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INDUSTRIAL PARAMETERS MONITORING USING IOT

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ABSTRACT

Today, smart grid, smart homes, smart water networks, intelligent transportation, are infrastructure systems that connect world more than ever thought. The common vision of such systems is usually associated with one single concept, the Internet of Things (IOT), where using sensors, the entire physical infrastructure is closely coupled with information and communication technologies, where intelligent monitoring and management can be achieved via the usage of networked embedded devices.These devices will connect to internet to share different types of data. Industrial monitoring system is proposed by using UBIDOTS server and sensing based applications for Internet of Things. In this project, sensing devices are used to check different parameters like production count, illumination intensity, power consumption, relative humidity, and temperature of room.

Keywords: Temperature sensor, Light sensor, Humidity monitoring, ESP32, IOT

INTRODUCTION

These days, smartphones have stronger processors, more storage space, more robust entertainment features, and more contact options. Bluetooth, which is mainly used for data exchange, adds new features to smart phones. The 1994 invention of Bluetooth by telco company Ericsson [1] demonstrates its benefit through compatibility with smart phones. It has changed the way people use digital devices at home or office and has transferred traditional wired digital devices into wireless devices. A host Bluetooth device can communicate with up to seven Bluetooth modules at the same time through one link [2]. It is particularly helpful in smart living, given its typical working range of eight metres [3,4]. Smart phones have evolved into an all-purpose portable gadget that people use daily due to the dramatic rise in their use [5]. Using smart phones for data acquisition is one of the innovative ways to make it portable and powerful.

Data acquisition is the process in which the real world's physical conditions, which are measured by signals, are sampled and then converted to digital one so that they can be processed by digital system like computer and in our case smart phone. Practical data acquisition system consists of many parts like transducer, amplifiers, filters, A/D convertor, software etc. [6]. The software section includes developing Android applications which receive the data via Bluetooth and save the digital values, as the system is wireless and uses Bluetooth mode of communication. Recently, an open-source platform Android has been widely used in smart phones [7]. A middleware layer, core apps, and an operating system make up the entire software stack of Android. In contrast to other systems currently in use, such as iOS (the operating system for the iPhone), it includes a Software Development Kit (SDK), which offers necessary tools and Applications. Also, Android platform has support for Bluetooth network stack, which allows Bluetooth-enabled devices to communicate wirelessly with each other in a short distance [8].

This paper aims to develop a Bluetooth-based application for the data acquisition and controlling system using an opensource Android Development Tools (ADT), Android SDK (Software Development Kit) and Java Development Kit (JDK) based microcontroller.

Due to the growing advantages of mechanization, robot use is growing. Declining costs, improved performance and simpler programming make robots more attractive. The deployment of these machines by manufacturing teams makes it relatively simple to improve data gathering and add test-and-inspection stations.

The robot itself collects the most basic data. It can track part production and inventory consumption, informing systems about how many elements were used in any given time. This data also includes time stamps, making it simple to store information about when each component was handled. This capability is especially important in regulated environments, where easy access to historical data on hand-offs can be critical when products need to be recalled.

A wealth of data can be obtained from ancillary equipment used with robots. Visual sensors, grippers, and other equipment all have the potential to provide additional information. Adding inspection stations to robotic work cells is frequently a simple process. Cameras that are used to direct robotic movement can also be used to inspect components. Some of the more common types of checks are the presence of key component features and measurements. To maintain high operating speeds, these visual inspections are frequently performed while parts are being moved or manipulated. Sensors can also be easily added to check other parameters. When these inspection stations are installed in work cells, quality checks can be increased while affecting throughput minimally.

