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AN IOT BASED SMART INDUSTRY MONITORING SYSTEM BY USING RASPBERRY PI 3

Pavan Kumar Reddy.Y[1,]Venkata Subbaiah.B[2], Venkata Sreekanth Reddy.E[3],

Abhishek. K[4]

1 (Assistant Professor, Department of ECE, Annamacharya Institute of Technology and Sciences, Rajampet
Email: ratnasena.reddy@gmail.com
2(UG Student,Department of ECE, Annamacharya Institute of Technology &Sciences, Rajampet
Email:b.venky4028 @gmail.com)
3(UG Student,Department of ECE, Annamacharya Institute of Technology &Sciences, Rajampet
Email:evsreekanthreddy @gmail.com)
4(UG Student,Department of ECE, Annamacharya Institute of Technology &Sciences, Rajampet
Email:koriviabhishek @gmail.com)

Abstract:
In Industry Weather Conditions Places a Major Role, If there is any Changes in Weather of the Machines or Equipment Causes Major Damages to the Industry and effects Economy of the Industry to protect from this type of Damages are introduce IOT Based Smart Industry Weather Monitoring System Using Raspberry pi 3

It is the Advanced Technology where we can Monitor Weather in the Industry from any where in the World by Using IOT Technology this System Collects the Weather Parameters from Sensors and Updated in thingspeak.com using http Protocol.

Keywords : Raspberry pi3, IOT, http Protocol, Sensors.

1.INTRODUCTION:

Smart Industry Monitoring is used to Monitor the weather Conditions of the Equipment in the Industry it plays a Major role Because if there is any Sudden changes in the Equipment if we consider an chemical heating machine if the temperature of the chemical is exceeds the required temperature if we unable to identify that changes if the temperature is keep on industry then the chemical may over flow or causes any chemical reactions

may damages the equipment and the gases released from chemicals causes health problems to near ones so to overcame this type of problems we introduce this system this system continually monitors the equipment with different parameters like Temperature, Humidity, percentage of gases in air and pressure due to this we able to monitor all the time so we can able to identify the changes if we absorb any abnormal conditions we can alert and take immediate action on the corresponding problem, it saves the many life's and also economy of the industry protects from Damages, this parameters we monitor at thingspeak.com website by using http protocol it is low cost and efficient.

2.EXISTING SYSTEM:

We have 2 existing methods for Weather monitoring they are GSM based weather monitoring system and Arduino Board based weather monitoring system. In GSM based weather monitoring system we interface different types of sensors like are temperature, Humidity and light. This sensors read the data and sends to the Microcontroller then it process the reading parameters and sends the alert message to the users by using GSM Technology but there is a limitations in this we can able to interact with limited number of users only so to overcame this limitations we go for another system i.e Ardino Based Weather

Monitoring system by using this we can able to Monitor the same Parameters in website by using IOT technology but it requires more hardware and ADC Ethernet ports and some we have to connect externally so complexity of the system increases and cost.

3.PROPOSED METHOD:

To overcome the limitations of existing system An IOT based Smart Industry Monitoring System by using Raspberry pi 3 was introduced. The weather monitoring can be done by any where through internet by using this system .In this proposed system we uses the ARM11 architecture based raspberry pi 3 it is single core 32 bit arm processor and it is having 1GB RAM it speed ups the execution process it is having architecture ARM11 processor is centre core. In this system single core32 bit ARM11 processor is used, which posses 1GB RAM. It is used to minimize the system hardware .and it is having inbuilt Ethernet port All sensors are interfaced with GPIO pins of raspberry pi board. There is no necessity of connecting microcontroller, it reads the data from the sensors and we can able to monitor all the time from any where in the world.

