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# Implementation of Industrial Boiler Monitoring System with GSM

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ABSTRACT

The working of the boiler is monitored by means of their parameters. The parameters are the key of the proper functioning of the boiler. The steam produced in the boiler is used for various industrial applications. The application vary from the industrial purposes which may be for the power generation. Here the steam ids used for the testing of valves. The parameters of the boiler like temperature, pressure, pH and flow level are monitored. The parameters thus monitored are sent through the GSM (Global system for mobile Communication) to the control room of the industry.

**Keywords:** Boiler, Temperature, Pressure, pH level, Flow level and GSM.

## 1. INTRODUCTION

The majority applications of boiler monitoring systems are in industries. The control of the parameters which causes boiler and deteriorates the industrial and natural environment pattern is a great challenge and has received interest from industries especially in Petro chemical industries, Paper making industries, Water treatment industries and Sugar manufacturing industries. The main objective of our project is to design an efficient and robust system to control the parameters causing boiler and to minimize the effect of these parameters without affecting the plant or natural environment. The proposed methodology is to model a system to read and monitor boiler parameters and to inform boiler control authorities when any of these factors goes higher than industry standards. A mechanism using LabVIEW is introduced in this proposed methodology, which will automatically monitor when there is a disturbance affecting the system. The system is implemented using LabVIEW software. The system investigates level of pH in industry effluents, level of CO gas released during industry process and temperature of the machineries. With the design of GSM, the signals can be effectively transferred and the actions in these cases can still be made accurate and effective. Thus through this project we try to prove that control of boiler can be computed and the data can be transferred online. Our proposed method is more accurate to derive the desired parameters. LabVIEW is the powerful and versatile programming language for operating and controlling the boiler monitoring system and GSM is suitable for interactive environment for signal transfer.

## 2. EXISTING SYSTEM

Boiler is very important part in industry and it require continuous inspection with specific time interval. Earlier days this inspection and monitoring is done with human workers. There are number of possibilities of errors with human workers while measuring particular values in boiler operation process. So a reliable monitoring system is required to avoid these errors and maximize profit. This paper gives design and development of some techniques used for boiler automation. Boiler automation includes the monitoring of temperature, pressure and water level

using different sensors. In case of emergency different automated check valves are used to release pressure, steam and inform the concerned authority through alarm.

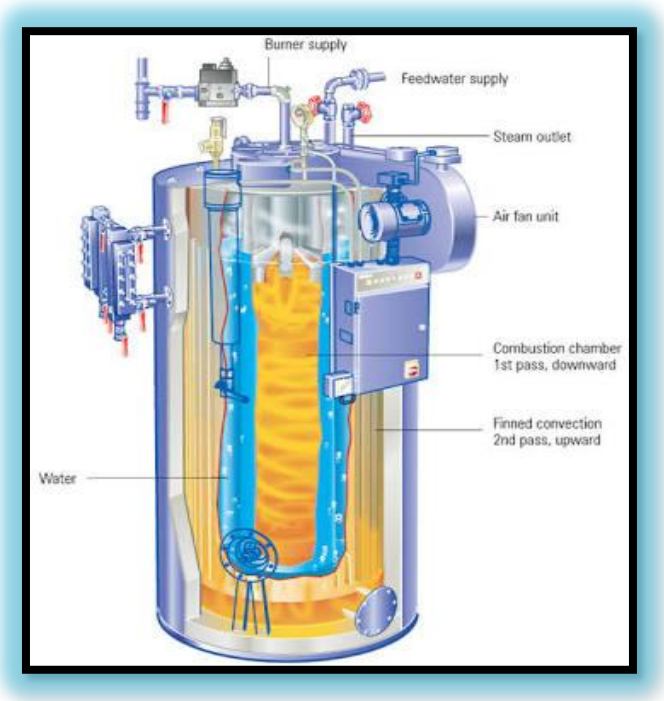
## 3. PROPOSED SYSTEM

The revolution of automation on factory floors is a key driver for the more demand for higher productivity, lower total cost of ownership, and high safety. As a result, industrial applications drive a more demand of higher data bandwidth and higher system-level performance. We propose the design and implementation of boiler automation, the water level in the main tank is controlled by a water level sensor, each boiler has two pipes, one is inlet other one is outlet and the pipes valves are controlled by temperature sensors located in each boiler. From the GSM mobile phone, the user will be able to get information about the current temperature in any boiler by simply sending a boiler identification number.

