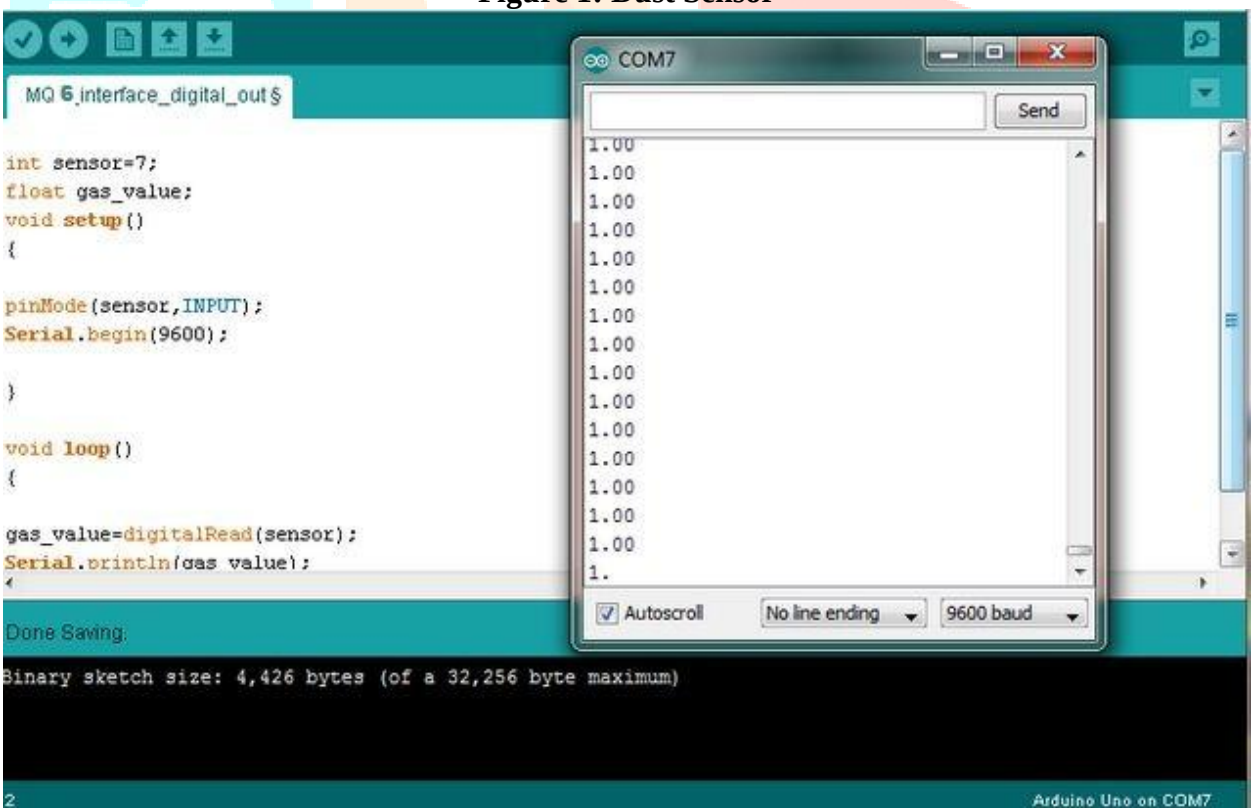

Figure 2: Gas Sensor

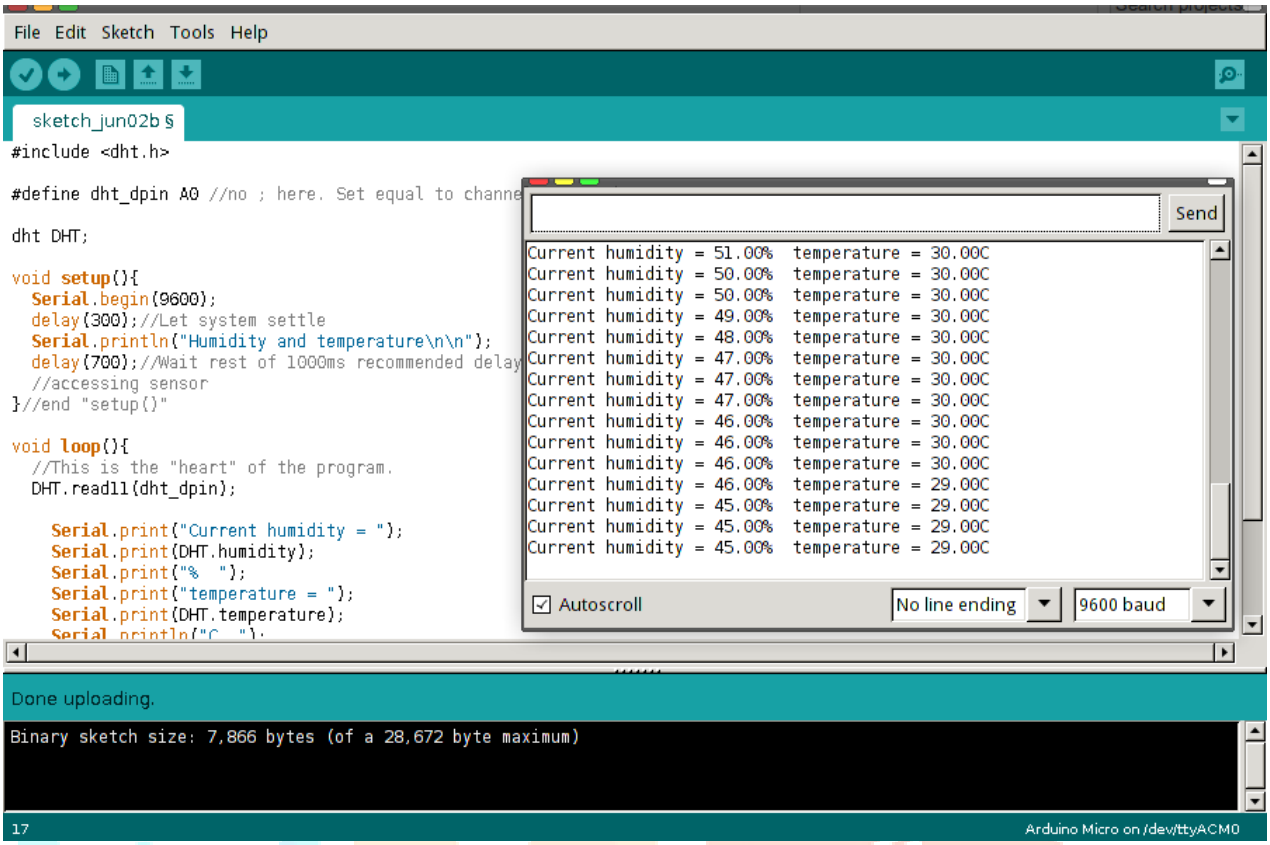

Figure 3: Temperature and Humidity Sensor

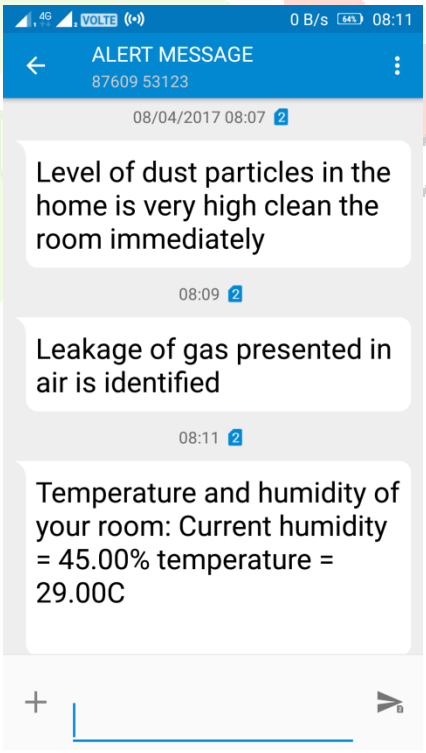

Figure 4:Alert Message to User

CONCLUSION

In this project, we monitored the quality of air and the amount of dust presented throughout the environment is identified and monitored periodically. Nowadays most of the people are affected by the dust allergy and asthma because of tiny dust particles presented in the air it causes several health issues to the people around the surroundings, people are not aware of whether the environment is dust and pollution free atmosphere. By using our technology we implemented the dust monitoring and detection using the internet of things technology by our project we give the up to date information to the user about the dust levels, gas leakage alert, temperature and humidity of the particular area where the device placed in the room, organization, industries, working place, etc. By giving the information people will aware of the place and also they clean the dusted area through the information given by the device. So we can lead polluted free environment by using our technology. In our future enhancement, we are going to implement the dust monitoring and detection along with dust collector. By using the dust collector we can collect the dust particles presented in the environment. This technology will helpful for the user to clean the room automatically, so they not needed to clean the room by own.

