

Smart and Secure Industrial Automation

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Abstract— At present, specific voice control has gradually become an important means for 5G-IoT-aided industrial control systems, such as controlling the operation and adjustment of IOT equipment through telephone voice of the controller. However, the security of specific voice control system needs to be improved, because the voice cloning technology based on transfer learning can easily simulate the voice of the controller, which may lead to industrial accidents and other potential security risks. The microcontroller used is ESP32 Microcontroller (ESP32) and the communication between the microcontroller and the application is established via Wi-Fi (Internet). Passcode system is implemented to operate the load.

Keywords—Temperature sensor, Speed sensor, LCD display, Relay, Microcontroller, DC Motor.

I. INTRODUCTION

Voice control has gradually become an important means to industrial control systems in 5G. For example, the core of industrial automation control is the closed-loop control system which requires the communication delay between systems should be at millisecond level, so as to ensure the timely data transmission in the production process and achieve the effect of accurate control. 5G technology enables the closed loop control system to achieve the timely data transmission in the production process and realize accurate control. It has also stimulated to apply some new technologies in closed loop control domain, such as voice control and computer vision-based control. Voice control technology can realize remote smart control for industrial equipment's. However, the security of specific voice control system needs to be improved, because the voice cloning technology based on deep learning can simulate the voice of the controller.

II. LITERATURE SURVEY

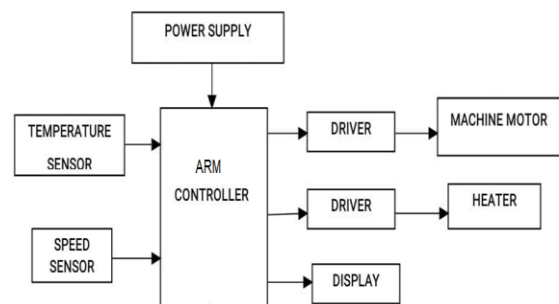
2.1 "Voice transfer attacking on Industrial voice control system in 5G - Aided IIOT domain" by Eric Ke Wang, Xi Liu. Therefore, this paper is mainly to study and

understand the principle of voice cloning attack technology, put forward voice clone attack method, in order to prepare for the construction of specific voice recognition system in the future.

2.2 "Through-Wall Remote Human Voice Recognition using Doppler Radar with transfer Learning" by Khanna.R, Oh D, Kim Y. This research, we could successfully capture echo signals using the Doppler radar when a human subject spoke seven musical notes from Do to Ti and alphabet letters from A to Z. Spectrogram analysis was conducted for classification purposes, and the deep convolutional neural networks employed could classify the 26 letters to an accuracy of 94%.

2.3 "Voice print Identification for limited dataset Using the deep Migration Hybrid Model based on transfer learning" by Cunwei S, Yuxin Y. A new method using a deep migration hybrid model is put forward, which makes it easier to realize voiceprint recognition for small samples.

III. EXISTING SYSTEM

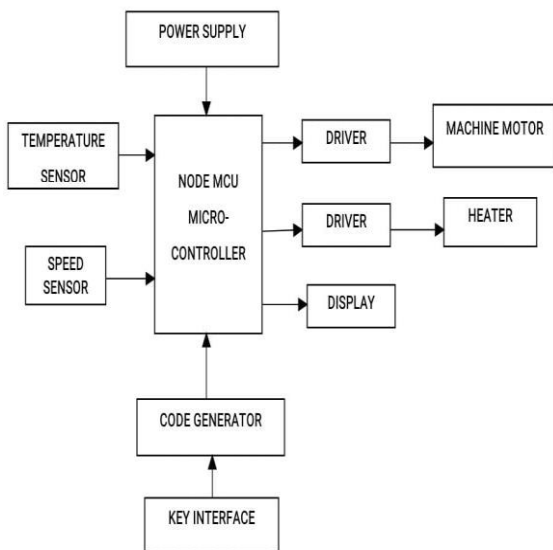


Current monitoring solutions include wired sensors and wired equipment, methods that present the disadvantage of expensive initial installation, and the need of periodic maintenance of the system. Due to this, companies and factories rarely implement condition monitoring systems. The hackers can attack the giant manufacturing industries. With the hacking they will make the huge motors and load can be made on/off repeatedly. So there may be a cause of motor damage as early as possible.

IV. PROPOSED SYSTEM

This proposed work is aim to control the device control using ESP8266. The voice control is done through by the Google voice assistant is connect with this IOT module. Apart from voice control a secret code will be given to all the loads. The kit should be connected with the internet, so that we can control the loads securely from anywhere.ESP8266 controller controls the overall process of the proposed system.

4.1 BLOCK DIAGRAM



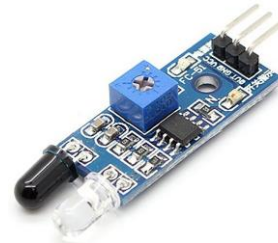
A. Temperature sensor

This is the sensor which is used to measure the ambient air temperature inside the mine. This sensor was built from rst principles using a load balanced thermistor circuit. This circuit acts as a voltage divider between the thermistor and the applied resistor (load). A thermistor is a temperature dependent variable resistor. Although all resistors are sensitive to temperature changes, thermistors are especially sensitive to temperature due to the material it is constructed from. This material has a specific resistivity.



B. IR Sensor

In our project IR sensor is used for sensing the speed of load. An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor.



C. NodeMCU Microcontroller

The Node MCU (Node Microcontroller Unit) is an open source software and hardware development environment that is built around a very inexpensive System-on-a-Chip (SOC) called the ESP8266. The prototyping hardware typically used is a circuit board functioning as a dual in-line package (DIP) which integrates a USB controller with a smaller surface-mounted board containing the MCU and antenna.



D. Relay Driver

A relay driver circuit is a circuit which can drive or operate a relay so that it can function appropriately in a circuit. The driven relay can then operate as a switch in the circuit which can open or close according to the needs of the circuit and its operation.



V. CONCLUSION

The result was positive and the system responded well. The diagram below shows the complete prototype implementation of the proposed system. 5V/1A Output, Mobile Chargers were used to power the ESP32 and the Relay Board. The aim of this project was to propose a cost effective voice controlled (Google Assistant) Industrial automation controlling general appliances found in one's Industrial. The approach discussed in the paper was successful as GACHA's (Google Assistant Controlled Industrial Automation) and the password based design was successfully implemented.

VI. References

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