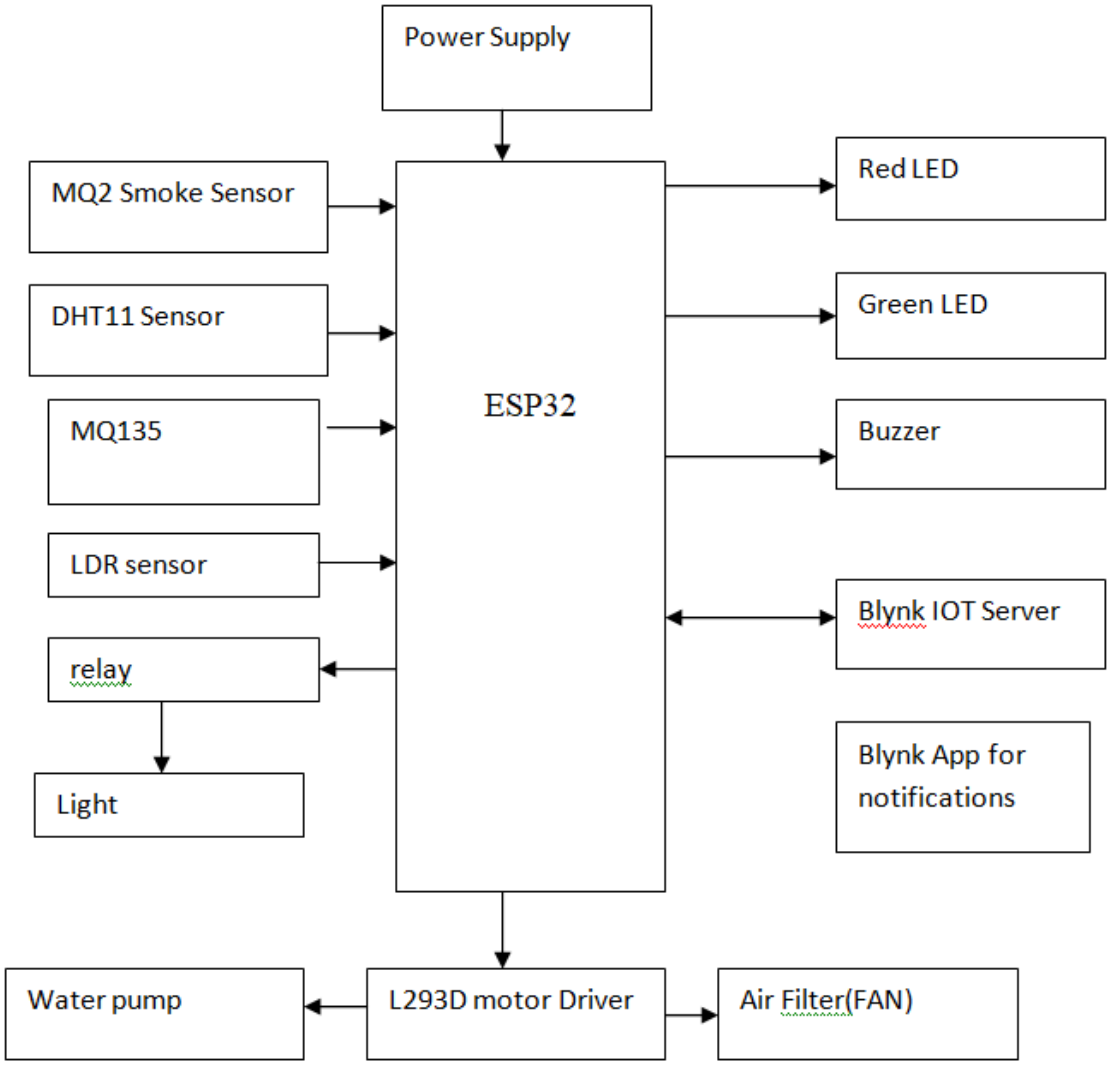
IOT (Internet of Things)

The Internet of Things (IoT) is being used to monitor industrial parameters by using sensors, devices, and communication networks to gather and analyse data from diverse industrial processes. This makes it possible to monitor and analyse crucial characteristics like temperature, pressure, humidity, flow rate, and energy usage in real-time.

To analyse and interpret the sensor data and gain insights into how well industrial processes are performing, information is transferred to a cloud-based platform. When certain parameters go above predetermined thresholds, the platform may employ machine learning algorithms and predictive analytics to find trends and anomalies in the data and send alerts and notifications.

A strong solution that enables enterprises to track, monitor, and manage their crucial parameters in real-time is industrial parameter monitoring using the Internet of Things (IoT). Businesses can get important insights into their operations and pinpoint areas for development by gathering and analysing data from connected sensors and devices. Industries can closely monitor vital variables that are essential to their operations, such as temperature, pressure, humidity, and vibration, thanks to IoT-based monitoring systems. Businesses may prevent downtime, cut maintenance costs, and boost overall efficiency by keeping an eye on these parameters, spotting anomalies, and taking the necessary corrective action. Advanced analytics tools can be used to analyse IoT device data in real-time, which can give important insights into how well industrial processes are doing.

