Design of Secured Wireless Iiot Network for Industrial Data Communication

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ABSTRACT: *Most of the accidents like blasts, fire-breakouts in industries occur due to the industrial high temperature and toxic gas leaks. This does significant harm to the machinery, human life, and the environment. At the moment, the people are using traditional the gas-leak detectors which only generate on-site alarms. So, this project proposes industrial environment surveillance and a safety assurance system through which the real-time monitoring of the industrial environment is possible through a cloud storage server (Think Speaks) and the system is also capable to send the warning to the client or person assigned for supervision through warning. Here Industrial Internet of Thinks (IIoT) system is used to establish secured communication between industry and cloud. This system is developed with Atmega MCU (Microcontroller Unit), DHT11 sensor for temperature and humidity sensing; MQ2, MQ7, and MQ135 gas sensors, ESP-8266 as a WLAN communication module to connect the system with the cloud and send alarm to pre-defined threshold to the specified person.*
Keywords: IIoT,PKI,UID.

I. INTRODUCTION:

Industrial IoT is an ecosystem of hardware, software, sensors, and networking tools that collaborate to gather, track, and analyze data from industrial activities. The goal of this project is to create intelligent wearables, such as a band and a helmet, that can track a worker's health and safety. The Internet of Things (IoT)-built gadgets assist in spotting worker falls and deliver SMS notifications for rapid assistance. The project's goal is to make construction sites safer and more secure for workers, which will decrease the frequency of fatal accidents there. The created prototype performed with high accuracy under various testing situations [1]. This paper explains the safety idea that will evolve along with the development of manufacturing sites and proposes a new safety concept that, for the first time in history, realizes human and robot collaboration safety as well as a general description of its safety level [2]. The safety theorem and its components, as well as the conventional implementation procedure, were all discussed in the study [3]. Monitoring the safety of construction workers makes extensive use of the Internet of Things. The IoT has helped to expand the range of safety considerations in order to give employees a better working environment. In turn, this might drastically lower accident rates and make the construction industry a safer place to work [4]. The goal of this study is to create a framework for Industrial IoT systems (IIoT) to leverage the Assurance Case methodology [5]. This necessitates the use of IoT-based safety management and control solutions. This paper develops a method for predicting risk factors for the IoT-based safety management of industrial valves. It is founded on the creation of an actuator control system and wireless communication [6]. In this study, a system that includes control, safety, and security subsystems for homes and businesses is described. The Bolt IoT platform is the foundation of the entire system. With the help of this system, a user can control lights like LEDs, fan speeds, or DC motors, monitor the temperature of the building with an alert subsystem for dangerously high temperatures via SMS and call, and keep an eye on who is inside the building with an alert subsystem for any intrusion via SMS and call [7]. In this research, we examine the ICN's potentials as a secure and reliable networking solution for restricted controllers in industrial safety systems[8]. An IoT-connected wearable sensor network system for safety and health applications is presented in this research. Workers' health and safety are crucial for industrial workplaces, thus an IoT network system that can track both physiological and environmental data can significantly increase workplace safety[9].

I. INTERNET OF THINKS

IoT is a system of interconnected computing devices, mechanical and digital machinery, items, animals, or people with the ability to communicate data over a network without the need for human-to-human or human-to-computer interaction.

> **Iot devices:**

An IoT ecosystem is made up of web-enabled smart devices that use embedded processors, sensors, and communication gear to gather, transmit, and act on the data they get from their surroundings. IoT devices

connect to IoT gateways or other edge devices to exchange the sensor data they gather. From there, the data is either transferred to the cloud for analysis or is examined locally.
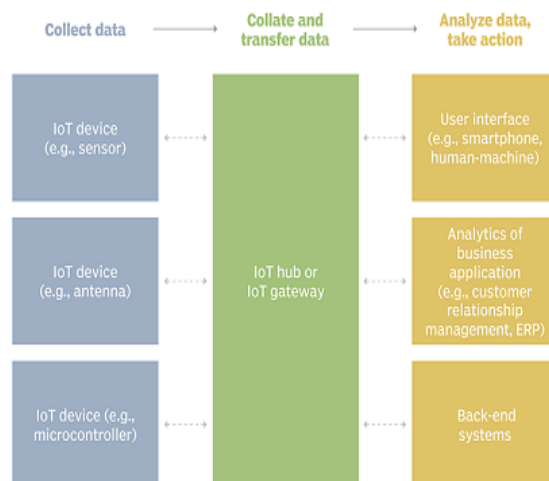

