INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 4.295
(Volume 5, Issue 2)
Available online at: www.ijariit.com

IoT based crack and pollution detection using Raspberry pi

Jayachitra R.
jayachitra2110@gmail.com
Sri Eshwar College of Engineering, Kondampatti, Tamil Nadu

Kanusiya Devi T.
kanusiyathangaraj@gmail.com
Sri Eshwar College of Engineering, Kondampatti, Tamil Nadu

Johned Blessy J.
johnedblessy.j@gmail.com
Sri Eshwar College of Engineering, Kondampatti, Tamil Nadu

Harihara Sudan K.
hariharasudan1997@gmail.com
Sri Eshwar College of Engineering, Kondampatti, Tamil Nadu

M. Vivekkumar
vivekkumar.m@sece.ac.in
Sri Eshwar College of Engineering, Kondampatti, Tamil Nadu

ABSTRACT

The IoT integrate heterogeneous end system, which provides open access to a large selected set of information for the advancement of digital service. To surveil the safety of high rise buildings and the small deform of surroundings by contaminants are a pivotal task. We should ensure the fire safety, safety from excessive loads, vibrations, etc and it is essential to observe the strength of the clear-cut constructions in the event of infrastructures and we should ensure the environmental changes around us because of natural changes in the habitat. In recent years, a major consideration should be given to framework health monitoring technology to Diagnose condition of the framework using a sensor attached to them, and the number of research projects on the health monitoring of architectural structures is on the rise. If life-cycle cost is to be reduced for the building from fabrication to sustainment, much attention should be given to strength of the building. The detecting issues on the crack and pollution in the buildings play a major role in our project. Cracks can significantly increase the rate of gas and liquid transport into a structure. Although there is a general awareness that cracking can be caused when the building is not that much strength to face external issues. The cause of the cracking is important as it may have profound implications on the crack morphology, which can greatly influence the relative contribution to transport and the subsequent impact on overall performance. Prevention is better than cure, we need to be alert before the pollution level crosses the safer limits and to monitor the building before the arrival of distracts.

Keywords— *Raspberry Pi, Python IDE, Sensors, Crack, Pollution*

1. INTRODUCTION

In our project, we uphold to make the safer side for the people living in the buildings with simultaneous conflicts on its natural habitat in their surroundings. The use of Raspberry Pi with its software named PYTHON IDE will help us out to accomplish our vision through this project.

1.1 Smart Buildings

The Smart buildings incorporate and comprise luminosity, inventiveness, and architecture as a whole building structure, with flexibility, non-sensitivity at the core, in order to meet the engineers for building progress: for effectiveness, lastingness, comfort and satisfaction. The higher number of details available from this broader area of sources allow these structures to become flexible, and enable a Smart Infrastructure to adapt itself for factors of complete life span.

In order to monitor the system changes in the building and the pollution in the environment, some sensors are required. System parameters will be measured and sent to a control system which then determines the action to be performed, based on a set of programs already written into the control system. The grade of goodness and safeness desired by the holders can only be granted if the building structure is automated and smart. It is not possible without the use of sensors and controllers. In order to meet the expected level of building performance some internal conditions are met which are energy efficient, control techniques at individual levels and building level are required. If situations are not alike the normal cases regarding the behavioural of the buildings and the pollution level of the environment, then the alert message is sent through the Internet of Things to the survivals in the residence and to the pollution control room in case of pollution.

1.2 Sensors

The one that detects and responds to some type of input from the environment is called as sensors. The input can be in the form of heat, pressure, etc… The output is human- readable display at the sensor location or it is transmitted electronically over a network for further processing.

2. PURPOSE OF THE PROJECT

With such a complex infrastructure that has numerous inter-connected components, it is very difficult for the operations staff of large commercial and residential buildings to be totally aware

of all the system conditions and changes happening in the building. Without automated monitoring systems and fault detectors, system efficiency can readily fall. The sensors and the processors are used for the running of these automated systems

3. COMPONENT USED

Raspberry Pi, GSM module, LCD display, Flex sensor, Gas sensor, Fire sensor, Vibration sensor, Sound sensor,
DHT11 sensor, Turbidity sensor.