4. BLOCK DIAGRAM:

The block diagram of an IOT based smart Industry monitoring system using

raspberry pi 3 is given below .in this we have Different sensors are interfaced with GPIO header of raspberry pi board. The sensors like Temperature, Humidity, pressure, level and gas or smoke detection sensor. Raspberry pi has on board 4 USB port, Ethernet port, HDMI port, SD card slot and 40 GPIO pins. The power supply to raspberry pi is given through micro USB slot. The minimum power given to raspberry pi board is 5V, 1A. USB ports are used to connect keyboard, mouse. Ethernet port is used for internet connection through LAN. HDMI port for monitor.SD card slot is used to handle memory of 16GB of capacity for operating system and programming files. We read the parameters from sensors and raspberry pi process it and we can monitor the data in the thingspeak.com by using IOT(internet on things)
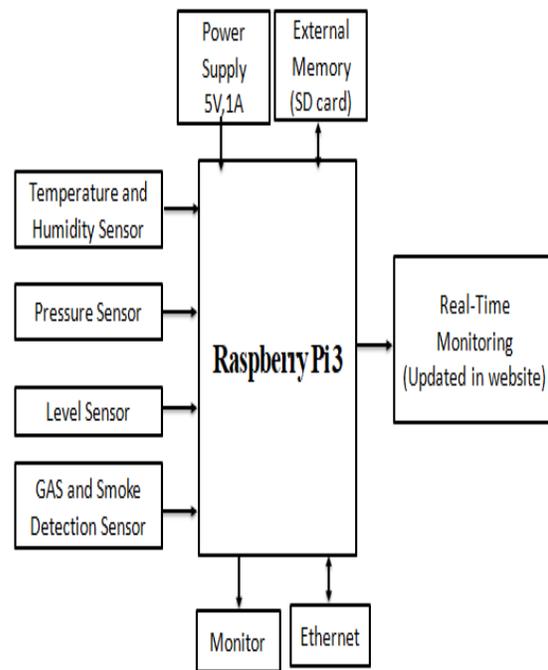
Fig 1 : Block diagram of An IOT Based Real-Time Weather monitoring system by using Raspberry pi

5.FLOW CHART:

The flow chart for this system is given below. First when we power on the powersupply the sensors start initialization This are connected to the raspberry pi3 using GPIO pins.
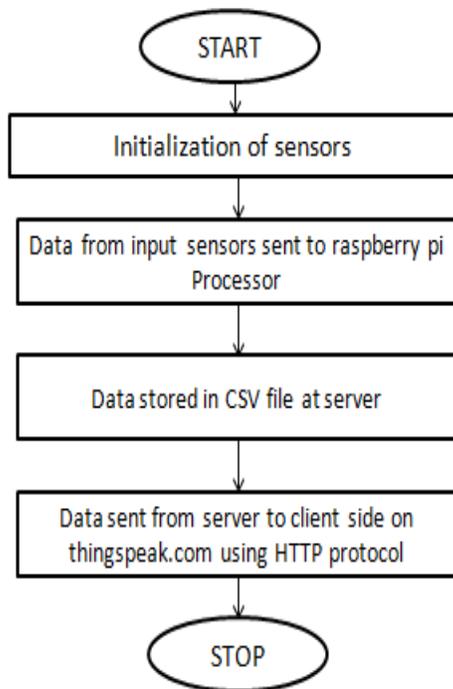
Then the sensors start reading the parameters and the data sent to the raspberry pi 3 then the raspberry process the data and stores in the .csv format then the data is sent to the thingspeak.com by using http protocol the data is finally displayed in the form of graphical representation

6.SYSTEM DEVELOPMENT:

In this system we are using the raspberry pi 3 and DHT11 Temperature Sensor BMP180 pressure Sensor ,MQ-2 gas and smoke detector and level sensor this are used to read the parameter from the machines.
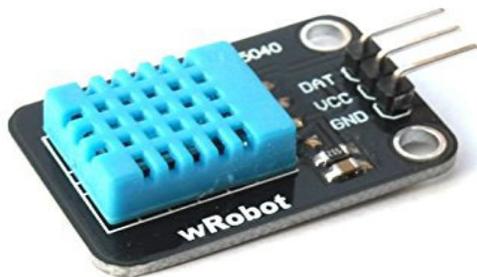
6.1 Raspberry Pi:

