

Remote Monitoring System using Internet of Things (IoT)

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Abstract- To create an intelligent sensor framework for monitoring the industrial environment using the beagle board. The framework of the monitoring system is established on the arrangement of distributing sensor units. It can be implemented by connecting sensors to display the various device activities and control those data from anywhere to provide greater flexibility to the user. The designed sensors can become an instrument for monitoring, preservation and protection of several environments. The system which records the several kinds of parameters such as temperature, humidity and location. The sensor node consists of various sensors to display the temperature value, relative moisture and GPS module is used track the board where it is placed. MQTT (Message Queuing Telemetry Transfer) system is the backbone for the internet of things operation which provides the information and instructions. The beagle board will receive the data from the sensor and then the board will be transfer the information to the MQTT broker protocol using dongle or Wi-Fi modem. The overall system can carry out various functions, such as fault detection, data processing, storage and alarming of the operating status parameters.

Keywords: *Beagle Bone Black, GPS module, Internet of Things, MQTT, sensor*

I. INTRODUCTION

The different creations and innovations will enrich the technology for an automated environment. the main target for the automated environment is improving the conditions as a ubiquitous manner. And the concept behind in this is pervasive computing, to execute or experimented the concept we need a clean function or a feasible tool. The microcontroller is nothing but a complete microcomputer. In essence, the microprocessor contains I/O ports, timers/counters, memory, ADC and DAC etc. Larger computers were designed to solve complex scientific and industrial problems and handle records of large corporations and government organizations. Only big industries and institutions are able to purchase large computers. A trend started in the middle of 60s to design smaller computers for smaller organizations and institutions. This situation gave the birth of minicomputer in the late 60s that prove the way for smaller institutions, organizations, etc. to use the computers. It is possible to construct a microcomputer having most of the features of third generation mainframe computers using just handful of ICs. The number of bits that a digital computer can access in parallel at a time is called its word length. The microcomputer has word length of 4 to 32 bits whereas large

computers are 32 to 64 bits. A calculator is not a computer as it is not a programmable device. The user does not prepare any program for his calculations. The working of microcontroller is often used to run dedicated code that controls one or more tasks in the operation of a device or a system. The system which needs a microcontroller for a continuous process without a microcontroller device is not possible nowadays. In this proposed system a new micro controller called beagle bone black can be attained a better results comparing to another microcontroller. The foremost aim for using the beagle board is for speed and accuracy. In this system beagle bone black is used as microcontroller device which sustains the conditions over the environment. The main process of IOT is the gathering of data over environment and remedy or recover the environment without any unwanted explosions.

II. BEAGLEBONE FAMILY

The Beagle Board is a mini CPU which was invented by Texas instrument. It has the all functionality of basic computer. It can support the various operating system such as debian, Android, Ubuntu and Angstrom. The various types of beagle board family are given below:

A. Beagleboard-XM

A beagle board-XM which will deliver the Advance RISC Machine(ARM)cortex A8 and also has the extra memory which consists of 512MB of low power DDR RAM. This board was announced in the month of August 27, 2010. It has the faster CPU core, more RAM, RS-232 port, JTAG connector and USB hub.

B. Beaglebone

It was established in the month of October in the year 2011, the Beagle Bone is a latest invention of the beagle board organization family as shown in the Fig.1. It is the minimum price ARM Cortex-A8 processor which was running at a speed of 720 MHz with a storage 256 MB of RAM. It also has a P8 and P9 connectors with each consist of 46-pin expansion connectors, Ethernet cable connection and a storage of 512 MB of DDR3. Beagle bone has a USB client which was connect to PC or laptop, USB host and also has a consists of four LEDs.

