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Smoke Detection Using Iot With Whatsapp Integration

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Abstract: The Internet of Things (IoT) serves as a vital bridge between the physical world and computer-based systems, allowing for the integration of existing networks. Its foundation lies in extending the capabilities of the Internet to incorporate physical objects, enabling them to provide smarter and more efficient services. As the demand for accessible data continues to grow, IoT facilitates the seamless exchange of information between devices, creating a more interconnected and responsive environment. An exemplary application of IoT is the implementation of a real-time fire alarm system. This system operates by continuously monitoring the presence of smoke, triggering an alert when the predefined threshold is exceeded. Upon detection, the smoke sensor initiates a warning to indicate the potential fire hazard, simultaneously activating a buzzer to alert occupants. Furthermore, the system is designed to send a notification, ensuring timely communication and necessary actions. Leveraging the capabilities of IoT, this FIRE DETECTION system has been successfully integrated into Home Automation using Arduino Uno, underscoring the power of interconnected technologies in enhancing safety and security measures.

Index Terms **- Component, formatting, style, styling, insert.**

1.INTRODUCTION

The network of physical things integrated with sensors, software, and connections that enable them to gather and share data via the internet is known as the Internet of Things (IoT). These objects can be commonplace things, cars, or industrial machinery that can communicate and interact with humans and other objects. This can result in increased convenience, efficiency, and insights across a range of areas.

APPLICATIONS OF IoT

IoT (Internet of Things) technology has various applications, including smart home automation, industrial IoT, healthcare, smart cities, agriculture, transportation, energy management, retail, environmental monitoring, wearable technology, home security, and smart appliances. IoT devices can be controlled remotely through smartphones or voice commands, learn user preferences, and adjust settings accordingly. Industrial IoT monitors equipment health, inventory, and supply chains, while healthcare uses wearable devices to monitor vital signs and provide real-time health data. Smart cities improve urban living through smart traffic management, waste management, and energy-efficient street lighting. IoT devices also help farmers optimize crop yields, improve transportation, and track environmental parameters. Wearable technology includes smart clothing, accessories, and augmented reality glasses. Home security systems offer remote monitoring and control of cameras, alarms, and access control systems. Smart appliances can adapt to user preferences and usage patterns.

WORKING OF IoT SYSTEM

IoT systems consist of four components: sensors/devices, connectivity, data processing, and a user interface. Sensors/devices collect data from their environment, which can be simple or complex. Data is then sent to the cloud through various methods, such as cellular, satellite, Wi-Fi, Bluetooth, low-power wide-area networks (LPWAN), gateway/router, or Ethernet. Each option has tradeoffs between power consumption, range, and bandwidth.

Data processing occurs when the data gets to the cloud, and software performs processing on it. This can be simple or complex, such as identifying objects or intruders. The user interface then makes the information useful to the end-user, either through an alert or a proactive checking in on the system. Users can also perform actions and affect the system, such as remotely adjusting temperature or notifying security teams or authorities. The IoT system's efficiency is significantly improved by eliminating redundant, duplicate, or irrelevant observations.

2. LITERATURE REVIEW

To get to know about the functioning of the smoke detector, and to know about the minimal tools used in making it, this is the best one. The things and materials that are used within it are completely safe and affordable. Their usage can be easily understood. In order to check the level of the smoke and to send a message regarding the fire accident to the nearest fire station if the smoke level is up to the mark, we use this Smoke detector. It also warns the people with an alarm which indicates the high smoke level. This detector might save numerous fire accidents within a few minutes by sending a notice to the nearest fire station immediately.

The objective of the project is to solve the problems such as,

- Immediate detection of high-level smoke.
- Sending the current status to the contacts through WhatsApp.
- Saving people from fire accidents.

