

IOT BASED INDUSTRIAL PARAMETER MONITORING SYSTEM

Prof. Nitin Ahire^{#1}, Shreya Bandodkar^{#2}, Kanchan Gupta^{#3}, Yasar Farooqui^{#4}, Shraddha Lokhande^{#5}

[#]Electronics and telecommunication, First-Third University

¹nitinahire@xavierengg.com

²shreya150698@gmail.com

³kn8450900479@gmail.com

⁴yasarfarooqui@gmail.com

⁵shraddhs.sl@gmail.com

Abstract— Internet of Things(IoT) has made great revolutions in industries.IOT is a technology that helps us with controlling of the physical devices over the internet. In this paper, we have designed a paradigm which can help us control and monitor all the industrial parameters from all over the world. For monitoring of the parameters, we have used different sensors such as fire, temperature, gas, humidity, voltage and current sensor. Also for alerting the workers, we have used a voice module which gives them voice alerts.

Keywords-IOT, Voltage sensor, Current sensor, gas sensor, humidity monitoring.

I. INTRODUCTION

The devices which were invented with the new emerging technologies related to the small, low power and viable sensors consists of a power monitor and remote communications capabilities. The server receives the natural phenomenon data i.e. Temperature, light, and pressure which is collected by the sensors monitoring and control of the physical environment from remote locations is performed by battery powered nodes. Wireless multisensory networks have met their applications in medical, military, industrial, agricultural and environmental monitoring. Current, voltage, temperature and water level are the traceable parameters. An android app is developed for the control of industrial automation automatically using cloud. The manager of the android application has his/her own unique and specific username and password by which the app can be controlled manually. Wireless communication is the best technology and it is widely used in industry for automation purposes. Now-a-days data acquisition system is widely popular in the industry for remote monitoring and controlling of system status. The aim of the project is to design a system that uses various physical parameters such as light, fire, humidity of an industry that can be monitored through a PC using the Arduino. This parameter contains various data from different sensors. It covers the range and performance of the system.

Objective

The objectives of the research are:

- To monitoring industrial parameter monitoring and power consumption control.
- To the Data availability and easy remote configuration.
- To the accomplishment of requirements of industrial sensors.
- To design strategies in achieving robust nodes, security in communication.
- Implementation of a real WSN is done to measure industrial parameters and to perform experimental validations.

II. PROBLEM STATEMENT

Now-a-days, the industries require more manual power to monitor and control the parameters like pressure, temperature, gas etc... with the help of individual Microcontrollers and LCD displays in various locations. Here, the sensing equipments aroused to sense the various parameters. In case the parameters will not be monitored and controlled properly at the time of emergency, it leads to a harmful situation. So, the method of monitoring the overall industrial parameters through a single computer and a concept of automatic control will reduce the high manpower requirement. In this method, the industrial parameters like pressure, temperature and gas are sensed by the respective sensors and are monitored by the individual Microcontrollers. Then, the values are displayed by using the individual LCD displays in the respective locations. When the fire is detected then the water pump automatically extinguishes the fire. In case of hazard, the situation causes the workers to panic then the voice module alerts the workers with proper action and the manager also gets system status on his phone.

Social and Environmental Impacts

WSN would revolutionize the world of technology if advanced changes would be made in its hardware and software. It would make lives easier and would, therefore, be a great boon to the society. It would be a whole innovative network using IOT. No use of fuel consuming machinery makes it environmentally friendly. It reduces the hazards to workers and adjoining population. It also leads to careful planning and emergency procedure.

III. LITERATURE REVIEW

In today's world, the use of wireless technology is becoming beneficial for the leisure and safety of people. Many wireless technologies like IOT, AR, AI, etc are in good demand for adaption of a new lifestyle. Keeping these inventions in the mark, we desired to create a sensor network for prevention and detection of hazards and using the same wireless sensors and then elimination of the cause which led to the hazard. The sensors encapsulated in the prototype are for fire, gas, temperature, humidity. Now the most crucial the parameter for hazard is fire. Temperature, gas, and humidity are the parameters that can be monitored at a prior notice for the preventing the occurrence of a huge fire. If these parameters are under control, it might prevent fire and vice versa. For the elimination and extinguishing the fire, we have used water as the extinguishing element. The prototype also contains a voice module. This is a device which records audio notes and then plays them for an audio alert of the parameter detected. For example, if there is the presence of any harmful gas like carbon mono-oxide in the surrounding, the gas is detected by the sensor and the voice module plays the audio output "gas detected". It is necessary to record the appropriate voice audio note for each parameter respectively. Thus, this prototype can be very beneficial for workers in industries, power plants, etc for the prevention of a hazard that might destroy machinery as well as can risk the life of the workers.