Raspberry pi 3 is an advanced latest technology Micro controller which is having 1GB RAM it is 32 bit arm based processor it is having inbuilt peripherals like USB ports, Micro SD card slot and HDMI cable slot for user interface it is a easily understandable and having less complexity and low power consumption it uses 5V ,1A power supply which is used for Mobile phones it is having inbuilt wife and latest Bluetooth connectivity i.e 4.0 it supports up to 16GB memory and it works on different Operating System like raspbian ,linux, windows 10 it is having HDMI slot for connecting monitor to it for better understand to the User and also having camera slot for connecting for camera interface and 3.5mm jack for external connection audio and video it is also having display slot for display connection and it is having 40 GPIO pins for interfacing with external hardware.

Fig3: Raspberry pi 3

6.2 Humidity and temperature sensor:

Raspberry pi GPIO 9 is used to interface DHT11 with the raspberry pi board for calculating Humidity (in%) and temperature (in centigrade).By using the single wire serial interface(SPI).For measuring the humidity resistive type component and for measuring the temperature the negative temperature coefficient (NTC) component is used by this sensor. Output of this DHT11 is in the form of digital signal which raspberry pi can understand easily and no need to have external usge of analog to digital converter .The 3-5.5V. voltage is required to interface the Sensor.

Fig4: Temperature and Humidity sensor.

And required Current supply is 0.5-2.5mA.and it is also used for Home and cooking equipments.

6.3 PRESSURE SENSOR:

Pressure sensor (BMP180) is interfaced to raspberry pi 3 by using I2C interface.SDA and SCL pins are used for interfacing. This pressure sensor measures the

atmospheric pressure (in Pa).and it gives the output in the form of digital so there is no requirement of DAC The voltage applied to pressure sensor is 1.8-3.6V and the current applied is 5 micro amps. The pressure is measured by using piezo resistive technology by using this we can measure the pressure in Hydraulic machine and also used for identify the pressure in the chemical heaters and pressure of the Fuels in the Pipes.

Fig 5 : Pressure sensor.

6.4 LEVEL SENSOR:

Level sensor is a device for determining the level or amount of fluids, liquids or other substances in the Industry . It is used to monitor and regulate the levels of a particular free flowing substance within a contained space. level sensors are widely used it is interfaced with ULN2803. ULN2803 is interfaced at GPIO7, GPIO8, GPIO 18 and GPIO23 of raspberry pi for IN1, IN2, IN3 and IN4 respectively.
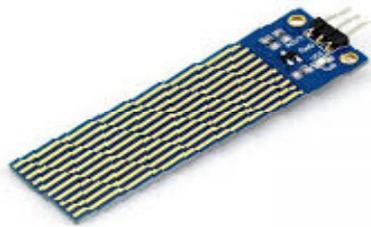
Fig 6 : Level Sensor

There are numerous physical and application factors that influence the determination of the ideal level checking strategy for mechanical and business forms. The determination criteria incorporate the physical: stage (fluid, strong or slurry), temperature, weight or vacuum, science, dielectric steady of medium, thickness (particular gravity) of medium, disturbance (activity), acoustical or electrical commotion, vibration, mechanical stun, tank or canister size and shape. Additionally, vital are the application limitations: value, exactness, appearance, reaction rate, simplicity of alignment or programming, physical size and mounting of the instrument, checking or control of persistent or discrete (point) levels. To put it plainly, level sensors are one of the critical sensors and assume essential part in an assortment of shopper/mechanical applications. Similarly as with different sorts of sensors, level sensors are accessible or can be composed utilizing an assortment of detecting standards. Choice of a fitting kind of sensor suiting to the application prerequisite is imperative.

