Fire Alarm System with Siren and Water Head Sprinkler using Arduino

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Abstract
Fire risks have long been a significant issue. Thousands of people perish each year as a result offire hazards, not to mention the destruction of property, long-term health problems, and decline in quality of life for the survivors. Small businesses and private homes continue to be particularly vulnerable to fire-related fatalities and significant property damage, despite the fact that large scale industries and buildings have implemented measures like highly effective and sophisticated alarm systems and smoke detectors to warn people of fires. Security is become a crucial requirement. Everyone looks for a practical and efficient solution to safeguard their belongings. This project is a prototype design that demonstrates the two traits listed above. The product is ideal for small-scale business.

Comprises of a high-performance fire detector that is made from widely available components. When a fire is detected, a siren will sound, and water sprinklers will start working to put it out and cause as little damage to your project as possible. It gives information on the water head sprinkler-equipped smart fire detection system. The creation of a security system that will alert people in case of a fire emergency is the main goal of this project. Numerous lives are saved by fire detection systems, which significantly reduce property losses. We utilized an Arduino Uno R3 and a power supply for our project. Additionally, we deployed buzzers to warn the public about the fire.

I. INTRODUCTION

In generally companies, homes, warehouses and malls suddenly fire accidents occurs. Fire will damage more property within span of period. We have fire engines to stop fire accidents but it will take some time to call fire station and their travelling so it is a time taking process. During this hard time fire may damage any property and it also cause severe injuries to human lives.

Now we are introducing Fire detection system with water sprinkler. This system will detect the fire and it will stop with in span of period. A system is a set up where all of its components cooperate in accordance with a set of rules. It can also be described as a method of carrying out one or more tasks in accordance with a predetermined schedule. A watch is one example of a device that

displays the time. To display time, its elements adhere to a set of principles. The watch won't function if one of its components breaks down.

Embedded refers to something that is joined to another thing, as its name would imply. A computer hardware system with software embedded in it is an example of an embedded system. An embedded system may be a standalone unit or a component of a larger system. A system built on a microcontroller or microprocessor and intended to carry out a certain function is called an embedded system. A fire alarm, for instance, is an embedded device that only detects smoke. The proposed system is Smart fire alarm system with water head sprinkler. In this system consist of 3 modules i.e., Fire detection module, alarm and water sprinkler module & water restore module. Fire detection module will detect fire, when fire exist automatically alarm and water sprinkler module will alert the people and it will spry water in surrounding areas. If water level decrease in water tank automatically sensor will detect water quantity and activate underground water motor this operation done in water restore module.
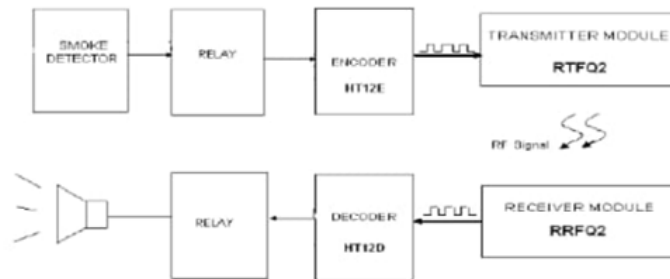
Figure-1: Block Diagram of Human Assistant Robot

Proposed method
(i) Flowchart
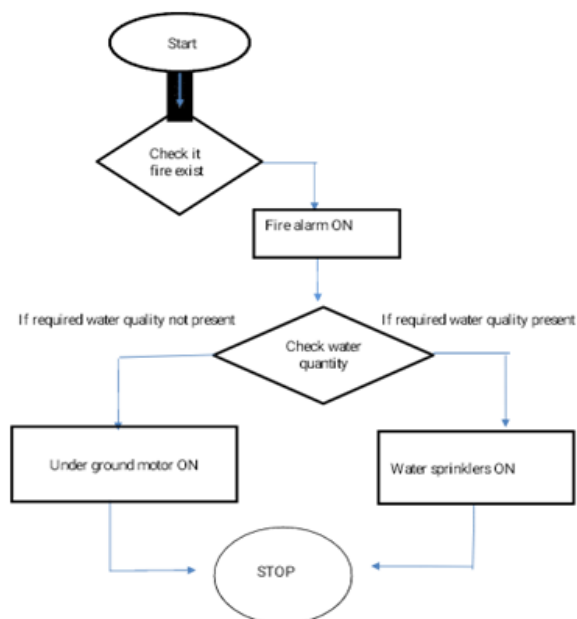
Figure-2: Flow Chart of the Fire Alarm System

(ii) Algorithm

Step 1: Collect the required components

  Arduino UNO

- Relay
- Moisture Sensor
- Water Filling Pump
- Ultrasonic Sensor
- Batteries
- Buzzer

Step 2: Interconnect the all components.

Step 3: Power ON the Supply.

Step 4: If any fire accident is occurred in the nearest areas.

Step 5: The panel 1 is activated, if the water in the tank flows to the fire accident area to stop the fire.

Step 6: In case, the water does not in the tank, the panel 2 is activated to take the Underground water to flows to the firing areas

  and to stop the fire.