II. IOT security:

Any connected equipment, from refrigerators to factory robots, can be compromised in the absence of IoT security. Once in charge, hackers can takeover the object's functioning and take the user's digital information.

➢ **Iot devices in arduino:**

They might also be sensors that collect and store environmental data digitally. With its extensive selection of peripherals, Arduino is able to join such networks, access or add to the data, and manage the aforementioned devices and sensors. Therefore, Arduino is essential to every IOT network.

➢ **SIM800L module:**

The SIM800L is a compact IoT project-friendly, portable, and inexpensive GSM breakout board that includes all the features of the bigger SIM900 shields.
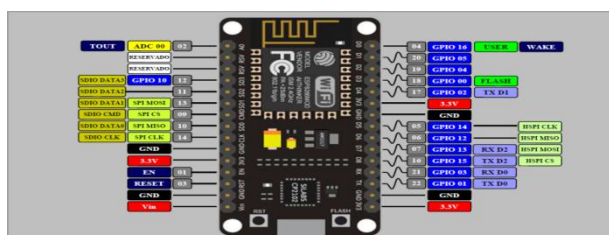

➢ **HC-05 Bluetooth module:**

Unlike the HC-06, which is solely a Slave, the HC-05 may be configured to function as both a Master and a Slave, allowing it to communicate between two Arduino boards or any other devices. The HC-05 typically includes a breakout board for quick connections, and it speaks serially with the Arduino.

➢ **ENC28J60 module:**

A small standalone Ethernet controller called the ENC28J60 has an integrated MAC and PHY, 8 Kbytes of buffer RAM, and a Serial Peripheral Interface.

➢ **NRF24L01 Wireless Transceiver:**

The SPI protocol is used by the NRF24L01 module and Arduino to interact. Only devices having dedicated SPI communication lines can use the module because it functions as an SPI slave.
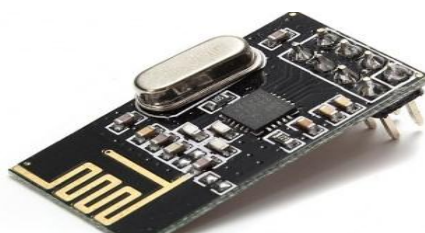
➢ **Dweet:**

IoT device messaging is available through Dweet. It uses a straightforward API to "Dweet" data from your smartphone to the cloud in a manner akin to Twitter. You can show the data on a dashboard once it has been collected.

➢ **Cayenne Devices:**

MyDevices' Cayenne is an IoT platform that enables customers to easily prototype and publish their linked IoT solutions.

➢ **Blynk Devices:**

The IoT platform Blynk allows users of iOS or Android smartphones to remotely operate devices like the Arduino, Raspberry Pi, and NodeMCU. By compiling and providing the required address on the accessible widgets, this application is used to construct a graphical interface or human machine interface (HMI).

III. CONCLUSION

The device will be very efficient in measuring poisonous and combustible gases in industrial settings where workers' lives are constantly in danger. In addition, because it is a cloud-based real-time monitoring system, its use can reduce the chance of fatalities and major injuries. This system is ideal for large industrial facilities where there is a high likelihood that poisonous and flammable gases may be present, increasing the risk of explosions or fire starts. The proposed solution is quite simple and reasonably priced to deploy. There are ways to improve the system and make it more effective through continued research in this area.

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BIOGRAPH

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