IoT Industrial Based Monitoring System Using Raspberry Pi

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Abstarct- The Internet of Things sits on the intersection of sensors, networks, layout, commercial enterprise fashions, and a massive type of industries. At its excellent, the IoT is the idea that wireless verbal exchange and digital intelligence can be embedded into the whole thing round us clothing, motors, houses, flowerbeds, even the ground beneath our feet. Underlying this transformative idea are complicated and interwoven layers of physical, virtual and human infrastructure so as to allow billions of gadgets to accumulate, transmit and collect statistics via the Internet.

Coal mining is usually a hard and perilous challenge, with hundreds of twist of fate and much less safety. In this assignment a unmarried board pc i.e. Raspberry Pi is used which acts as a CPU with ARMv8 (BCM2837) microprocessor, 1.2 GHz velocity and 1GB of RAM is used this is programmed in python programming language. A Wireless Sensor network (WSN) is created the use of the sensors like Temperature sensor, Humidity sensor, Gas sensor and LDR, whose values can be up to date every 2nd and deliver to the Raspberry pi so as to automate the technique like if Temperature is immoderate it'll ON the cooling FAN and deliver SMS, Humidity High Buzzer will prompt and SMS is probably sent mechanically. Any abnormality in sensor automation can be applied. At the identical time all of the WSN values may be accrued and deliver to the raspberry pi server on the way to be updated within the internet page with picture of any abnormality. Web page could have 3 fundamental element i.e. Tracking phase, photo updating and controlling section. This project is built which will make the subjects automatic with greater protection factors.

Keywords- ARM, CPU, GHz, IOT

I. INTRODUCTION

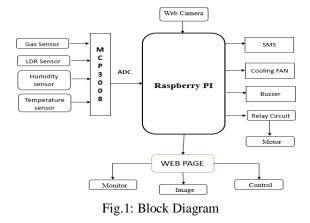
In the above block diagram Wireless Network Sensor (WSN)i.e. Temperature sensor for monitoring the atmospheric Temperature of the environment, Humidity to apprehend if any rainfall or monitoring the atmospheric humidity content cloth. LDR to come across the moderate intensity in that region if the slight is low the Led will glow routinely, the dependency of the LED depends on the LDR. Gas sensor discover polluted air if any toxic gas is detected it will offer the alert. This all sensors are analog sensors and as our Raspberry Pi3 a single board computer that's programmed in python programming language doesn't have the constructed in ADC so an outside known as MCP30008 is used to convert analog values to virtual values. Now our Raspberry Pi3 will

update all the sensor values within the server as a result and robotically on/off the buzzer, motor and cooling FAN constant with the alternate inside the WSN. And an internet website is programmed the use of HTML and PHP this is stored within the server i.e. Apache server and moreover SMS API is constructed to ship SMS. Also a virtual camera is used to seize the photograph while there is any abnormality in sensor values.

II. LITERATURE SURVEY

In industrial automation, there are different manufactures producing their own PLCs [3]. The PLCs in an industry is connected with distributed control system (DCS) by protocols such as RS232/485, USB and Ethernet [1] [5]. The DCS has multi-level hierarchical network structure for communication. Due to the hierarchical network structure, the communication becomes complex and high in cost. Complete network from field level to control level is not formed [8]. The java simulators can be used as front end panel for monitoring and control. The java servers used to control the process in a field [5]. Internet of Things (IoT) is a fast developing technology that connects all devices with internet [6]. For soft real time systems TCP, UDP and IP protocols are efficient [3]. Embedded web server and Linux based system is cost effective with high performance [3]. The RS232 protocol is sufficient for parameter monitoring and control [2]. The master slave architecture gives good performance in real time control applications [7]. The graphical language is efficient for development of front end and back end panels for process monitoring and control [4]

BLOCK DIAGRAM



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III. HARDWARE COMPONENTS

Raspberry Pi Core Module

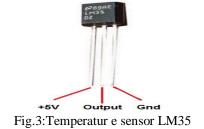
The core module of the system is realized using a Raspberry Pi 3 board; it's a \$ 35 bare-bones computer designed and developed by the Raspberry Pi Foundation, the Pi 3 features a BCM 2837 System-on-Chip which includes a Quad-Core 64-Bit ARM Cortex A7 CPU clocked at 1.2GHz paired with 1 GB of RAM. It also has Video Core IV GPU for graphical processing applications, it also includes four USB ports for peripherals and 40 Pin General Purpose Input Output (GPIO) pins for interfacing the Pi with external electronic circuits, these GPIO pins are used to interface the Pi to the module. The Raspberry Pi is designed to run various Linux based operating systems and has Raspbian as its official operating system and Python as its official programming language.



Fig.2: Raspberry Pi 2 Module

Temperature sensor:

TheLM35 pin diagram is shown in the figure 2 .As a temperature sensor, the circuit will read the temperature of the surrounding environment and relay temperature to us back in degrees celsius. The LM35 is a low voltage IC which uses approximately +5VDC of power. This is ideal because the Raspberry pi power pin gives out 5V of power. The IC has just 3 pins, 2 for the power supply and one for the analog output. The output pin provides an analog voltage output that is linearly proportional to the Celsius (centigrade) temperature. Pin 2 gives an output of 1 mills volt per 0.1°C (10mV per degree). So to get the degree value in Celsius, all that must be done is to take the voltage output and divide it by 10- this give out the value degrees in Celsius.