A fire alarm system consists of parts that work together to detect smoke, fire, or other risks and to alert people through visual and audible means. Additionally, it has the ability to regulate all local fire alarm systems and alert the fire department. Today, we perceive it in such manner.However, fire alarm systems have been around for a very long time and not just recently. The first fire alarm system was created in 1852 by Dr. William F. Channing and Moses Farmer, according to the website of Life Safety Consultants. Two fire alarm boxes with a handle and telegraphic key each made up the system.

We utilized an Arduino Uno R3 and power supply for this project. To warn the public about a fire, we also employed buzzers.For water sprinklers, we used a 5v relay and a DC water pump. The relay is connected to the pump, which will draw water from the water source and extinguish the fire through the sprinkler head.

Results or Findings

Figure I contains the Fire Alarm Detecting System is monitored by using Arduino UNO and Arduino IDE is used as the programming software tool. Additionally, it has a bell and a water pump that are turned on when the moisture sensor detects a fire.
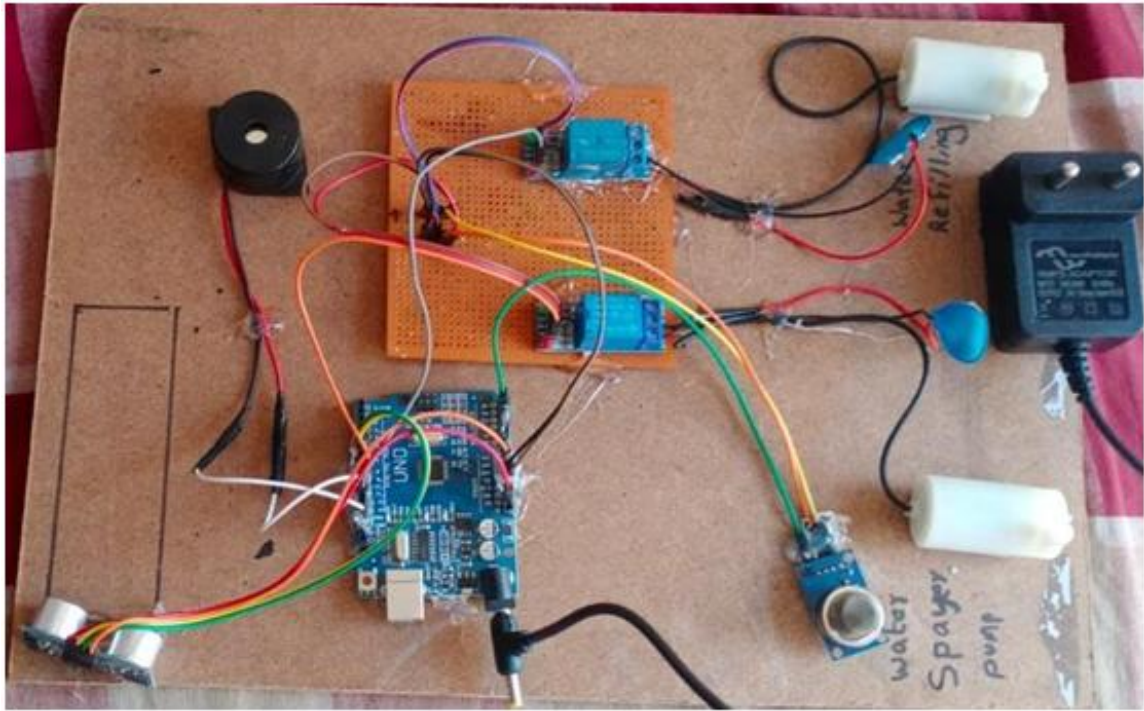
[I] Fire Alarm Detecting System Setup

Figure II illustrated the fire alarm monitoring and detecting system and installation of the fire alarm detecting system setup at the required areas and places.
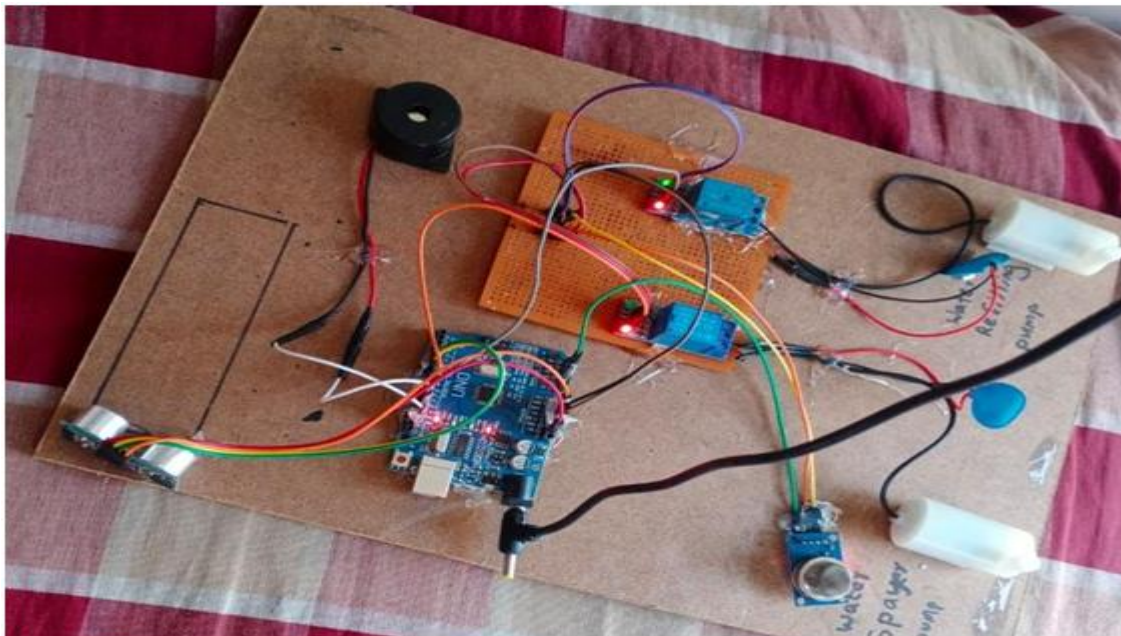
[II] Installation of Fire Alarm Detecting System

