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IOT BASED TEMPERATURE MONITORING SYSTEM

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Abstract: This article gives a brief explanation about use of Internet of Things (IoT) in monitoring the temperature in real-time. By using a simple monitoring system to identify a use of temperature. Here the temperature can be monitored by the help of IoT and Field Programmable Gate Arrays (FPGA) architecture. For every situation the temperature is set in the particular IP address, for food preservation. And also, in this project here the temperature is monitored and temperature data uploaded into the things speak, so that we can monitor the temperature data at any time.

Keywords: GSM, ADC, Wifi module, FPGA, Arduino Mega, IoT.

I.INTRODUCTION

Fluctuation in the temperature it may affect the healthy life. This has led to monitoring of temperature at the hospital, home, industries, agriculture, forest, and weather-related applications [1]. FPGA implementation of Internet of Things (IoT) is a recently introduced technique. The IoT applications on the FPGA platform have received significant attention from the research community in the past few years. This technique offers a complete, low cost, powerful and user-friendly way of 24 hours real-time monitoring and remote sensing system [2]. This system makes use of sensors for detecting and monitoring weather parameters and then this collected information is sent to the cloud which can be accessed using the internet [3].

Web services with FPGA based hardware have already been defined. Their embedded nature permits the developers to simply adjust those services to energetically interrelate with their surroundings. The IOT applications can be developed by implementing IP addresses with the particular VHDL code in order to make Internet of Things.

II.LITERATURE SURVEY

The internet has enabled an unpredictable growth of information sharing with the introduction of embedded and sensing technology, the number of smart devices including sensors, mobile phones, RFIDs and smart grids has grown quickly in recent years.

Various types of sensors used in the system are vibration, humidity, temperature, and fire sensors etc, for integrated food monitoring. The system is suitable for vacuum-packed foods. A real-time intrusion and tracking system using multi-parameter monitoring systems using wifi for monitoring food grains at home [4]. A grain storage system with monitoring and controlling using an IoT based system framework for the monitoring of the warehouse environment [5]. A wireless transceiver and Advanced RISC Machine (ARM) controller based monitoring system described in the literature survey shows the food management system needs to be continuously monitored to check the temperature and humidity which is controlled by FPGA [6]. This confirms a safer monitoring system. The parameters of Area, Power and timing report are investigated. So the IoT based system for monitoring of food grains not only aims at implementing a multi-parametric system which helps in preventing the loss against various factors like moisture, aging and decaying but also consumes less time and is cost effective [7].

III.METHODOLOGY

It is important to maintain the safety and hygiene of the food to keep it fresh and edible which helps in decreasing the food wastage. The whole task of the framework is controlled by an Arduino Mega and FPGA. As the system switches ON the device, the sensor attached to the Arduino Mega gets activated. To find the temperature and humidity the DHT11 sensor module is used and to determine the status of the food, the MQ4 gas sensor module is used.

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The real time values of the temperature, humidity and methane gas will be measured and sent over the web to be displayed on it. If the temperature is at the critical value, we get the warning, and the fan will also be automatically controlled.

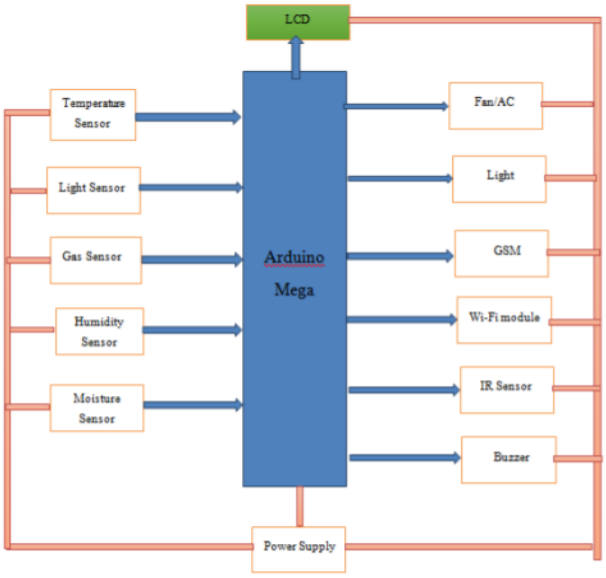

Fig 3.1 IoT based temperature monitoring system for food.

Arduino will convert the analog value into digital value compared threshold value. If the parameter above or below the threshold value then actuators will turn on and control the temperature. Alarm will be on to turn on. The gas sensor which will send message to owner. The IR sensor unit, which is used to monitor the stock. If the stock is less it will sense and send information to the vendor. The GSM to communicate with vendors and owner. The EPS-8266 which is a wifi module which is used to upload all measured data into the cloud. The Liquid Crystal Display (LCD) which displays the status of each sensor.

IoT devices should be installed in a food store. Once it is properly installed and powered on, it connects with the internet via wifi modem and starts reading data from the interfaced sensors DHT11 temperature and humidity sensor and LDR sensor. DHT11 temperature and humidity sensor is a digital sensor with inbuilt capacitive humidity sensor and thermistor it relays a real time temperature and humidity reading every 2 seconds. The sensors operate on 3.5 to 5.5 V supply and can read temperature between 0 degree C and 50 degree C and relative humidity between 20% and 95%.

Sensor cannot be directly interfaced to a digital pin of the board as it operates on a 1-wire protocol which must be implemented only on the firmware. The first data pin is configured to input and a start signal is sent to it. The start signal comprises a LOW for 18 milliseconds followed by a HIGH for 20 to 40 microseconds followed by a LOW again for 80 microseconds and a HIGH for 80 microseconds. After sending the start signal, the pin is configured to digital output and 40-bit data comprising of the temperature and humidity reading is latched out. Of the 5-byte data, the first two bytes are integer and decimal part of reading for relative humidity respectively, third and fourth bytes are integer and decimal part of reading for temperature and last one is check sum byte. The Light Dependent Resistor (LDR) sensor is connected in a potential divider circuit and inputs a voltage at the analog input pin of the controller. The voltage is read and digitized using in-built Analog to Digital Converter (ADC) channel.

The Arduino collects data from all the sensors and convert the values to the strings. The sensor data wrapped as proper strings are passed to the character LCD for display. The ESP8266 wifi module connected to the Arduino uploads the data to cloud server. For displaying and monitoring data uploaded to the Colud server, the analog output is passed to the analog pin of the Arduino which has inbuilt ADC that coverts the analog to digital value that is compared with threshold value. If the parameter is above or below the threshold value then actuators will turn on and control the temperature. Alarm will be turned on. The gas sensor which will send a message to the owner. The IR sensor unit, which is used to monitor the stock. If the stock is less it will sense and send information to the vendor. The Global System for Mobile Communication (GSM) to communicate with vendors and owners. The wifi EPS-8266 module which is used to upload all measured data into the cloud. The LCD display, which displays the status of each LDR Sensor. The LDR is

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used to sense the intensity of light. The sensor is connected to the A1 pin of the Arduino board. The sensor is connected in a potential divider circuit

IV.CONCLUSION

The proposed study effectively introduces the low-cost Iot based embedded system which is interfaced with various sensors such as LDR sensor, MQ4, DHT11 sensor with Arduino to monitor and control the environmental conditions in warehouses to prevent decaying and rotting of food items. The system also supported by buzzer as an alarm system which will activate as soon as the threshold value of the sensor crosses a specific value. The user can get updates related to food. The system is helpful to monitor the various parameters of the warehouse and also it will inform the Warehouse Corporation by uploading the data on the cloud computing server using IoT.

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