BLOCK DIAGRAM



Working

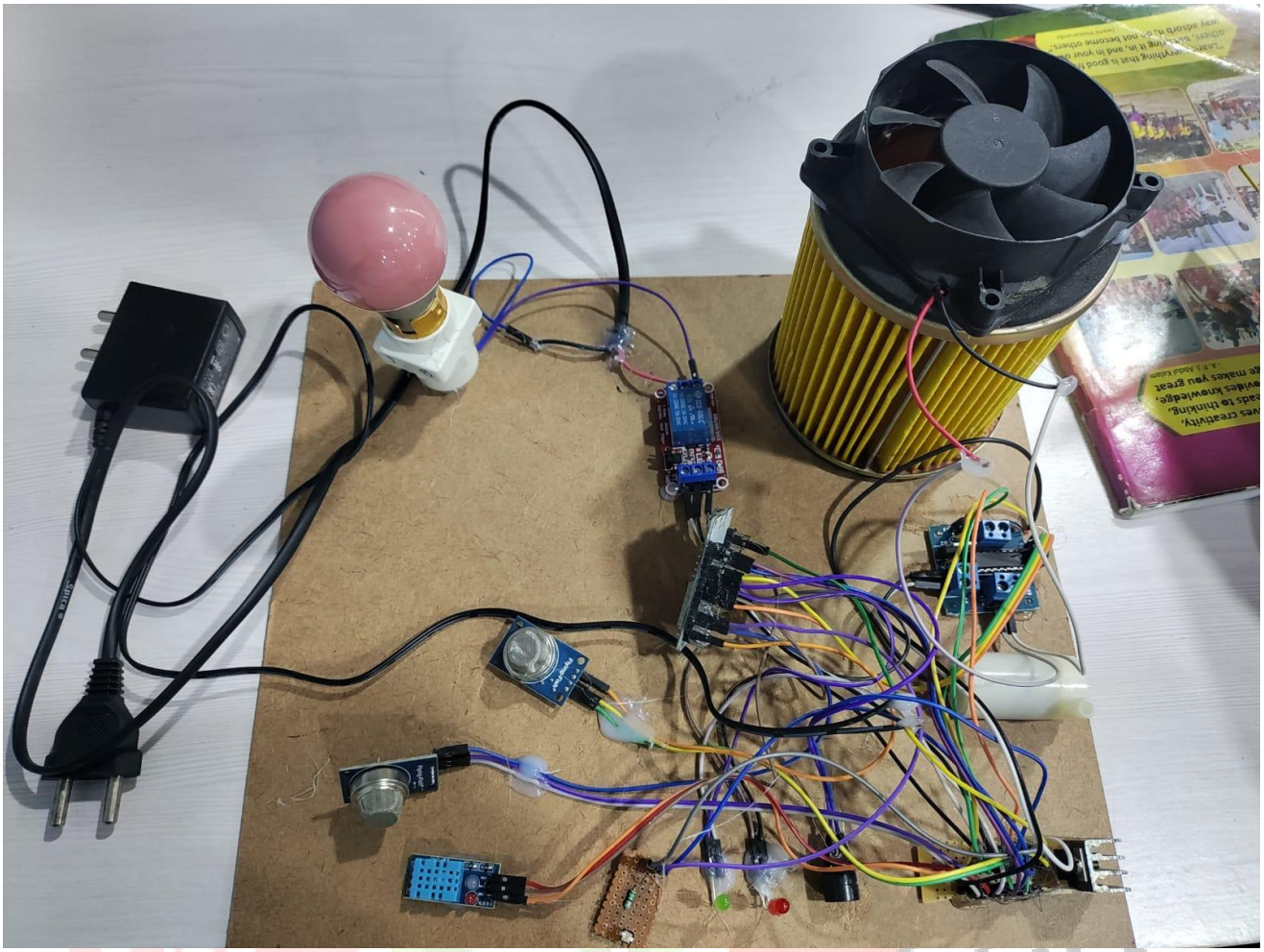
The ESP32 is be used as a central node that collects data from various sensors connected to it, and then transmits that data to the cloud for analysis and further processing. This ESP32 microcontroller has a total of 36 GPIO (General Purpose Input/Output) pins. These pins can be used as both analog and digital pins. To monitor industrial parameters, the ESP32 can be connected to sensors that measure various parameters such as temperature, pressure, humidity, flow, and more. The ESP32 will communicate with these sensors using various communication protocols such as I2C, SPI, and UART. Once the data is collected from the sensors, the ESP32 can process the data and send it to the cloud using various wireless communication protocols such as Wi-Fi, Bluetooth, or cellular networks. The ESP32 also has built-in security features such as hardware-based encryption and secure boot, which are important for ensuring the integrity and confidentiality of the data being transmitted.

The MQ-2 sensor is a gas sensor that can detect various types of gases such as smoke, propane, methane, and carbon monoxide. It works by measuring changes in the resistance of a sensitive layer of tin dioxide when it meets a gas. When the sensor is exposed to a gas, the gas molecules interact with the tin dioxide layer, causing a change in the resistance of the layer. This change is measured and converted into a voltage or current signal that can be interpreted by an electronic device. The MQ2 gas sensor typically requires analog input (pin 34) to read the sensor output.

A piezo buzzer is a type of electronic buzzer that produces sound when an electric signal is applied to it. It consists of a piezoelectric crystal and a diaphragm. When an electric signal is applied to the crystal, it vibrates and causes the diaphragm to vibrate

as well, which produces a sound. For industrial parameters monitoring using IoT technology, piezo buzzer is used to alert operators or maintenance personnel of any anomalies or abnormal conditions in the process or equipment being monitored.

Result



Advantages

1. Increased efficiency.
2. Improved quality.
3. Improved working environment.
4. Longer working hours.
5. Capital cost.
6. Expertise

Applications

1. This system can be used for weather monitoring.
2. This system can be used for labs.
3. This system can be used for industries.

CONCLUSION

Industrial parameters monitoring using IoT technology can provide numerous benefits to businesses, including increased efficiency, reduced downtime, and improved safety. By connecting sensors and other devices to the internet, businesses can monitor critical parameters such as temperature, pressure, and humidity in real-time, allowing them to identify and address potential issues before they become significant problems.

Where a microcontroller device is connected to various sensors, including temperature, humidity, light intensity, and smoke sensors. Data logging systems, as the name implies, are used to gather data from various sensors to record or analyse the phenomenon of pollution or the working environment condition for the Employees. Data acquisition is the fundamental component of industrial environment monitoring or for weather monitoring.

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