Figure III Illustrates that the fire is detecting by the moisture sensor when the fire is catch up in the certain areas and places.
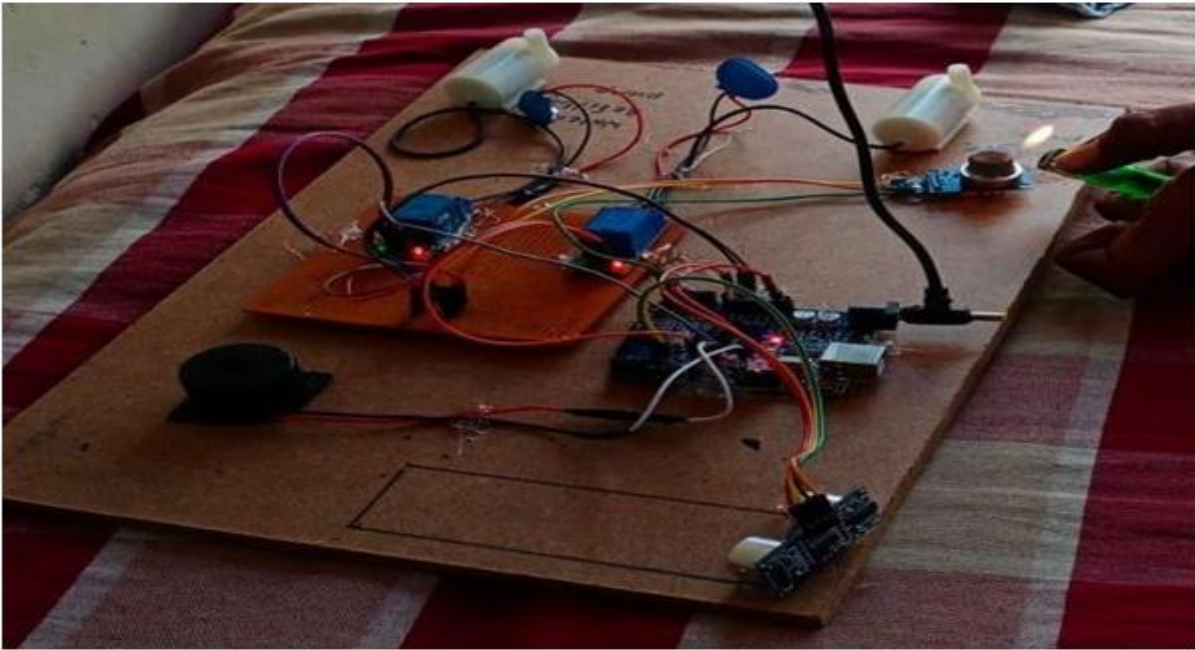
[III] Moisture Sensor detecting the fire

Figure IV shows that the water pump and buzzer activated when the fire is detected and after that the water head sprinkler is activated to cool down the fire which is catch up in the certain surroundings.

[IV] Water Head Sprinkler and Buzzer is activated when fire is detected

II CONCLUSION

This project certain control strategies and constructed and modelled a personal assistant robot as a daily aide. The proposed design is to develop fire detection and alarm system with water sprinkler feature. Here detecting fire and alerting peoples and also preventing fire accidents through water sprinklers. By using this project we can save the peoples and prevent the infrastructure damages. Since they have a very high efficiency and can be utilized for security purposes, electronic circuits can therefore be constructed for fire-based alarms. Installation and upkeep of fire detection systems in all rooms and parts of the home or building are the best ways to achieve early fire detection. The fire alarm system will raise the alarm in this project if there is an urgent threat to life, property, or the mission, alerting inhabitants to leave and informing authorities that they must act.

When lighting levels fall below acceptable levels, smoke detectors are devices built and intended to sound an alarm using voice signals. They are necessary in public spaces, especially those where fire incidents are more prone to occur, such kitchens, where they are designed to warn people if there is a threat of fire.

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