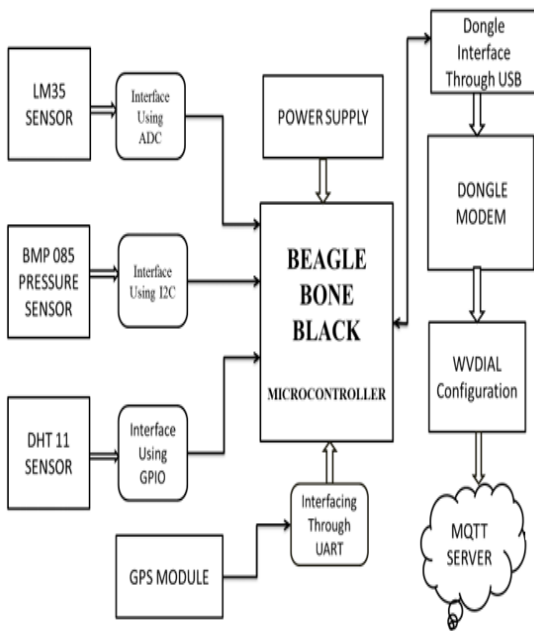


Fig.5: Block diagram

From the above Fig.5 it explains that the various sensor such as IC LM35, DHT 11 and GPS module is attached to the beagle bone black. The temperature sensor is attached to the processor (AM 3358A) through ADC interfacing. In similar way the various sensor modules is attached to the beagle bone black board. Here the Wi-Fi modem is linked to the internet through the WV dial configuration. The Weave(WV) is a point to point protocol (PPP) and also which helps in making modem connection. Here the various sensor modules will send the information to the beagle bone black. In this work, a cloud based remote monitoring is proposed. This work involves get the sensors values through by means of beagle bone black, measuring the temperature value and relative moisture. Here GPS module is used in order to track the where it is placed and also it will have established a time and date. Finally, the board will transfer the records to the MQTT broker protocol using dongle. The circuit diagram for the system as shown in the below Fig.6

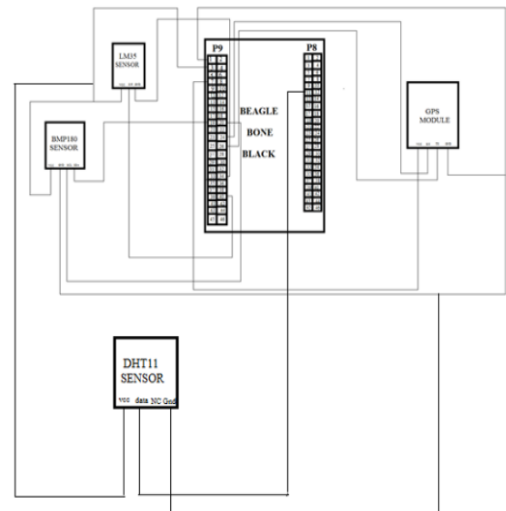


Fig.6: Circuit Diagram

B. Functional operation of proposed system

Here we show the several sensor is attached to the board as shown in the below Fig.7. As per the circuit connection is connected using the bread board to make the pin connections successfully. Using the temperature sensor program is done in order to test the board and finally got the sensor values.

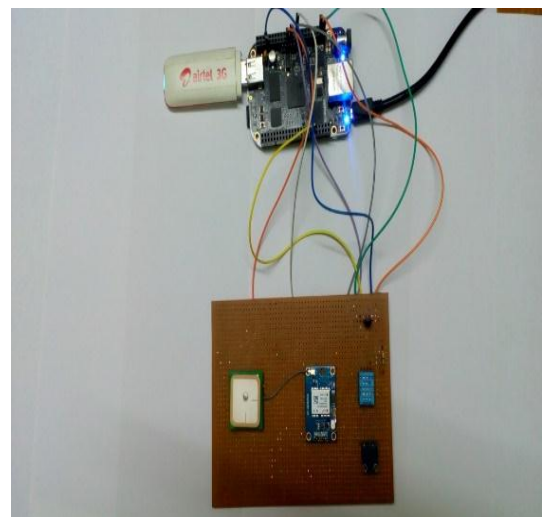


Fig.7: Sensor connection

IV. RESULTS

After the connections are made to run the program by means of the following command `python tmp36.py`. The sensor provides the analog values in millivolts it is a raw data. To convert the raw data in the system. Here we had used the conversion formula in order to convert the raw data as shown in the Fig.8. The reference voltage is 1800 mv in the system it prevents voltage drops in the system. Now we had got only the temperature sensor readings.

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