Performance Analysis of Two IoT-based Wireless Sensors for Environmental Monitoring

S.Varadhaganapathy, S Anandraj kumar, A Meganathan, R Karthikayen

Abstract: The climatic change will increase the environmental monitoring in a research place or area and it may change the climate in periodically. To find the environmental climate in those area by using the remote sensing techniques and find the climate, gather and store the climatic data. Now a days, we have many new technology to find all the data and transmit the data to the destination and the climatic data are observed to the environmental parameters and we store it in cloud or database for the reference of climate environmental condition. Now, we use two different type of IoT based system for environmental system monitoring to find climatic data, one is based on Wi-Fi environmental sensor system and another one is based on Bluetooth environmental sensor for environmental monitoring.

In sense, by developing these two techniques we can record or find the climatic data in research area or place is very easy and accurate to find the climatic data with the internet connection. This system provide a different techniques when compare to before developed system and gives similar climatic data in all manner for the environment. These two system have their monitoring application, high energy, easy to handle, cheap, gives accurate solution, network connection easy, revealed, and have good work or candidates for IoT based system for the environmental system.

Keywords : Bluetooth, energy harvesting, IEEE 802.11 standards, Internet of things (IoT), low-power electronics.

I. INTRODUCTION

The new technology have the serious impact on the climate and continuous change of climate in researched area and to find the climatic data in these area. In 2014, the panel of intergovernmental has conform the climatic change in all the researched area and increase of environmental change on due to atmospheric change, by implementation the system we can find the climatic data in these area . Now a days, these represent the collecting of climatic data and these new technology gives the data and understanding the environmental biosphere for sequence in monitoring of data of the climate in these area and biosphere degradation to adopt climate. Next is to gain in environmental system in all the area of the climatic sequence of indoor area. To monitoring of environmental based system are mainly temperature, pressure and moisture by some of the environmental gas like carbon-di-oxide, nitrogen gas, and other gases in the atmosphere of organic compounds and all the atmospheric gas which present in it. The system that benefits the all properties in atmosphere like the climate, pressure, and soil content as moisture are achieved in agriculture for the resource to be achieved for various system. This system works on the wireless based system for monitoring the climate which bring the low cost, high data accuracy, cable replacement easy, all topology network, and maintained cost is low for the developed system. These all wireless network is used in various field for the monitoring of atmosphere change like climate, disaster, and some hazardous change of climate due to gases by this we can find easily to prevent environment by this system for various network connection application and process may developed in high range climatic solution data defined and by using these techniques we can also find the climatic data for research area in very easy for environmental system. We use many protocol in this system application for climate monitoring in the research area and have unique data which consist of Wi-Fi sensor and Bluetooth sensor. Wi-Fi is the high technology which used to find the climatic data in high range where the cost is high for energy and it give the accurate value of system source. By developing low cost Wi-Fi system, RN131C/G as the device for the wireless network to made this system as better and good application system among all technology application and sensors will sense the climate that have in atmosphere. This system has the type of different modules to transmit data of climate in all the area where the different new technology application used for the monitoring of climate in area by the internet connection. Bluetooth is the new technology introduced in 2010 for the low internet access of data transfer without internet and it have low power consumption and continues system development of new technology. These system implementation with internet access have the two system device of implementation and to transfer the data with internet connection system for the data to find or measurement of climatic source. It gives the secure system and give the low energy consumption of data source of the internal system application. All the network will transmit the climatic data to the base station for the reference of the climate in research purpose of the performed data of climatic research field. In our paper we developed the two different types of sensor network for finding the climatic data in the researched area, one is based on Wi-Fi environmental sensor system and another one is based on Bluetooth environmental sensor for environmental monitoring. In sense, by developing these two techniques we can record or find the climatic data in research area or place is very easy and accurate to find the climatic data with the internet connection.

*Correspondence Author

Dr S Varadhaganapathy, Professor, Information Technology, Kongu Engineering College, Perundurai.

S Anandraj kumar Student, B.Tech Information Technology in Kongu Engineering College, Perundurai.

A Meganathan Student, B.Tech Information Technology in Kongu Engineering College, Perundurai.

R Karthikayen Student, B.Tech Information Technology in Kongu Engineering College, Perundurai.

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This system provides different techniques when compared to before developed systems and gives similar climatic data in all manners for the environment. These two systems have their monitoring application, high energy, easy to handle, cheap, give accurate solution, network connection easy, revealed, and have good work or candidates for IoT-based systems for the environmental system. The analysis of all data systems in the climate have two cases to implement the new technology for the system base solution of the drawbacks. The last have resulted for the processes that we have done.

