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MONITORING OF INDUSTRIAL DEVICES BY USING INTERNET OF THINGS

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Abstract— ***India's requirement for power generation is growing every day for a variety of reasons. Across the nation, industrial units produce close to 70% of the nation's electricity. Due to the fact that these industrial plants run continually, constant monitoring of these power plants is necessary. Major components of any industrial plant are the boilers. In industrial operations, it is crucial to monitor boiler characteristics like temperature and humidity. Because of the unpleasant industrial environment, regular monitoring of the plant premises is not always practicable. In this paper, it is suggested to construct local and wireless IoT systems for remote boiler parameter monitoring. The suggested technique uses a variety of sensors to measure temperature and humidity remotely.***

***Keywords*— IoT, Boiler monitoring, Real-time monitoring, Predictive maintenance, Data analytics**

I. INTRODUCTION

Industries are currently moving more and more towards automation. Steam is produced in thermal power plants when coal is burned in the boiler. The turbine receives this steam at high pressure and temperature, which rotates the shaft of the turbine. The Generator shaft is attached to this Turbine shaft. Power is produced by the generator shaft revolving in tandem with the turbine shaft. In steam, the primary variable that can be regulated is temperature. If steam temperature rises, boiler tubes will become pierced. Therefore, it is important to monitor and regulate steam temperature. The boiler tank level needs to be kept within the manufacturer's recommended range. If the boiler tank level goes beyond these limits, boiler water carryover causes the turbine damage resulting in extensive maintenance costs or outages of either the turbine or the boiler. If the level is low, overheating of the water wall tubes may cause tube puncture and serious accidents, resulting in expensive repairs and injury or death to personnel.

II. LITERATURE SURVEY

Studying the current system is more crucial than creating a new one. With the help of this study, learn what kinds of requirements have been met so far and how to use cutting-edge technology to upgrade the system and make it more effective than its predecessor. The research paper analysis that goes into our suggested system is as follows: Rahul Malhotra Conventional Proportional Integral, as described by Rahul Malhotra1 [1]. A lot of industrial applications use controllers because of their dependability and simplicity. Due to environmental change, the parameters of various industrial processes are subject to modification. These variables can be divided into three categories: steam, pressure, and the operating temperature of the industrial machinery. To control these variables, numerous process control techniques are being developed. This study controls a boiler's steam flow parameters using a traditional PID controller and then optimizes them using a fuzzy logic controller. The comparative results demonstrate that using a fuzzy logic controller yields better results. The maximum overshoot for a fuzzy logic controller is measured at 9.35%, whereas a conventional PID controller gives a value of 47.3% We can create a system that can be used for SCADA, or supervisory control and data acquisition, according to Mr. Malikamber and Mr. Tamhankar. They employ the IEEEC37.1 standard for that. This system allows for the monitoring and management of the various devices used in the industrial setting. Mr. Zafar directed us to a system that allows us to use web technology to access the process control library from locations other than the college campus. Professors Jaikaran Singh, Tiwari, and Shrivastava explain how automation has become a crucial component of industrial development. The efficiency of our products is greatly increased if we replace the outdated manual processes with newly emerging automated ones. The efficiency of our products is greatly increased if we replace the outdated manual processes with newly emerging automated ones. Compared to manual controlling, we can produce high-quality products in a shorter amount of time. The majority of automated systems use newly developed software technologies. Using an Arduino development board, Mr. Bulipe Srinivas Rao, Mr. NOme, and Prof. Dr. Srinivas Rao proposed a system for monitoring the weather. Our ability to use the internet of things to remotely monitor local weather conditions is supported by their research. However, it is a system that only keeps an eye on the weather. In the system, there is nothing that controls anything. Different sensors, including those for temperature, light, and sound, were used. According to Subodh Panda et al., the key to designing a control system that can evolve, self-organize, develop, and evaluate itself as well as improve itself is to develop methodologies, concepts, algorithms, and technologies. Even though they can deliver adequate performance for a variety of systems, linear models may not be appropriate for non-linearity. Therefore, a model that captures the nonlinear relationship between the cause-and-effect variables is essential. Using a self-organizing neural network, a soft sensor is implemented in a neural network to process data. The fundamental understanding of the relationship between the process variable and the parameter in question is a prerequisite for designing a neuron control with soft sensor in this situation. The extension of a traditional neural network with time-variant input and output is known as a process neural network. Because the data processing is superior to that of a traditional neural network, it is ideal for reducing heat loss at blow down stations and enhancing performance. The development of the Internet of Things, a technological revolution that represents the future of computing and communications, is dependent on rapid technological advancement in a number of key areas, including nanotechnology and wireless sensors. A server program was written by programmers working several floors above the vending machine to track how long a storage column had gone without being filled. If the programmers decided to go down to the machine, they could connect to it via the Internet, check its status, and find out whether or not a cold drink would be waiting for them.