### *3.1 Objective*

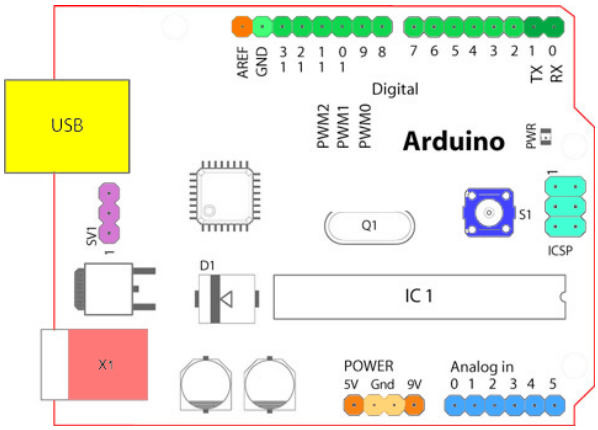
The main objective of this paper is to build a monitoring system for the boiler. The important objective of this automated system in industries are:

- Monitor the working of boiler.
- Identify the cause of malfunctioning.
- Monitor accidents due to heavy exposure of steam

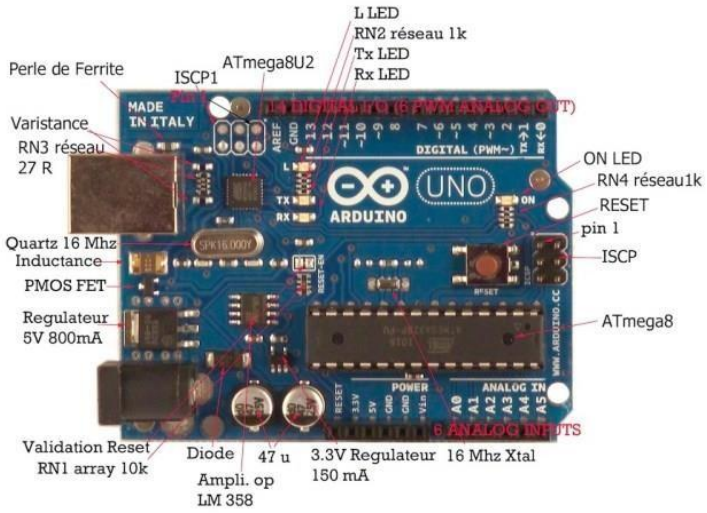



### *3.2 Arduino*

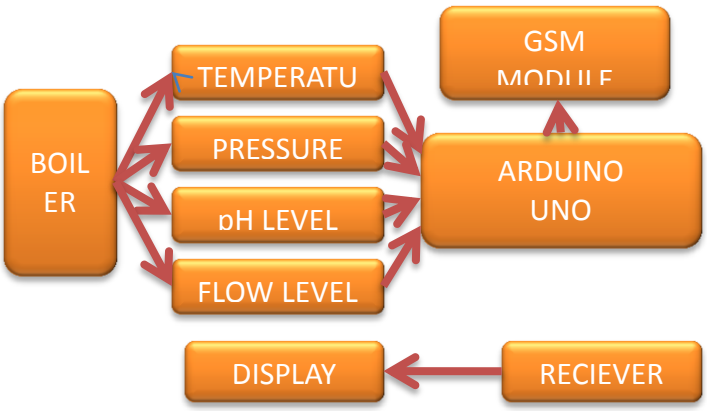
The current topic is the Arduino In brief description and outlook of the arduino board, features, applications of the board are left to your creative part. Whether you make a Home Automation System or a Quad copter or many multidisciplinary projects that impresses you and your thoughts.




## 4. ARDUINO UNO BOARD




### *4.1 Block Diagram*




### *4.2 GSM Modem*

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. A GSM modem can be an external device or a PC Card / PCMCIA Card. Typically, an external GSM modem is connected to a

computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be inserted into one of the PC Card / PCMCIA Card slots of a laptop computer.

### *4.3 Pressure Sensor*

A pressure sensor usually acts as a transducer. A pressure sensor is a device for pressure measurement of gases and liquids. Pressure is an expansion of force required to stop a fluid from expanding and is usually stated in terms of force per unit area. Pressure sensors are used for control and monitoring in thousands of everyday applications. Pressure sensors can also be used to indirectly measure other variables such as fluid/gas flow, speed, water level, and altitude. Pressure sensors can alternatively be called pressure transducers, pressure transmitters, pressure senders, pressure indicators, piezometers and manometers, among other names. Pressure sensors can vary drastically in technology, design, performance, application suitability and cost.

### *4.4 PH Sensor*

A pH meter is a scientific instrument that measures the hydrogen ion activity in water-based solutions, indicating acidity or alkalinity expressed as pH. The pH meter measures the difference in electrical potential between a pH electrode and a reference electrode, and so the pH meter is sometimes referred to as a "potentiometric pH meter". The difference in electrical potential relates to the acidity or pH of the solution. The pH meter is used in many applications ranging from laboratory experimentation to quality control. Potentiometric pH meters measure the voltage between two electrodes and display the result converted into the corresponding pH value.

### *4.5 Flow Level Sensor*

Level sensors detect the level of liquids and other fluids and fluidized solids, including slurries, granular materials, and powders that exhibit an upper free surface. Substances that flow become essentially horizontal in their containers (or other physical boundaries) because of gravity whereas most bulk solids pile at an angle of repose to a peak. The substance to be measured can be inside a container or can be in its natural form (e.g., a river or a lake).