Gharge and Birla (2014) present a system which can efficiently detect fire after the image of the area has been captured by a camera. Fire has destructive properties which cannot be tolerated in any work areas. Fire is the rapid oxidation of a material in the exothermic chemical process of combustion, releasing heat and light. The light parameter and color of flame helps in detecting fire. The system first detects smoke and then fire. When smoke is present in the area it displays a message on the Security terminal. When a fire breaks out in the area under consideration, the corresponding fire region in the input video frame will be segmented which covers the fire. If the area of the flame increases in the subsequent frames, then an alarm is sounded.[1] Petar & Aleksandra (made a system for detecting carbon monoxide, particles of smoke and combustible gases is described in this paper. Detector is based on application of Arduino platform with MQ-2 sensor as a source of input signal. The gas sensor functioning principles and detector configuration are explained in detail. The described detector could be successfully used for various gas leakage detection, alone, or as a part of a more complex system. The experimental results are given for burning paper smoke and three types of combustible gases. They confirm good performance of the system.[2]

EXISTING SYSTEM

There is an already existing system which belongs to the same sector. But there is a slight upgrade within the introduced system which makes the existing one different from the introduced one.

Disadvantages of Existing system

- Stops its functioning after the alarm or buzzer is turned on.
- Cannot initiate the automation of informing people on WhatsApp.
- Will not calculate or intimate the level of smoke (gases) in the air after fire accident.

3. PROPOSED SYSTEM

Recommender systems are software that automatically turns on a buzzer as soon as the smoke turns on. Recommender systems are tools that interact with complex and large information spaces. They prioritize the immediate detection of the smoke. Recommendations are part of applications such as Fire extinguisher, etc. These recommendation-based systems have been missing till date.

The proposed system is distinctive in such a way that not only a turning the buzzer but also intimates all the members of the building through WhatsApp by calculating the level of smoke in the air. This is one of the best approaches that can save many lives irrespective of the amount of smoke that occurs. As soon as the level of the smoke reaches to an extent where an average of people cannot survive will be detected and informs the

all the people of the apartment through WhatsApp explaining that there is a fire accident happening in the specified place.

Benefits:

- Immediate actions will be taken.
- Initiates an automation of informing everyone.
- Cheap and affordable.
- Calculates the level of the smoke present in the air and detects the maximum level.