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Gas sensor:

Ideal sensor for use to detect the presence of a dangerous LPG leak in your car or in a service station, storage tank environment. This unit can be easily incorporated into an alarm unit, to sound an alarm or give a visual indication of the LPG concentration. The sensor has excellent sensitivity combined with a quick response time. The sensor can also sense iso-butane, propane, LNG and cigarette smoke.



Fig.4: Smoke sensor

DC MOTOR



Fig.5: DC Motor

DC engines are arranged in numerous sorts and sizes, including brush less, servo, and apparatus engine composes. An engine comprises of a rotor and a changeless attractive field stator. The attractive field is kept up utilizing either changeless magnets or electromagnetic windings. DC engines are most regularly utilized in factor speed and torque. Movement and controls cover an extensive variety of parts that somehow are utilized to produce as well as control movement. Regions inside this class incorporate direction and bushings, grips and brakes, controls and drives, drive parts, encoders and resolves, Integrated movement control, restrict switches, straight actuators, straight and rotating movement segments, straight position detecting, motors(both AC and DC engines), introduction position detecting, pneumatics and pneumatic segments, situating stages, slides and aides, control transmission(mechanical), seals, slip rings, solenoids, springs. HUMIDITY SENSOR



Fig.6: Humidity sensor

The DHT11 is basic, а ultra low-cost digital temperature and humidity sensor. It uses а capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). Its fairly simple to use, but requires careful timing to grab data.

LDR SENSOR



Fig.7: LDR sensor

An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits.

Linux

IV. SOFTWARE TOOLS

Linux is a free open source working framework and it has a place with the Unix working frameworks. In reality Linux implies the piece itself which is the core of the working framework and handles the correspondence between the client and equipment. Regularly Linux is utilized to allude to the entire Linux dispersion.

Linux appropriation is a gathering of programming in view of the Linux Kernel. It comprises of the GNU-task's parts and applications. Since Linux is an open source venture, anybody can alter and circulate it.

Raspbian Wheezy

Raspbian Wheezy is a free working framework in view of Debian appropriation. It is made by a little group of designers who are enthusiasts of Raspberry Pi. Raspbian is improved for the Raspberry Pi's equipment and it accompanies more than 35 000 packag-es and pre-incorporated programming. Raspbian is still under dynamic advancement and it intends to enhance the solidness and execution of the Debian bundles

Python

RESULT:

Python is a multi-worldview programming dialect: protest arranged programming and organized writing computer programs are completely upheld, and there are various dialect highlights which bolster practical programming and viewpoint situated programming (counting by meta programming and by enchantment strategies). Numerous different standards are bolstered utilizing expansions, including configuration by contract and rationale programming.

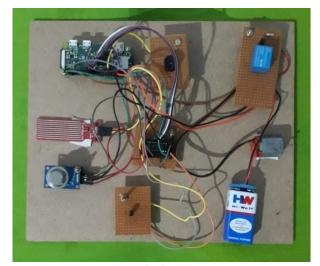
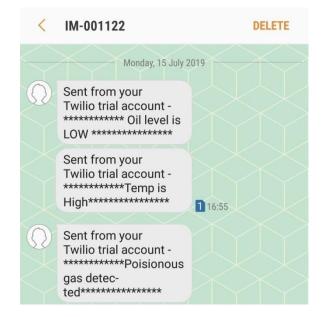


Fig.8:

Python 2.7.9 Shell* File Edit Shell Debug Options Windows Help Python 2.7.9 (default. Sep 17 2016, 20:26:04) [GCC 4.9.2] on linux2 Type "copyright". "credits" or "license()" for more information. >>> >>> 011 Level: 6 Temperature: 35.87 GAS: 758 011 Level is LOW Poissionous gas detected 011 Level: 6 Temperature: 34.415 GAS: 764 011 Level: 15 Temperature: 34.415 GAS: 760 011 Level: 15 Temperature: 34.415 GAS: 755 011 Level: 15 Temperature: 34.415 GAS: 756 011 Level: 15 Temperature: 34.415 GAS: 756 011 Level: 15 Temperature: 34.415 GAS: 764 011 Level: 15 Temperature: 34.415 GAS: 764 011 Level: 15 Temperature: 34.415 GAS: 764 011 Level: 15 Temperature: 34.415 GAS: 764

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V. CONCLUSION

The have a look at on actual time tracking of toxic gases and precise parameters determined in underground mine has analyzed the usage of wi-fi sensor network. A real time tracking device is advanced to offer clearer and further problem to issue perspective of the underground mine. This system is displaying the parameters at the LCD at the underground segment wherein sensor unit is installation in addition to at the tracking unit; it'll possibly be beneficial to all miners gift within the mine to keep their existence in advance than any casualty takes area. Alarm triggers even as sensor values crosses the brink level. This device furthermore shops all the records within the laptop for destiny inspection.

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