III. METHODOLOGY

a. Block Diagram:

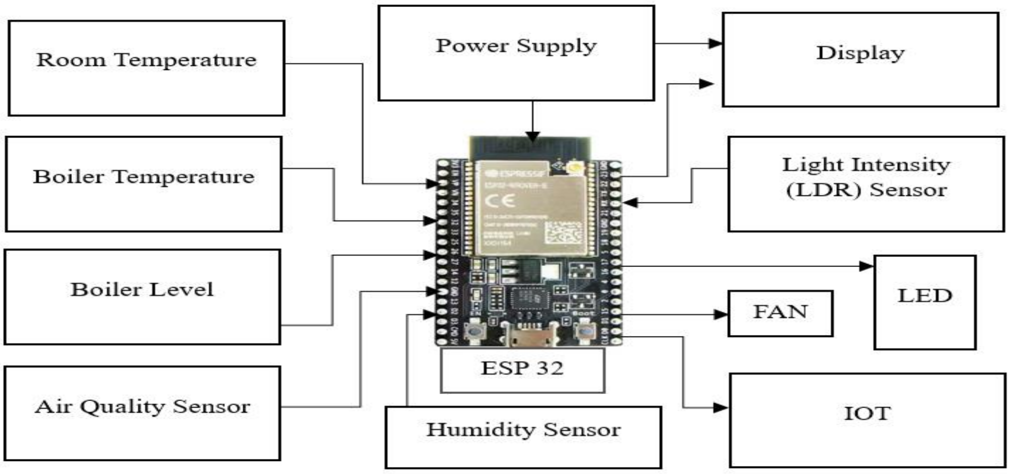


Fig. Block Diagram

B. Methodology

The NodeMCU board is connected to three different types of sensors, including temperature, pressure, and humidity sensors. in order to convert analog values to digital values and connect these parameters to the ESP32. Therefore, these values are shown on the LCD screen. The values of the parameters are altered when an external disturbance is applied. These are picked up by the various types of sensors depicted in Fig. 1. All parameter values have a set point value, and if the value exceeds that value, a fault will occur. To prevent this, online monitoring has been done, and if the value exceeds that value, it will be corrected. Sensor for Temperature Precision integrated-circuit temperature sensors from the LM35 series have a linearly proportional output voltage. IoT can be used in this proposed system to control the many boiler variables, including temperature, water level, and humidity. In order to protect users and increase boiler dependability, a crucial variable must be examined. The boiler will malfunction if none of these factors are regulated. The boiler's temperature, water level, and humidity levels are all controlled by sensors that measure temperature, water level, and humidity. Microcontrollers must be used to check the values of this parameter to ensure the boiler's safety. A clever way to monitor things is through the Internet utilizing IoT, and an LCD 16x2 is utilized to monitor data locally. To design and implement the industrial boiler control system for monitoring the pressure and temperature and humidity of the boiler and control the water valve using Internet of things.