REFERENCES

1. Navreetinder Kaur, Rita Mahajan, "Air Quality Monitoring System based on Arduino Microcontroller" International Journal of Innovative Research in Science,Engineering and Technology(An ISO 3297: 2007 Certified Organization)Vol. 5, Issue 6, June 2016.
2. B.Narmadha, M.Ramkumar, K.Vengatesan, M.Srinivasan, "Household Safety based on IOT", International Journal of Engineering Development and Research (IJEDR), ISSN:2321-9939, Volume.5, Issue 4, pp.1485-1492, December 2017
3. Snehal Sirsikar1 , Priya Karemore2 "Review Paper on Air Pollution Monitoring system" International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 1, January 2015 Copyright to IJARCCE DOI 10.17148/IJARCCE.2015.4147 21.
4. GaikwadVarshaBhagwan, Puranik V.G" Real Time Air Pollution Monitoring Using Mobile Phone" International Journal of Innovative Research in Science, Engineering and Technology An ISO 3297: 2007 Certified Organization Volume 3, Special Issue 4, April 2014.
5. Jen-Hao Liu1 , Yu-Fan Chen1 , Tzu-Shiang Lin1 "AN AIR QUALITY MONITORING SYSTEM FOR URBAN AREAS BASED ON THE TECHNOLOGY OF WIRELESS SENSOR NETWORKS" International Journal On Smart Sensing And Intelligent Systems, Vol. 5, No. 1, March 2012.
6. Parminder Kaur*, Er. Rajbhupinder Kaur "Energy Efficient Routing Protocol For Air Quality Monitoring System Using Enhanced Leach In Wireless Sensor Networks" International Journal Of Engineering Sciences & Research Technology
7. P.VijnathaRaju , R.V.R.S.Aravind, B Sangeeth Kumar "Pollution Monitoring System Using Wireless Sensor Network In Visakhapatnam" International Journal of Engineering Trends and Technology (IJETT) - Volume4Issue4- April 2013.
8. Mr.Vasim K. Ustad , Prof.A.S.Mali , Mr.SuhasS.Kibile "Zigbee Based Wireless Air Pollution Monitoring System Using Low Cost And Energy Efficient Sensors" International Journal of Engineering Trends and Technology (IJETT) – Volume 10 Number 9 - Apr 2014.
9. Gowtham. Sarella Mrs. Dr. Anjali. K. Khambete "Ambient Air Quality Analysis Using Air Quality Index – A Case Study Of Vapi "IJIRST –International Journal for Innovative Research in Science & Technology| Volume 1 | Issue 10 | March 2015
10. Sagar, Dr Rajesh Goel "Wireless Sensor Network Deployed for Air Pollution Monitoring System in any Area" SSRG International Journal of Electrical and Electronics Engineering (SSRG-IJEEE) – EFES April 2015.
11. Anil.H.Sonune, S.M.Hambarde "Monitoring And Controlling Of Air Pollution Using Intelligent Control System" International Journal of Scientific Engineering and Technology Volume No.4 Issue No5, pp: 310-313.
12. Kalaivanan M., and K. Vengatesan.: Recommendation system based on statistical analysis of ranking from user. International Conferenceon Information Communication and Embedded Systems (ICICES), pp.479-484, IEEE, (2013).
13. Vengatesan K., Mahajan S.B., Sanjeevikumar P., Mangrule R., Kala V., Pragadeeswaran (2018) Performance Analysis of Gene Expression Data Using Mann–Whitney U Test. In: Konkani A., Bera R., Paul S. (eds) Advances in Systems, Control and Automation. Lecture Notes in Electrical Engineering, vol 442. Springer, Singapore.
14. Vengatesan K., Mahajan S.B., Sanjeevikumar P., Moin S. (2018) The Performance Enhancement of Statistically Significant Bicluster Using Analysis of Variance. In: Konkani A., Bera R., Paul S. (eds) Advances in Systems, Control and Automation. Lecture Notes in Electrical Engineering, vol 442. Springer, Singapore