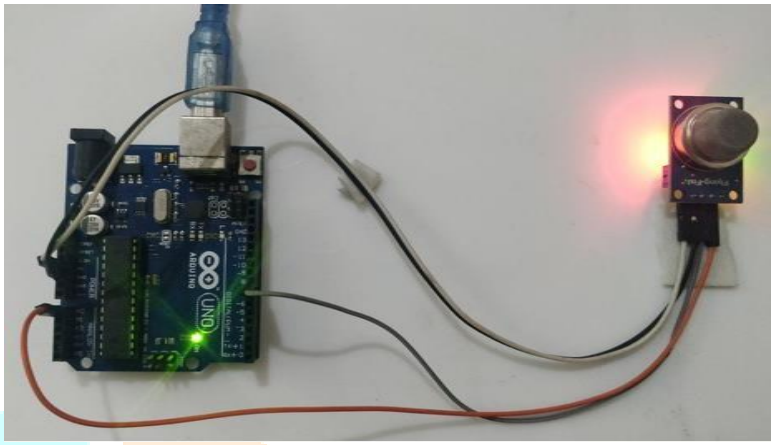

Figure 3.1: Arduino Board with MQ – 2 Sensor

4. RESULTS & DISCUSSION

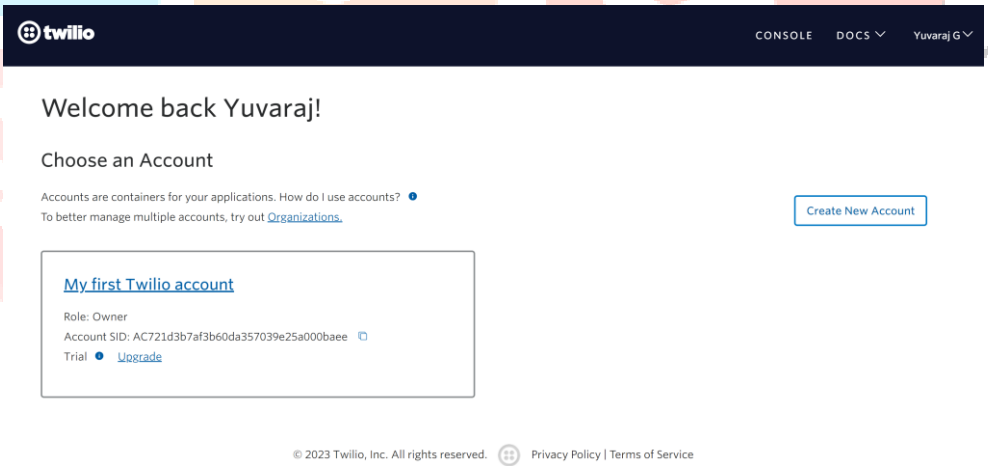

Figure 4.1: Twilio Interface

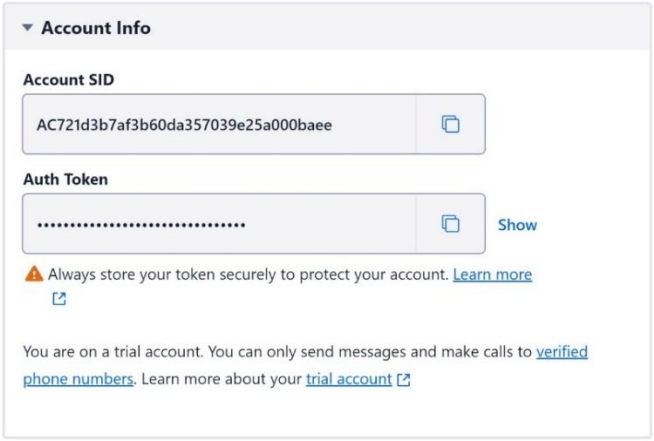

Figure 4.2: Twilio Authentication

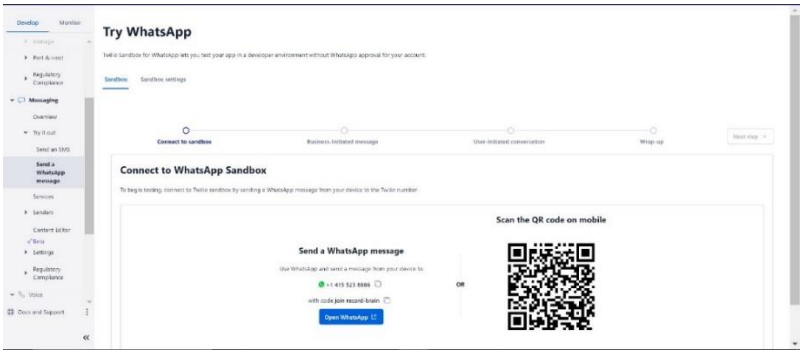

Figure 4.3: Twilio Connection with WhatsApp

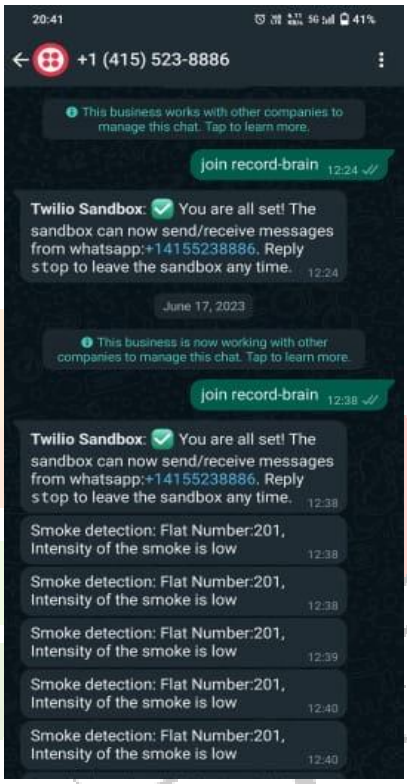

Figure 4.4 & 4.5: Response from Twilio through WhatsApp

To enable Twilio to send messages when smoke is detected, you first need to create a Twilio account and acquire your Account SID and Auth Token. After obtaining these credentials, you'll need to go to the Twilio console, navigate to the development dropdown, and select 'Messaging'. Choose the option to 'Send a WhatsApp Message'. This will prompt you to scan a QR code, which will direct you to the WhatsApp chat conversation. In this chat, you should send a message to your Twilio number, such as 'join record-brain'. By completing these steps, you'll establish the necessary connection between your Twilio account and WhatsApp, allowing Twilio to send messages when triggered by your smoke detection system.

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