6.5 GAS SENSOR :

The gas sensor is a device that senses smoke ,and percentage of gases in the air it can able to detect amonia methene and carbon dioxide and some more gases in the air.it could be used in gas leakage detecting equipments in industry areas and also used for Home applications the resistance of the sensitive component changes as the concentration of the target gas changes it also able to detect H2,LPG,CH4,CO,ALCHOOL,SMOKE,PROPANE and other gas sensors.it is to detect combustible gas in the air and output can be measured from 300-10,000ppm operating voltage is required for gas sensor 5v and it response time is <10s and recovery time is <30s gas sensor have four pins they are VCC,D0 PIN[digital output],A0 pin [analog output],Ground.

FIG 7 : Gas Sensor

Simple smoke/LPG/CO gas sensor(MQ-2) modulen uses a MQ-2 as the touchy an insurance resistor and a customizable resistor on board.the MQ-2 gas sensor is delicated to LPG,I butane,propane ,methane ,liquor,hydrozen and smoke it should be utilized as a part of gas spellage distinguishing types of gear in the family and industry. The protection of the touchy part changes as the fixation. Application prerequisite is imperative.

7. SOFTWARE TOOLS USED:-

7.1 RASPBIAN(OS):-

Raspbian is a free operating system for the raspberry pi hardware. Raspbian is the Foundation's authority underpinned working framework. You might introduce it for NOOBS. Raspbian hails pre-installed with a lot of product for education, modifying Also general utilization. It need Python, Scratch, sonic Pi, Java, Mathematical Furthermore a greater amount. Those Raspbian for desktop picture held in the ZIP file may be over 4GB clinched alongside size, which implies that these chronicles utilize Characteristics which would not underpinned via more seasoned unzip devices ahead A percentage platforms. Though you Figure that the download shows up will be degenerate alternately the document will be not unzipping

correctly, Kindly attempt utilizing 7Zip (Windows) or the Unarchive (Macintosh). Both are gratis and have been tried to unzip the picture effectively. Raspbian provides more than a pure OS it comes with over 35,000 packages, pre-compiled software bundled in a nice format for easy installation on your Raspberry Pi.

7.2 IDLE text editor:

IDLE (Integrated development and learning environment) used in python language. It means nothing but this text editor can be used to write the python language program for execution. It is suitable for beginner.

Its main features are

1. Python syntax highlighting
2. Multi window text editor
3. Auto completion

IDLE is having some of the faults in various usages like lack of copying to clipboard, line numbering options, losing focus, and design for common user interface. According to author Guido van Rossum IDLE stands for "Integrated development environment", and he named the language python relatedly to honor British comedy group Monty Python, similarly the IDLE name was probably chosen partly to honor Eric idle who is the

one of the Member of Monty python's found

7.3 Python:

Python can be used for general purpose programming which is a high level language and free to use. IDLE (integrated development and learning environment) which is the special text editor programming software used in python programming. Python is an object oriented and beginner's language. Python can runs on Linux operating system. Python is first released in the year 1991 which is created by Guido van Rossum.

Python features are

1. Supports multiple programming

8. Applications:

1. Weather parameters can be monitored online with graphical presentation.
2. People can monitor the weather information via mobile phone or web easily
3. Can be used in home automation
4. Industrial purpose

9. Conclusion:

This IOT based Smart Industry Monitoring system gives real-time monitoring of weather conditions of

2. Has large and comprehensive standard library
3. Automatic memory management and dynamic type system

Python is open source software and has a community-based development, which is managed by the Python Software Foundation. It is the fourth most popular language and it was selected Programming Language in the Year of 2007 and 2010.Python has been embedded successfully in many software products as a scripting language The Raspberry Pi has adopted Python as its main user-programming language for single board computer project.

Industry. It monitors temperature, humidity, level of chemicals,also detects the Leakage of gas, and detect the smoke when fire Accidents done . Information can be seen from anywhere in the world. By using this system the person can continuously monitor the changes in environmental situations without any interaction. Raspberry Pi itself acts as a server. This is efficiently carried out by Raspbian operating system with Low cost and small size and Protects From fire Accidents and Damages in the industry with remote monitoring.

10. References:

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