IV. RESULTS AND DISCUSSIONS

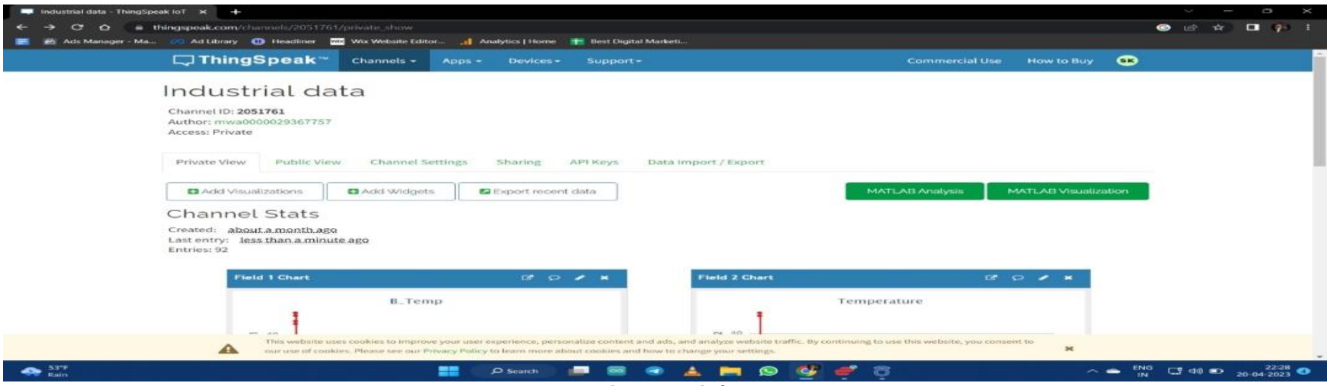


Fig.2 Things speak for IOT

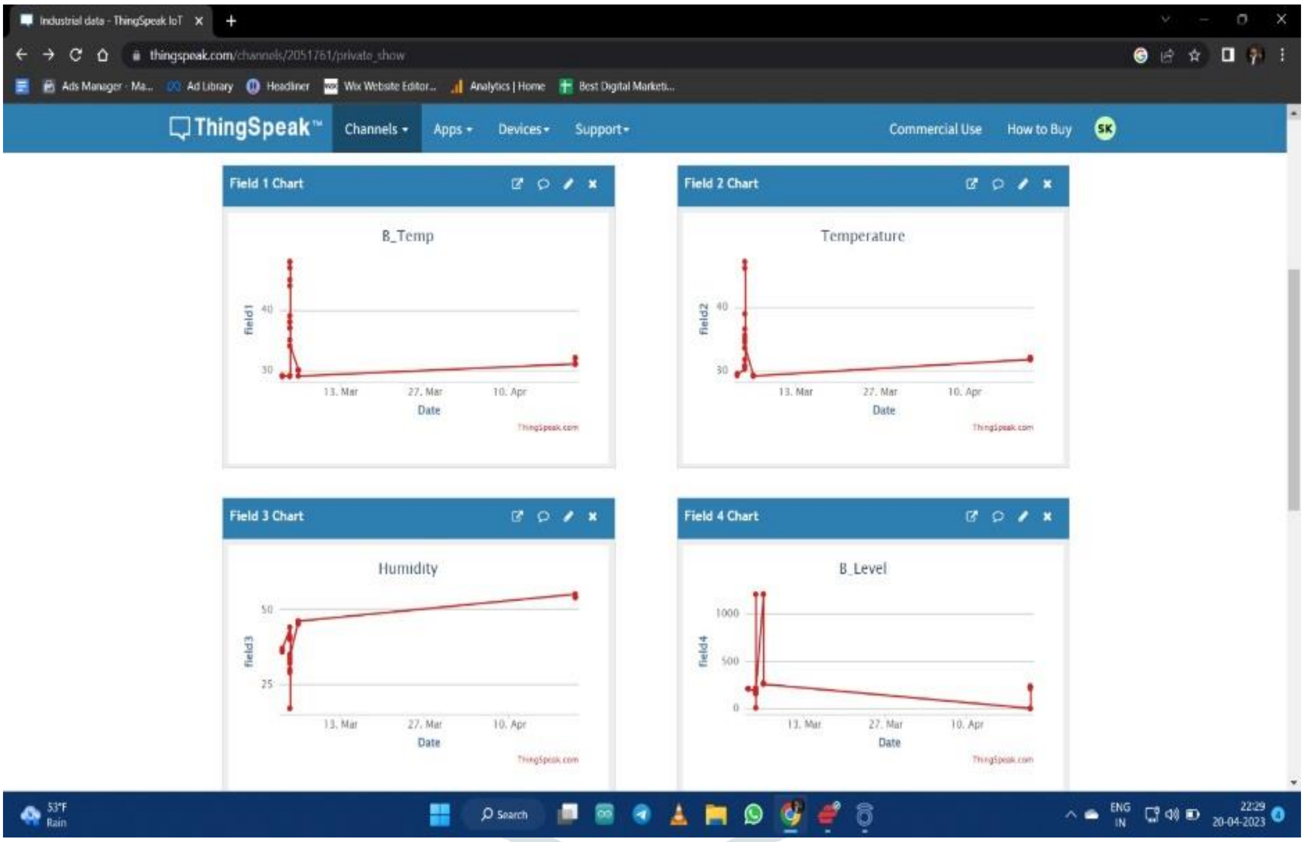


Fig. 3 Field 1: Boiler Temperature b) Field 3: Room Temperature
c) Field 3: Humidity d) Field 4: Boiler Level