IV. PROPOSED METHODOLOGY







No.	Devices	Picture	Main function
1	Arduino		All the sensors are interfaced through the Arduino(required)
2	Fire detector		It detects the fire and is interfaced through Arduino(required)
3	Gas Sensor		It detects the smoke and is interfaced through Arduino (required)
4	LDR		It detects if the light is present
5	Voice Module		It gives us the output of the different sensors
6	GSM		It sends the message to the user regarding fire, smoke alert.

TABLE 4.1: COMPONENTS USED

V. BLOCK DIAGRAM

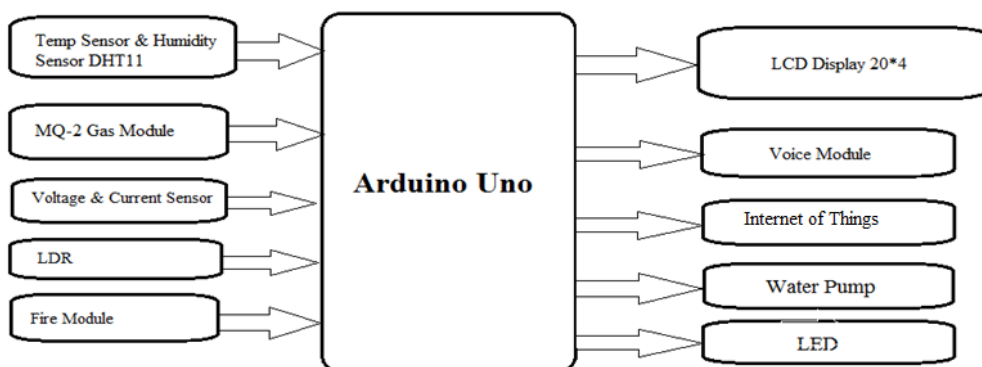


Figure 5.1: Block Diagram

Arduino module is fully equipped with inbuilt peripherals and bridging devices for communicating with sensors or another platform. This module operates with solar energy and using of battery charger circuit it is operating night time also. The figure shows the interfacing of physical parameters like Temperature, Light intensity, Water level identifier, voltage and current in this module. Data acquired from each parameter is collected in the Arduino module is displayed in (16x2 LCD) which is used as our output module. The in-built analog to digital (ADC) converter is used to measure the voltage and current. The water pump releases when there is fire. The voice module gives voice output of various requirements. The LED glows when there is some gas leak or some problem. In this section receiver, a personal computer can be used. Receiver collects the data from the transmitter and sends to the personal computer through a serial cable. If any fluctuations in the parameters then it will be shown on LCD for example if the fire will be detected then work pump will ON or voice module will give emergency alerts like don't use lift etc. Voice module has 8 voices. If the fire is present then the voice sound is "Fire is present". While using IOT it sends the message to the server room if any sensor limit is raised. IOT has two parts that are a sender and receiver.

