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INDUSTRY AUTOMATION BASED ON IOT USING RASPBERRY PI

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ABSTRACT: -

Before, industrial machines were manually operated by humans in various industries. Whenever people fail to turn off the fans, lights, and machinery. Some power losses do happen in those situations. We can create this project in order to protect the industrial power supply. The Internet of Things (IOT) is a technology that has grown and spread in recent years. IOT refers to the collecting of sensor data using an embedded system, which then uploads the data to the internet. IOT and Industrial Automation face a number of difficulties, such as constraints on the automation domain, data and service security, trust, data integrity, and privacy of personal information. In this essay, the ideas of the industrial Raspberry Pi workstation and industrial automation with IOT are combined. The Raspberry Pi serves as both the controller and the server for the system, and Python is used for programming. To operate industrial machinery anywhere and at any time, we use Telegram and a Raspberry Pi.

KEYWORDS: Raspberry Pi, 5V 4 Relay Module, IOT.

1. INTRODUCTION: -

Over the past few years, a wide variety of industrial IOT applications have been developed. The term "Internet of Things" (IOT) refers to the idea that a variety of things and items are present everywhere they go, and that these things and objects may communicate with one another and work together to develop new services and applications as well as accomplish shared objectives. Because the Raspberry-Pi includes general purpose input/output (GPIO) pins right on the board and runs a Linux-based operating system, it may be utilized directly in electronics applications. This project involves using a Raspberry Pi board and an Internet connection to build an industrial automation system in detail.

The automation, which can be partially or fully controlled, keeps track of the sensors attached to the utility grid. This project serves as an example of how to design and construct a multipurpose remotely controlled system that can switch any industrial acuity by connecting to a Raspberry pi, which is programmed to control the systems inside industrial environments, when the person is away from their workstation and allows them to access the relevant information on their phone. The system will give feedback indicating whether it is currently stopped or operating.

2. LITREATURE SURVEY: -

Smart environmental monitoring based on the Internet of Things utilizing a Raspberry Pi computer. Through sensors, it gathers data about the environment around it and immediately uploads it to the internet. The results show that the system can precisely assess temperature, humidity, light intensity.[2]Commercial Automation We're creating a system that automatically monitors industrial applications using the Internet of Things (IOT).

Employing the IOT concept, it has developed robust industrial systems and apps using wireless

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devices, Android, and sensors. It also generates alerts/alarms and makes intelligent judgments.[3] Industrial automation is introduced utilizing Zigbee technology. For short-range communication in wireless industrial automation, Zigbee technology is preferred. The industrial process in the system below uses Zigbee communication to provide remote monitoring of parameters Relays, motors, and other devices can all be controlled by it. [4] Using Arduino, an IOT-based industrial automation control system. In order to run the industrial appliances efficiently, the controller collects data from the industrial environment. Additionally, we can use the internet to monitor and manage industrial appliances.

3.HARDWARE COMPONENTS: -

3.1 RASPBERRY PI:

Raspberry Pi is much more than a modern computer. With a Raspberry Pi you can get into the heart of a computer. A Raspberry Pi allows you to access the brain of a machine. You can connect wires and circuits directly to the pins on your operating system's board and set up your own operating system.

FIG 1: Raspberry Pi 4 Model B

3.2 5V 4 RELAY MODULE:

Up to 4 different devices can each be controlled separately by the 4-channel relay module. The majority of microcontrollers, even an Arduino or Raspberry Pi, cannot tolerate the higher voltage needed by relays, which are commonly used to switch devices. This specific relay module is capable of managing up to 10A of common household appliances.

FIG 2: 5v 4 Relay Module

3.3 T-COBBLER:

Any solderless breadboard will accept the T-Cobbler All of the pins on the T-Cobbler PCB are neatly labelled, allowing you to construct circuits without having to maintain a printout of the pinout nearby. Designed for use with any Raspberry Pi with a 2x20 connection. No soldering is necessary.