4. COMPONENT USAGE

In order to detect the variation apart from the normal cases happening in the building and in the environment, we provide a 10mc sensor. The vibration part deals as a detector which detects the vibration in the building. People must always make sure that gas leaks and hazards are addressed on building sites, as an explosion may lead to a collapse of certain structures. The issues of fire explosion are very paramount in any building organization as such we use Fire sensor in our project. As of now, there are many cases related to gas leakage which cause damage to people lives and property damage. Gas detection identifies the potentially hazardous gas leaks by sensors. When the dangerous gas has been detected, these sensors usually employ an audible alarm to alert people. Implementing the Gas sensor for buildings, which can save lives of people and so we implemented it as one among our requirements where it deals with the leakage of gases. Flex Sensor plays as the major usage criteria, as it overcomes the drastic influence due to the crack made in the building. The skimmed sensors since the abstract are placed in the building where people survive which detects the unexpected happenings of the building. In such a way, peoples can be prevented from forthcoming issues. This project describes the analytical pathway for quantifying these damages in physical and economic terms, once the dispersion of pollutants has been described. People on their surveillance, do struggle a lot with the changing environment that leads to cause of normal or rare disease. Pollution has been an important criterion for humans. Since it causes severe problems like asthma, allergic diseases, skin diseases, and many other health issue which are faced by the people in their daily routine. Seeking for the solution to recover this problem, we use certain sensors which play a relevant role in detecting the pollution that is majorly reasoned to occur in the surroundings. Due to this our environment gets polluted, whenever the pollution crosses the safer limits, messages will be sent through IoT to the pollution control room Medical applications need efficient humidity control systems, especially for respiratory equipment, sterilizing devices, medical incubators, pharmaceutical processing, and other biological products. DHT11 sensor helps in detecting the temperature humidity in the atmosphere. The sound sensor is on the second level of detecting the unbearable level of pollution that occurs in the environment. The Turbidity sensor defences the turbidity level of the water by measuring the turbidity level of the water. The turbidity sensor designed for harsh field conditions and uses recent technology. If the pollution reaches above its limited cases, then it helps to send the messages to the respective pollution control room.

5. DESIGN AND IMPLEMENTATION

Power Supply is provided to the RASPBERRY PI. The DHT11 sensor detects the Temperature Humidity, Flex sensor used to detect the cracks in the system, Gas sensor to detect the leakage of gases in the buildings, Fire sensor detects the explosion of fire, Seismic sensor detects the vibration in the building, turbidity sensor senses the turbidity level of water and Sound sensors used to sense the sound. These sensors are connected to the input pins of the raspberry pi. When the value exceeds the threshold value in the sensor it provides notification by using to the required people in the building in case of some districts in the building and to the pollution control room in case of some environmental changes.

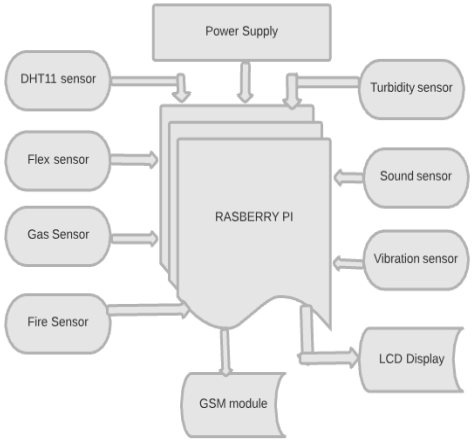

Fig. 1: Block diagram

6. CONCLUSION

By focusing on the 40% of global energy consumption by buildings, it is obvious that we can reduce a significant amount of energy wastage. Smart construction of buildings will be an apt solution for this problem. The combination of sensors, controllers and other analytic systems monitor the energy usage in buildings and will report any anomalies, in the form of graphs. But monitoring these patterns the faults, which otherwise go unnoticed may be rectified. Although smart buildings integrate comfort and energy savings, further research in this field will help develop better and effective systems. Some R&D may be useful in developing sensors with more precise data responses. Another problem with current smart buildings is its initial cost of investment. By developing technologies that are cheap but efficient, will drive more buildings to adopt this technology, which will further save energy. In future, we hope to see buildings that are smart and self-sustaining. A combination of Passive buildings and Smart buildings can create a new era of high efficiency, low-cost, self- sustaining Super-Smart buildings.

20% of the airborne diseases will get reduce once the pollution is detected and controlled. Pollution causes an effect in all living organisms and the atmosphere, which results in many air diseases like asthma, allergic disease etc. By this project, some concerns will be taken by the higher official to reduce the air pollution which in-turn reduces the level of airborne diseases and to maintain a healthy nation.

7. REFERENCES

[1] Vinay Kumar G, Deepak, Bharath D R, Manasa D,'Safety technologies for high rise buildings with intelligent crack detection using iot'-Vol-2 Issue-5 2017

[2] Himadri Nath Saha, Supratim Auddy, Avimita Chatterjee, Subrata Pal, Shivesh Pandey, Rocky Singh, Rakhee Singh, Priyanshu Sharan, Swarnadeep Banerjee, Debmalya Ghosh, Ankita Maity 'Pollution Control using the Internet of Things (IoT)'-978-1-5386-2215-5/17/$31.00 ©2017 IEEE

[3] K.Nirosha, B. Durgasree, N. Shirisha 'Iot based air pollution monitoring system'-VOLUME-4, ISSUE-6, 2017

[4] Austin Downey, Antonella D' Alessandro, Filippo Ubertini and Simon Laamme;'Automated crack Detection in conductive smart-concrete structures using a resistor mesh model'- August 2017