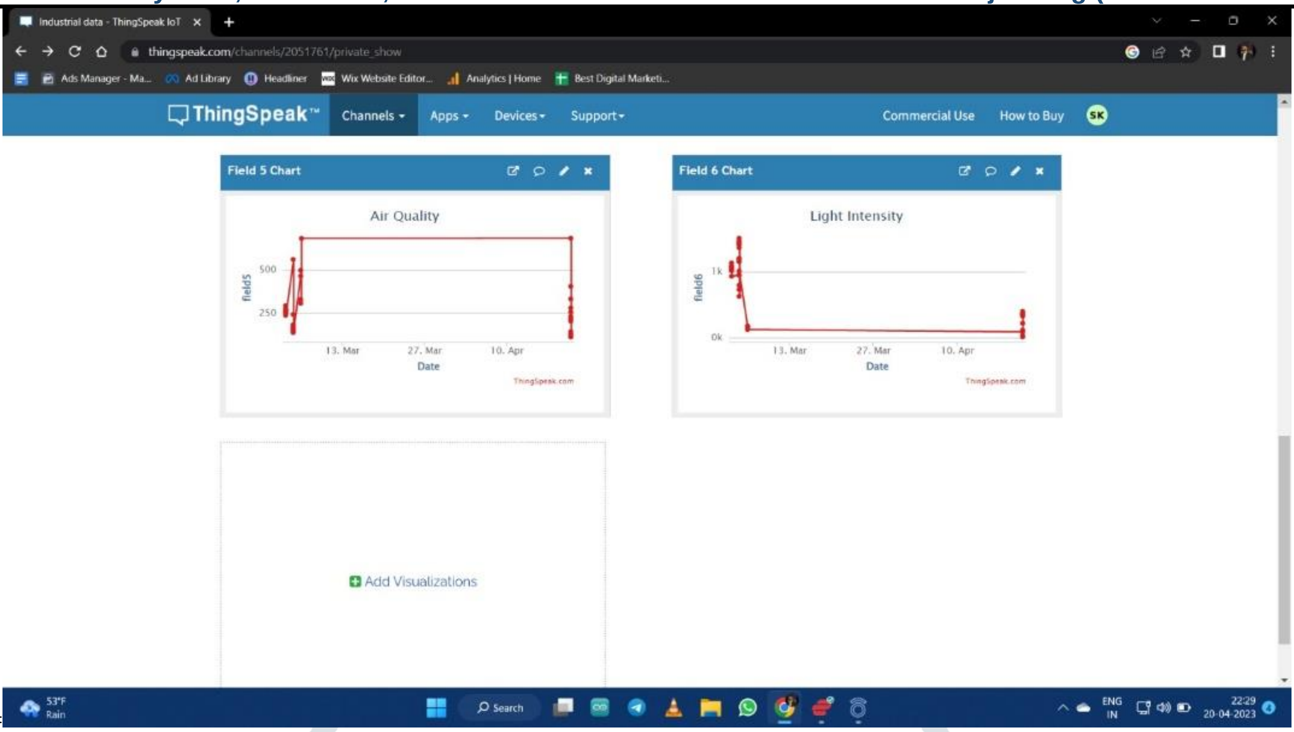
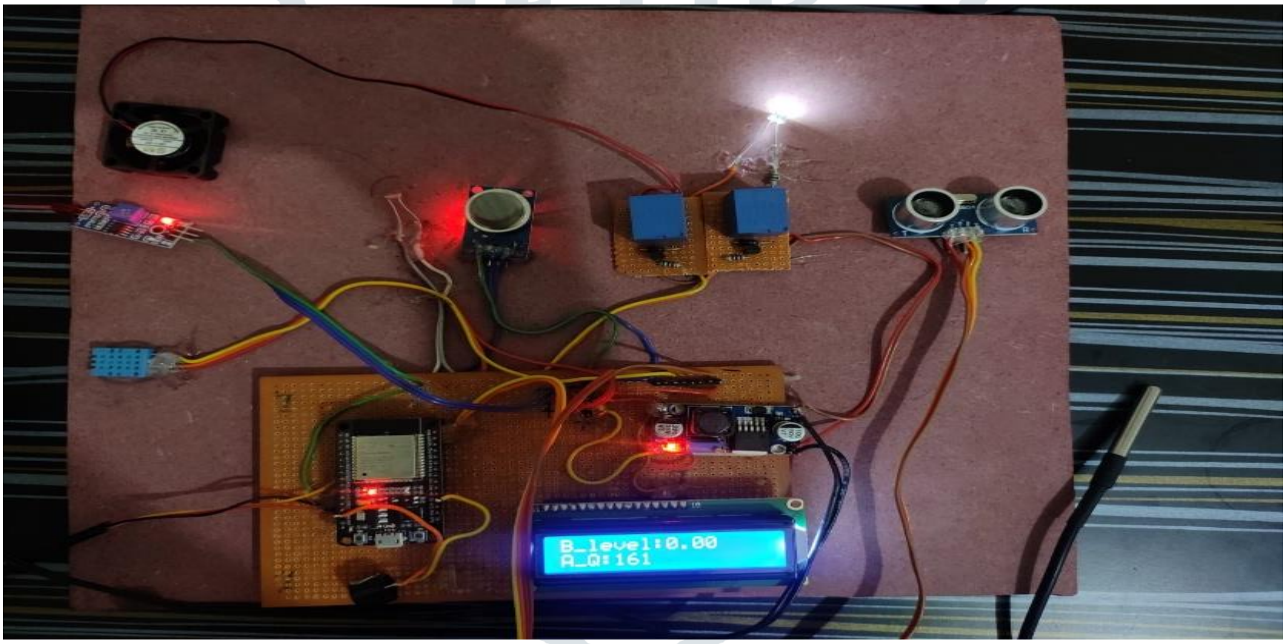


Fig. 4 e) Field 5: Air Quality f) Field 6: Light Intensity



V. CONCLUSIONS

This project shows a conceptual implementation of IOT based Circuit Breaker Monitoring & Control which will reduce the size of the circuit breaker & facilitate the concept of as needed maintenance approach. Moreover, this will eliminate the concern regarding security vulnerability of third-party system as the platform is opensource.

VI. REFERENCES

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