VI. EXPERIMENTAL SETUP

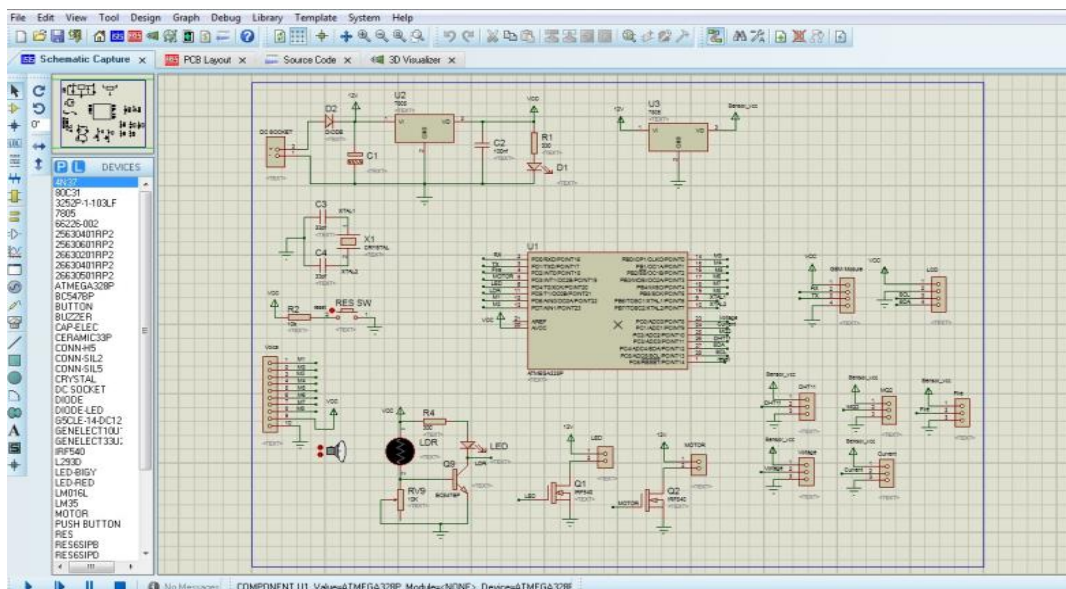


Figure 6.1: system layout

VII. Outcome



Figure 7.1: LCD output

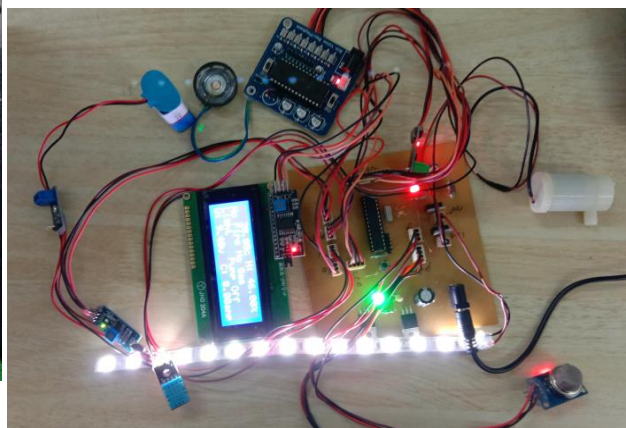


Figure 7.2: Experimental setup

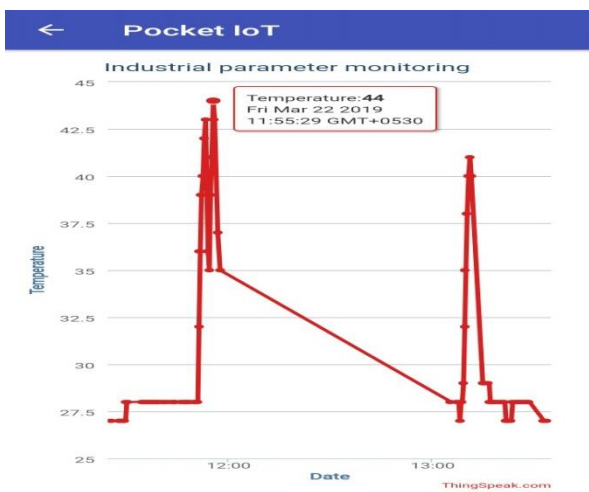


Figure 7.3: Temperature Detect

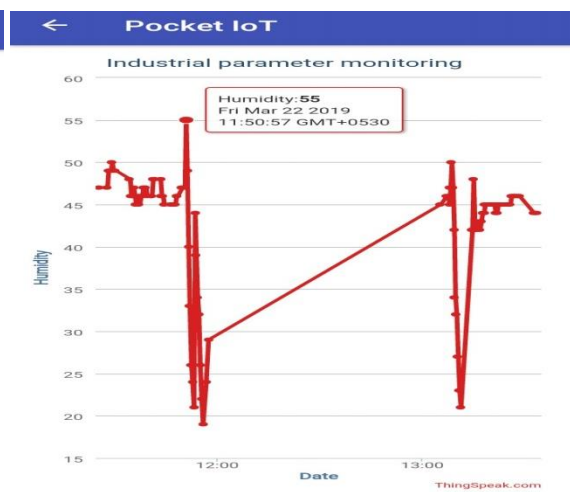


Figure 7.4: Humidity Detect



Figure 7.5: Fire Detect

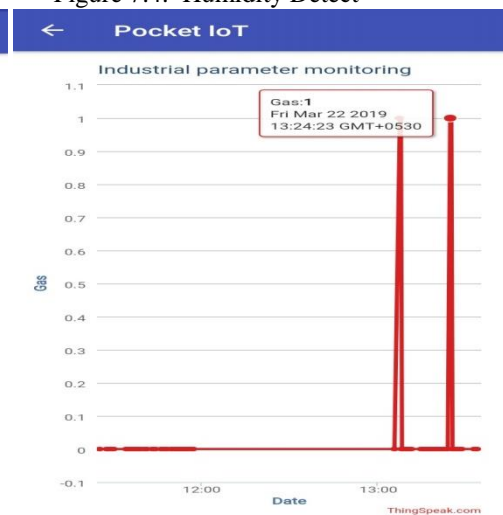


Figure 7.6: Gas Detect

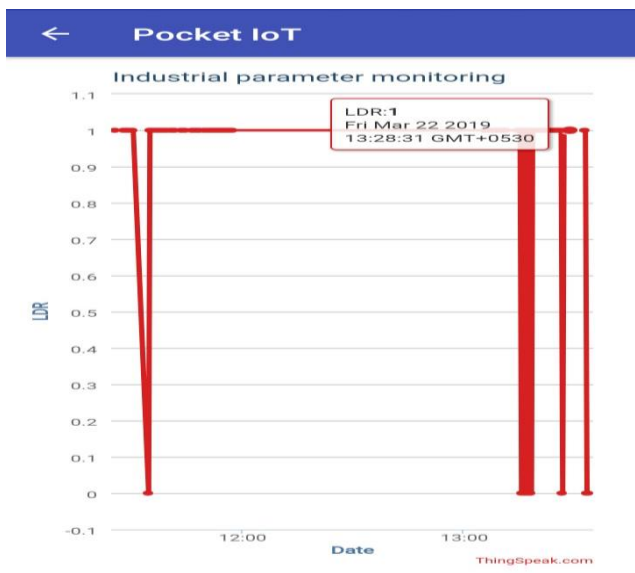


Figure 7.7: LDR ON

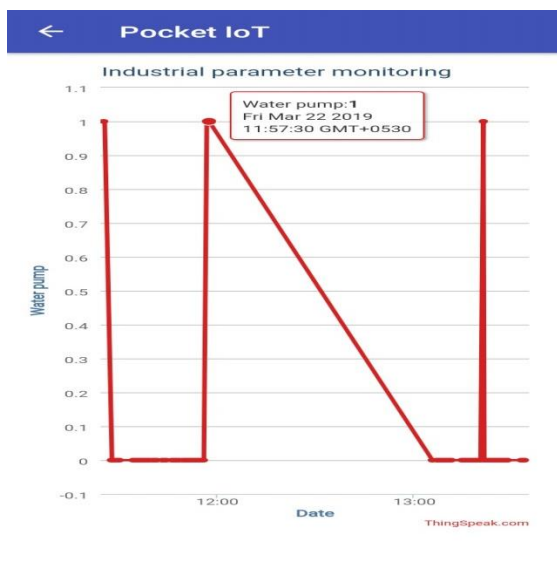


Figure 7.8: Water pump ON

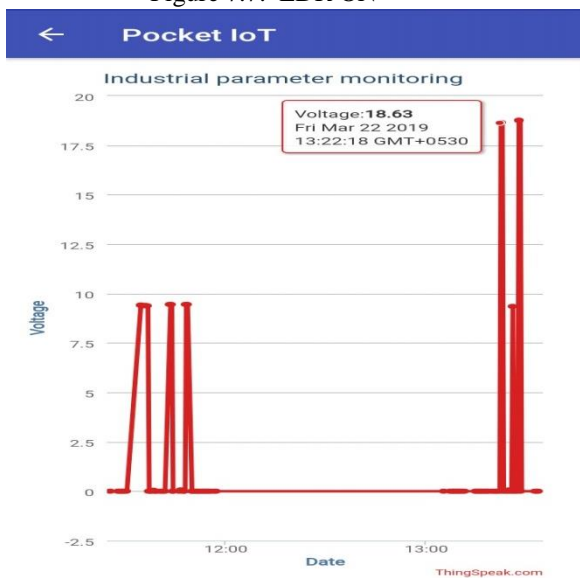


Figure 7.9: Voltage Range

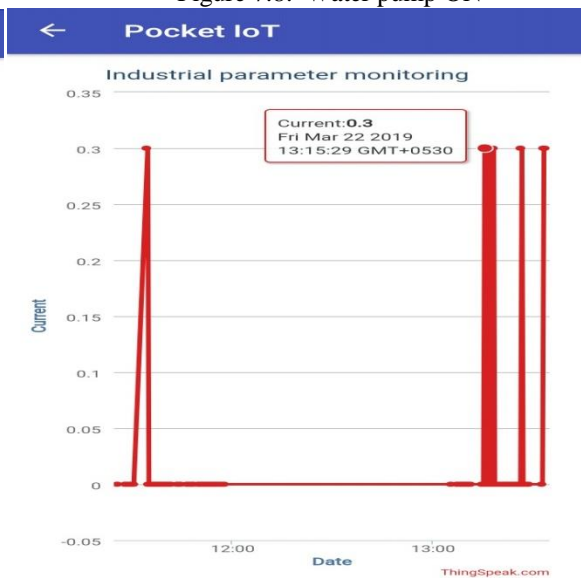


