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Smart Work Assisting Gloves

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ABSTRACT

No one wants to get hurt, but sometimes in industries workers neglect best safety practices because it takes extra time and effort, a little extra time is always worth it to avoid any injury Hence this paper describes a smart device in the form of gloves that has IoT devices which connects to any type of machinery and permits access based on whether proper safety equipment has been worn.

Keywords: *Internet of Things, Industrial revolution, Tone*

I. INTRODUCTION

As we know after Industrial revolution many industries with big machineries came into existence .Everyday millions of people work on life threatening machineries. Recent reports say 250 million people are set to join India's workforce by 2030[1].As a big chunk of population shifts to the working age group, organizations need to look at the safety and health of the workers on priority to ensure the good productivity. This paper describes about a smart device which connects to any machine and permits access based on whether proper safety equipment has been used. If a worker tries to use the machine in bare hands without using any safety measures the machine will not work thereby forces the worker to use safety measures before operating on the machine and it even enables machine to machine connections which also restrict the access to the tools which are being used actively and it has the capability to analyse the tone of the worker so that whenever a worker gets hurt and shouts in pain it directly sends message to the medical assistance group. It also contains stress detector in order to check the employee's mental health condition too.

II. RELATED WORK

Through research on various online articles and papers it is evident that many workers get injured or even lose their lives because of lack of experience, fatigue due to long hours of working

2.1 The paper "A study on electrical accident and safety measures" by Rolgaroy, AswathyVijayakumar, Rakhi R Nair states" new workers have a high risk for work related injury compared with more experienced workers. Electricity is so familiar a force, your employees may think they know all its mysteries. Not so-and what they don't know can kill them."

2.2 Michael Trufant in his article "The dangers of workplace fatigue" says that "Fatigue is caused by both mental and physical factors, such as talking to people, lifting heavy objects, operating machinery or tools and performing tasks to require prolonged focus. If the workers are drowsy they often cannot focus and fall behind on project or just don't have energy to pay attention to safety regulations so workplace accidents and even deaths occur as a result."

III. PROPOSED WORK

The wearable can be included in any type of protective gear. A screen on the wearable and physical buttons allows the worker to select which machine he wants to work with. This data and the data from sensors on the protective gear allows the Arduino to make decisions. A self-built capacitive sensor placed on the gear allows us to monitor if it is worn or not. The wearable is provided on one piece of protective gear. Any additional pieces of protective gear required to be worn for a specific machine will have just the capacitive sensor. Simultaneously, all the machines in the factory also have various sensors including temperature, pressure,

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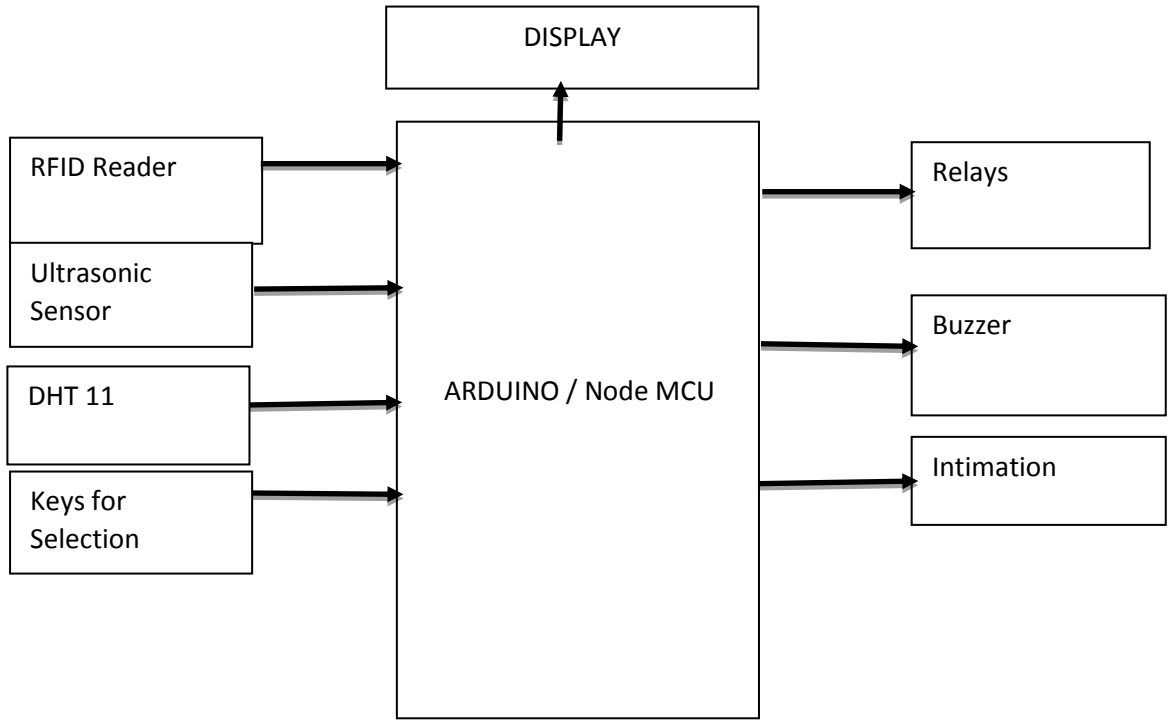
humidity etc, which will also regularly send data to the broker. This data can be used by the company for analysis and can be used by the company to improve the efficiency of its factory- floor. Depending on the availability of the required machines, the broker publishes this information to the wearable. If all the required conditions are met, the broker authorizes the microcontroller inside the machine to turn on the device.

This way, the system ensures that the person working with the machine has the proper equipment on. Additionally, the machines have RFID readers placed in them. We will use these and RFID stickers to ensure that no tool is running while unattended. This is an extra dimension of security that will ensure safety in the workplace.

3.1Block diagram



NodeMCU is microcontroller Unit based on the 12E version of the Esp-8266. It has an extended number of GPIO pins and features an on-board digital-analog converter (DAC) so that it can read analog sensor values. Unlike the 01 version of the ESP board, the NodeMCU can run at a higher processing frequency, and support multiple modules and sensor integration. In S.W.A.G, each microcontroller unit is connected to the broker, but it is also connected to multiple sensors and switches that can control the system.ESP8266 is a low powered microcontroller developed by Espressif System, which specializes in building low power communication devices such as the Bluetooth and WiFi chipsets. It is a very low powered device, which has an in-built wifi chip, which is beneficial to get connected to the LAN. The 01 version of this microcontroller has only 2 usable GPIO pins on board and it can be used to create standalone sensor-transmitter pairs.

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IV. HARDWARE AND SOFTWARE REQUIREMENTS

Table 4.1

HARDWARE REQUIREMENT	SOFTWAREREQUIREMENT
1. Arduino Uno / Node MCU 2. RFID Reader 3. RFID Tags 4. Alphanumeric Display 5. Buzzer 6. Fire Sensor 7. Ultrasonic Sensor	1. Arduino Suite 2. Embedded C

V. CONCLUSION

There is a large market for a product like this. Companies are looking for ways to ensure a greater sense of security at their factories. A safe, cheap alternate is exactly what they are looking for. However, the manufacturing industry is not the only place of use for Smart Work-Assisting Gear. Anyone who uses any type of power tool that requires protective gear to be worn can use this product. Thus, this product is aimed at large industries as well as the everyday consumer. Being fairly simple to use and cost-effective, it is ensured that its adoption rate is high.

Smart Work-Assisting Gear is an innovative product that will definitely revolutionize safety at the workplace. By using technologies like the Internet of Things, data analytics and RFID, we have ensured that the product will improve the standard of the factory-floor.

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