II. RELATED WORK PROCESS

The review of the report has more number of climatic application data for research field and wireless network for the device system for implementation of literature process. The present system have high field to collect the environmental data in RF energy for validation and it was designed by two different phase of system. This system have achieved and it transmit the energy range of value from 11 and 25 m in all the mode of process in passive state system, respectively. In before, the system is monitored and defined some host process like the weather resource parameter, and host processor and internet data process connection in the IoT system application and this give different value of the climatic data process system. It is on low cost transmit range, and the system may have the low power sensor system process of the climatic data in all researched area in wireless network. Different system based on different Bluetooth technology and the system process may to find the developed climatic process system in the developed research area to be defined. This may have the energy sequence in the defined aspect of climatic state in home field Bluetooth network of the system resource. Very low consumption of power, less cost, and the system of low defined resource in the wireless for IoT system in the developed potential in home field. The performance of the two system network is used to find the climatic data in environmental research area and environmental system process in packet format ratio. By improving the protocol for mesh network to develop in future work that may defined in monitoring process for the data defined in all the high range of system to preserve the climatic data in the research field in above developed two system for monitoring field for high resource field in developed system. The above system will send the climatic data, atmospheric temperature, pressure, and moisture to the data store device by the system. The life time for battery is 3 years with 25 min cycle of the system was successfully done.

III. WI-FI BASED COMMUNICATION

This system is a hardware technology which used for environmental monitoring. The general architecture of the Wi-Fi sensor is shown in Fig. 1. This system have the processor, LAN system module for the processor system. To choose the system application and wireless sensor to take or eliminate the interfering of bad source in the wireless module for this application. This technology will perform all the action for receiving the data from the proper device of the Wi-Fi technology for all action on the atmosphere. By transmitting of climatic data to the base station, link produced in processor device and module where the communication occurred and it is mainly used. By using the RN-131C/G network based wireless sensor and it is low cost of production, produce 6 µA and low 215 mA for the data transmission and the climate will measured and stored. The system process for current have to be produced in range of 31 µA in all the mode, which the current efficiency in all the process system for the development. The Wi-Fi system of developed structure is shown in Fig. 2. Fig. 3 shows an Environmental monitoring system with communication for finding climatic data in research area. The present system have many advantages for transmit data in all the climatic source to base station and gives the data for all device with data connection by the use of high connection technology.
UDP is mainly used for this system implantation, because it has no connection in their process system. The server platform can reside in all the high UDP system that can provide for the system implementation for climatic data and it stores the data in cloud or database which has the server to store the high range in all the data in all the field to be continuously develop for the web server system specification process. The work in earlier, has the consumption of power in presented detail of 24.77 mA in all the way of 14-s-long system period in all the atmospheric gases like co2, nitrogen, and pressure in all the intensity process development range that to be process for all the inductive in climatic data process. The present system include the separate system for power supply in all the sensor where the power used for only 17 µA in all periods for the all application process. By setting the ratio between start cycle and stop cycle of system controls, the present system defines and a data or internet provide between 150 and 250 mW. The current process system may defines the period for all the gas sequence in the sensor of active time of 7s to the system comparable with the all HTTP based system process solution is presented and shown in Fig. 4 and may reduce the consumption of power. The current which used in this phase is about 25.05 mA. In all the period, the current may used and estimate the sequence of period in the field of system implementation of about 33 months for the solution based process system of cyclic data in 1.7 h at the data source field in all range of climatic path. The present system has an SHT22 sensor for the process and the 2.9 s for all the period of section. The current system at the size of 54 B and define the current of the 37 mA to obtain the present resource of the data. The sleep of current power is range in 22 µA and the battery to be develop for lifetime and the system process of 2 years of specific and 53 min of cycle period. These experiments performed for evaluating the environmental monitoring of climate and all the package has the current loss due to done for the UDP system for device the system for all the application for system specification in all environmental monitoring. The temperature and the pressure in all the climatic values is 2.28% one state, respectively of 1.1% of the packet done to be lost and total form of 3003 message bit and sent the transmission rate of all 94.5%. The period of sequence in 18 min and the 455 message bit process sent, and to develop process, 4.33% of one packet period design state and the 0.33% of message to be lost the sequential process and give 95.7% success. This system indicate the network process and to develop by the UDP system design in all system specification process developed by the data cloud in wireless specification design in all the process of system required period to be done in wireless device.