Figure 7.10: Current Range

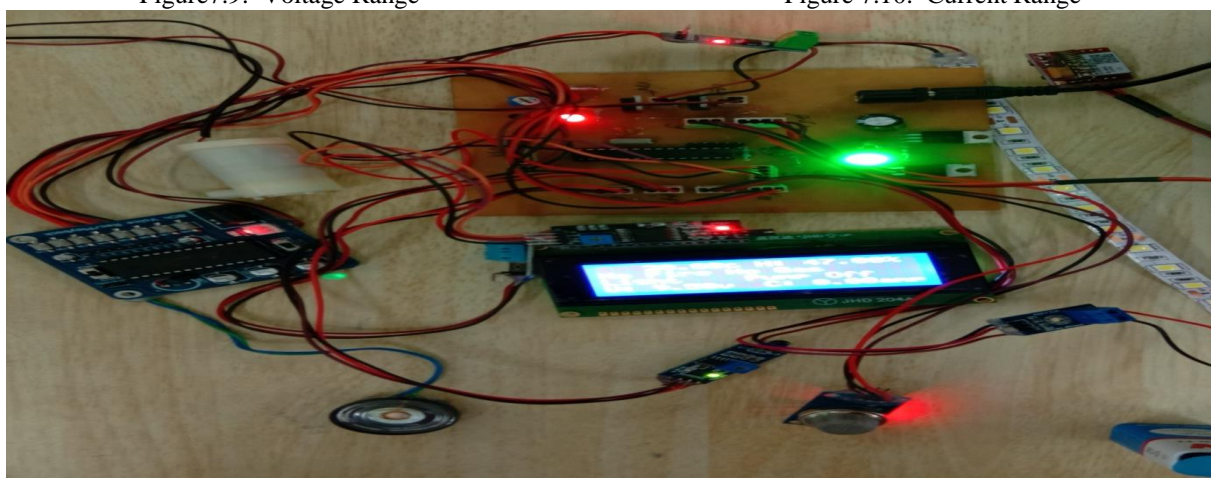


Figure 7.11: Final Output

VIII. ADVANTAGES

This system helps in the following ways:

- The capability of sensing accurately with increased flexibility.
- Reduce human effort.
- Reliable and economical.
- If any of the sensor output will be high, Voice module will produce the sound for alerting the condition to others.
- To detect fire in the disaster-prone area.
- Also extinguishes the fire on detection.
- Simple and low cost technology.
- Automation of sensors leads to better monitoring of devices.

XI. CONCLUSION

WSN is possible today due to technological advancement in various domains. Envisioned to be an essential part of our lives design constraints need to be satisfied for a realization of sensor networks. In this system, various sensors like fire, gas, LDR sense the fire and other parameters, the fire get extinguished with the help of water pump attached in the system. Similarly other actions will to be taken by the system. If the voltage and current go above the threshold value and leakage of gas are detected by gas sensors and the voice module plays an audio note which gives an alert message to the factory workers for the gas and fire detected. IOT and the Android app help us for remote monitoring. The entire mechanism is controlled by Arduino.

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