FIG 3: T-Cobler

3.4 SD-CARD:

The Secure Digital proprietary non-volatile flash memory card. You have the option to set up either internal storage or portable storage when you set up an SD card on your Android device. On the SD card, can store files like pictures and videos. The SD card can be moved between devices.

FIG 4:SD-card

3.5 JUMPER WIRES:

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Small metal connectors called jumpers are frequently used to open and close circuit components. A circuit board for an electrical system is controlled by two or more connecting points on them. They are in charge of configuring the motherboard and other components of the computer. Think of your motherboard as having an intrusion detection system.

Fig 5: Jumper Wires

3.6 BREAD BOARD:

Temporary circuits are constructed using a breadboard, often known as a plugblock. Designers may quickly remove and change components thanks to its usefulness. It is helpful for someone who wants to construct a circuit to show how it works before reusing the parts in another circuit.

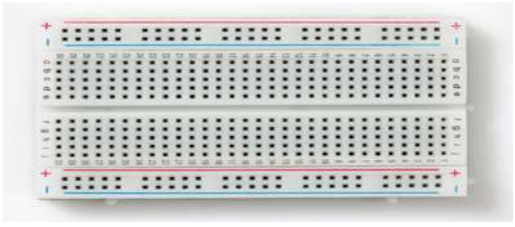

FIG 6: Bread B

4. PROPOSED SYSTEM: -

Our objective is to investigate if industrial automation based on the Raspberry Pi is implementable utilizing IOT. This initiative intends to provide security to the system's industry. With the Raspberry Pi kit, you may manually replace the alarms to get access to high-security systems and buildings. Our goal is to make the system affordable, simple to use, and effective. Industrial workstations powered by Raspberry Pi and industrial automation via IOT are concepts. Python is used for the system's development, and the raspberry pi serves as both the controller and server. Through the internet of things

platform, remote access is available to all the used data**.**

4.1 BLOCK DIAGRAM: -

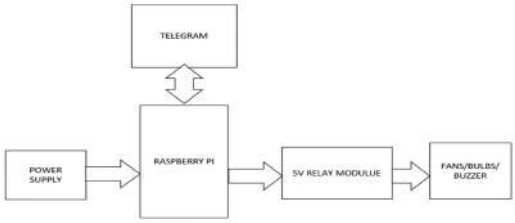

FIG 7: Block Diagram of Proposed System

In this project, we use the Telegram app to manually operate mobile industrial equipment from any location. The Raspberry Pi is provided with a power source. Wi-Fi will be used to turn on and connect the raspberry pi. Relay module and Raspberry Pi are connected, and the relay is connected to lights and fans. We can control the relay by utilizing the Telegram app. We can conserve energy and control the machines anywhere, anytime by using this project.

4.2 ADVANTAGES:

- Greater physical protection
- Instantaneous data access
- Enhanced data collection

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5. SOFTWARE IMPLEMENTATION: -

- **5.1. PYTHON:**

Python is an interpreted, general-purpose programming language. Guido van Rossum created Python, which was first made accessible in 1991. Its design philosophy makes excellent use of significant whitespace and lays a heavy emphasis on code readability. Its object-oriented methodology and language elements are made to help programmers write clear, understandable code for both small and large projects. Python has dynamic typing and garbage collection. Functional, object-oriented, and structured (particularly procedural) programming paradigms are among the ones it supports. Python is commonly referred to as a "batteries included" language because of its vast standard library.

6. RESULT: -

FIG 8:Output and Result

CONCLUSION: -

We comprehend the raspberry pi system overview. We are aware of the most recent developments in IoT and industrial automation. The writers also cover a variety of IoT and industrial automation constraints difficulties. The writers also cover how to approach this problem. The authors also conduct an analysis of the industrial market from an IoT standpoint. A interesting comparison by the author explains the benefits of using the Raspberry Pi in industrial projects. Due to its compact size and low power consumption, the Raspberry Pi is capable of processing large amounts of data. Energy is wasted significantly in workplaces and in industries because employees often conceal the installed system's true status be the middle industry hierarchy.By giving the owner or other top-level hierarchy members enough information remotely so they can make the right decision, this technology tries to reduce energy waste.

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