### *4.6 NTC Temperature Sensor*

NTC stands for "Negative Temperature Coefficient". NTC thermistors are resistors with a negative temperature coefficient, which means that the resistance decreases with increasing temperature. They are primarily used as resistive temperature sensors and current-limiting devices. The temperature sensitivity coefficient is about five times greater than that of silicon temperature sensors (silistors) and about ten times greater than **those** of resistance temperature detectors (RTDs). NTC sensors are typically used in a range from −55°C to 200°C.The non-linearity of the relationship between resistance and temperature exhibited by NTC resistors posed a great challenge when using analog circuits to accurately measure temperature, but rapid development of digital circuits solved that problem enabling computation of precise values by interpolating look up tables or by solving equations which approximate a typical NTC curve.

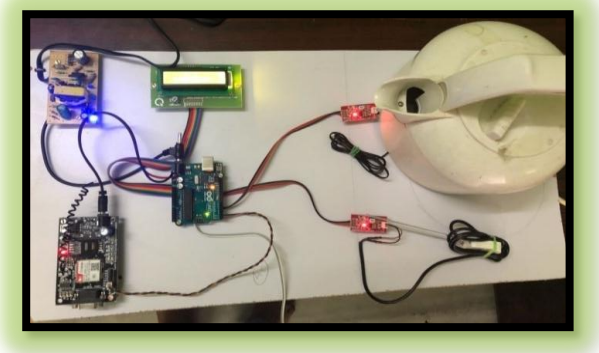
### *4.7 Human Ability*

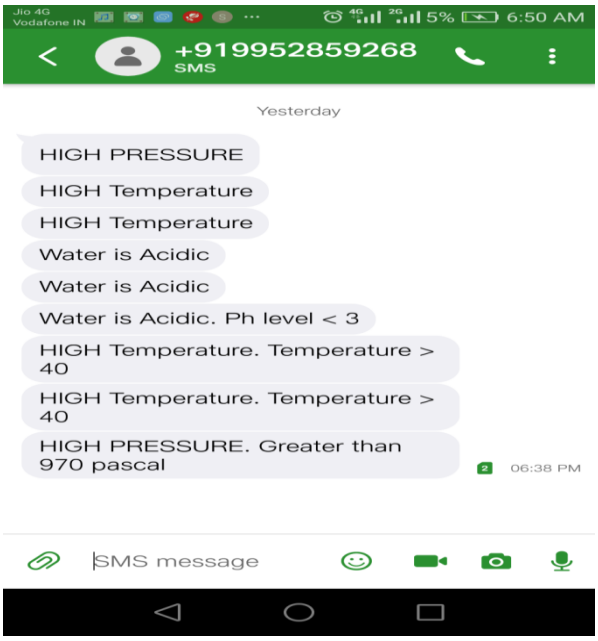
Human cannot monitor the working of the boiler nearby. Any fluctuations in the system can lead to accidents. Large amount of heat is liberated from the boiler .The heat liberation and the electrical fluctuations leads to problem in human health.

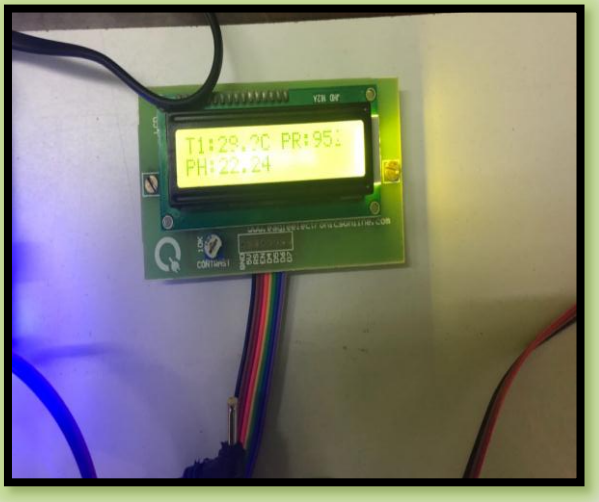
### *4.8 Approach*

A different concept is implemented where the information sent can be easily reached to the user through another network. Boiler working is studied thoroughly and the sensors are interfaced in places where the parameters are needed to be measured. Another alternate network must be employed.

### *4.9 Results and Discussions*






## 5. CONCLUSION

A growing variety of boiler design and ambient sensor units is leading to new and promising ways to monitor boiler in their natural surroundings. These sensors also result in several challenges to application developers, however, as the increasing heterogeneity of data formats, protocols, and communication channels hinders them in a swift application development The event-driven middleware architecture is designed to aggregate and provides information from both sensor networks and ambient sensor networks to subscribed applications via broadcast channels. In this project an automatic boiler monitoring system is presented by maintaining the temperature, steam, flow level and pressure based on smart devices. This monitoring system will sends the alert message to the persons if any abnormal values of temperature, steam, flow level and pressure by corresponding sensors.

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