IV. BLE BASED COMMUNICATION

BLE technology is now well developed in resources field in all technology, therefore this has developed in high range in all over technology. The general architecture of the BLE is shown in Fig. 6. The present technology has power consumption ideals for the acquirement of environmental data, communicating in a wireless network. The structure in this case is a mobile one, where the mobile phones are placed in the sensor’s range for collecting the climatic data. From here the mobile send the climatic data to the server and which stored in the cloud or a system for the environmental process. By using the location obtained by the mobile gateway or GPS, we can easily find the current place of the climatic data where the data has sent from the mobile by the mobile gateway. One simple example, the small changes in the climatic in smart city can easily observed their climatic by their location in this system, over a sequence period. The system will give the data range of the sensor in all the aspect for the all location in the system specification for all the sensor device application running on the all the mobile phones, acting as mobile forwarders of data to the cloud or a system. In this technology, the current sensor is used to measure the periodic change of climate and to be measure the sequence specification in all the application to be develop of the resource like temperature, pressure, and intensity. The current sensor will polls for 4 minutes and the system will be executing the data for every period of the sequence of 4.4 s in the acquired data. All the layer of application to be running in the system of specification to be develop for high data packet of 3 of the BLE sensor to be processed between them to be specified. BLE can display the climatic data in accurate manner for which the mobile sensor to be develop for the rate of high process sense in IoT application as given in Fig. 6. The developed BLE sensor is shown in Fig. 7.
sensor from devices in the climatic data for receiving the source; the value of the climatic data which received by the sensor will be stored and to be proceed and store into a cloud platform or database; this may specifies the location access and longitude and latitude by the use of google map. The climatic data obtained from this system are transmitted in the list and store to cloud using HTTP POST and GET methods.

V. RESULT

A Wi-Fi environmental sensor prototype and BLE environmental sensor system are used for environmental monitoring and they include sensors for climate measurement in research areas. These two different wireless sensors for implementing IoT-based solutions for environmental monitoring were developed, and analyzed for the implementation.

In Wi-Fi environmental sensor method, climatic measurements are done by the Wi-Fi module and it gives the correct climatic data in the research areas for the periodic time period. It consumes more energy and less cost. By using UDP-based system, the climatic temperature, pressure, relative humidity in the air are measured. In this, climatic data for temperature is measured as 133.0° which is 69.4% accurate.

In BLE environmental sensor, climatic measurements are done by Bluetooth data transfer and ZigBee protocol. BLE, a smart communication, has also been proved to be efficient, lower in cost, accurate produces promising results. BLE sensors periodically measures the climatic temperature, relative humidity in the air, and atmospheric pressure. In this, climatic data for temperature is measured as 28.0° which is 97.4% accurate when compared to Wi-Fi Environmental Sensor.

From the above, BLE sensors give more accuracy than the Wi-Fi sensors for monitoring the environment. So, BLE is suitable for distributed monitoring of environmental parameters in large scale with precision.

VI. CONCLUSION

Two different types of sensors used for IoT based system to find the climatic data were designed, displayed, and analyze the data of environment in accurate. The above system are developed by the components of commercial set and to give the internet or data access for minimum source of the software process. The implementation of two system as Wi-Fi and Bluetooth are successfully developed and analyzed for the environmental monitoring process used by many protocol. As we known, Wi-Fi will take more energy but it is lower in cost where in existing infrastructure enables the development of solutions. The second one, Bluetooth sensor communication, has also been proven to be efficient, cheap, low consumption of power, and will give accurate value of the climatic data by the Bluetooth sensor and the data may store in it at the secured level in this system. In future, mesh network van give high accuracy and easy to find the climatic condition where the climatic condition is very worst.
The analysis presented in this paper represents a current point for the selection of a direction in the implementation or developing of IoT-based environmental monitoring applications, providing an overview of the potential and challenges of each one of the two developed wireless sensors.

REFERENCES


AUTHORS PROFILE

Dr S Varadhaganapathy received the Ph.D. degree in ICE from the Anna University, Chennai. He is a Professor with the Information Technology, Kongu Engineering College, Perundurai.

S Anandraj kumar Pursuing B.Tech Information Technology in Kongu Engineering College, Perundurai.

A Meganathan Pursuing B.Tech Information Technology in Kongu Engineering College, Perundurai.

R Karthikayen Pursuing B.Tech Information Technology in Kongu Engineering College, Perundurai.