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Fire Fighting and Health Check-up Robot

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ABSTRACT

Fire assumes a significant job in mortal life still alongside that it's dangerous too. Fire circumstance is a catastrophe that can beget the loss of mortal life, property detriment, and lasting incapacity to the told casualty. Firemen are principally entrusted to deal with the fire circumstance, yet regularly they presented to the advanced troubles when quenching fire particularly in dangerous conditions, for illustration, in atomic force plant, oil painting oil treatment installations, and gas tanks. With the development in the field of robotics, mortal intrusion has come less and robots are being considerably used for safety purpose. In our day- to- day lives, fire accidents have come common and sometimes may lead to hazards that make it hard for the firemen to cover mortal life. In analogous cases, a firefighting robot is used to guard mortal lives, wealth and surroundings from the fire accidents. also, we apply two modes of robotic operations-Automatic mode & Homemade mode. In Automatic mode, the robot takes controls by itself grounded on the stoner predefined command. In Homemade mode, the robot can be controlled by the stoner. therefore, this paper presents the advancement of putting out fires using Robots that can quench the fire without the demand for firemen.

INTRODUCTION

The design that's being presented is concentrated on a firefighting robot. Robots are able of performing tasks in a more effective, cost-effective, and accurate manner than humans. In the absence of modern hardware and machines, firefighters need to risk their lives to save others' lives in a hazardous situation caused by fire. The firefighting robot is programmed to checkup for and extinguish fires in affected areas. A wireless robot can conduct successful work, allowing the robot to be operated from a distance. As a result of a fire outbreak (or) fire explosion, we're demanding that we use mortal coffers that aren't secure to put out the fire. Its veritably Robots are designed to remove the human factor from Its veritably

Robots are designed to remove the human factor from dangerous work and to act in inaccessible environment. The use of robots is more common today . Our task is to design and build a prototype system that could autonomously detect and manually extinguish a fire .This strategy would free firefighters from dangerous tasks, and being jeopardized.

LITERATURE REVIEW

A literature review on fire-fighting and health-checkup robots can provide an overview of the existing research, technologies, and advancements in these fields. Research has focused on developing robots equipped with advanced sensors and algorithms for autonomous navigation within complex environments. Cameras, and infrared sensors have been employed for mapping and localization during firefighting operations. Integration of heat and smoke sensors for early fire detection. Development of robotic arms and water/foam spraying mechanisms for effective fire suppression. Studies on improving coordination between human firefighters and robots for enhanced efficiency and safety.

Communication interfaces and shared decision-making processes are crucial aspects. Exploration of robotic capabilities in locating and rescuing individuals in hazardous environments. Use of drones for aerial surveillance and situational awareness. Research into wearable robotic exoskeletons to enhance the physical capabilities of human firefighters. Focus on reducing fatigue and improving overall performance during emergency response. Integration of sensors for vital signs monitoring (heart rate, blood pressure, temperature). Development of telepresence robots enabling health-care professionals to remotely assess patients. Implementation of artificial intelligence for preliminary diagnosis based on collected health data. Use of robotics in sample collection for diagnostic testing.

EXISTING SYSTEM

Existing fire fighting robots typically consist of remote-controlled or autonomous vehicles equipped with firefighting capabilities. These robots may have features such as: Remote Control: Many fire fighting robots are remotely operated by firefighters to navigate through hazardous environments. Fire Suppression Systems: These robots are equipped with firefighting tools such as water cannons, foam sprayers, or fire extinguishers to suppress flames. Sensors: They may be equipped with sensors to detect heat, smoke, or gases, allowing them to identify and navigate through fire-affected areas. Cameras: Cameras mounted on the robot provide visual feedback to firefighters, helping them

assess the situation and plan their strategy.Mobility: Fire fighting robots are often designed to traverse rough terrain, climb stairs, or navigate through narrow spaces to reach inaccessible areas.

DISADVANTAGE

- Large in size.
- High cost.
- Accuracy level is very Low.
- Efficiency is very low.

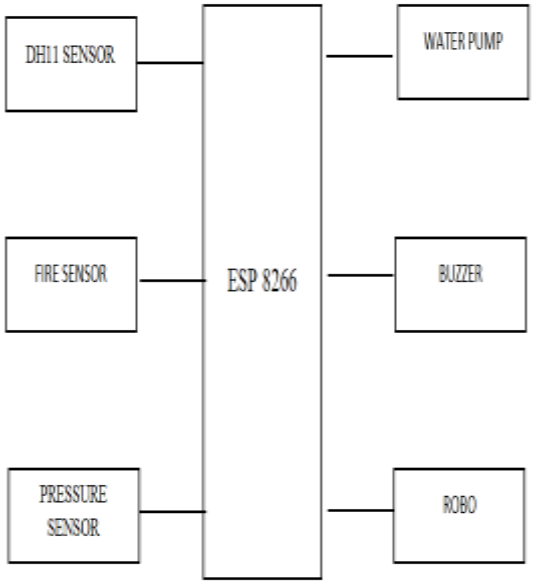
PROPOSED SYSTEM

Integration of advanced sensors (LiDAR, cameras, infrared) for real-time mapping and navigation in complex environments. Path planning algorithms to navigate through obstacles and find optimal routes during firefighting operations. Utilization of heat and smoke sensors for early fire detection. Communication interfaces for seamless interaction between human firefighters and robots. Shared decision-making processes to enhance coordination during emergency response. Integration of drones for aerial surveillance and situational awareness. Robotics systems designed for locating and rescuing individuals in hazardous environments. Regular user feedback and iterative design processes for continuous improvement.

ADVANTAGES:

- Fire Fighting Robot: Improves well being by limiting dangers to human firemen in unsafe conditions.
- Health Checkup Robot: Expands availability to medical care administrations, especially in remote or underserved regions.

BLOCK DIAGRAM



HARDWARE REQUIRED

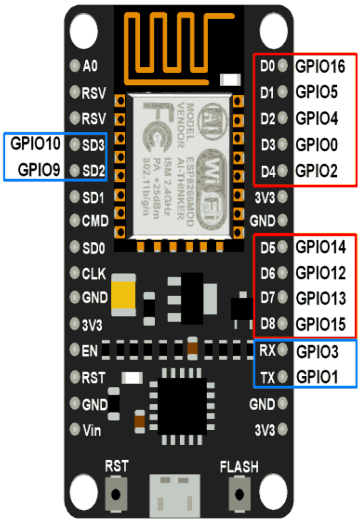
- ESP 8266
- DH 11
- Fire sensor
- Pressure sensor
- Robo
- water pump
- Buzzer

SOFTWARE REQUIRED

- Arduino ide

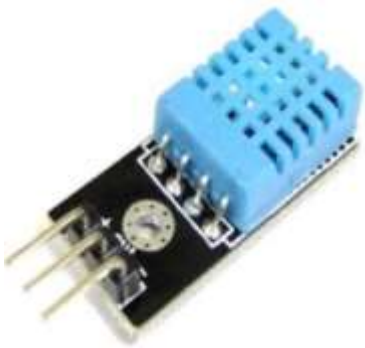
HARDWARE DESCRIPTION

ESP 8266



General-purpose input/output (GPIO) is a pin on an IC (Integrated Circuit). It can be either input pin or output pin, whose behaviour can be controlled at the run time.

DH11 SENSOR



It seems like there might be a typo in your query, and you're likely referring to the DHT11 sensor. The DHT11 is a low-cost digital temperature and humidity sensor commonly used in DIY electronics projects and applications.

FIRE SENSOR

Fire sensors, also known as flame sensors or fire detectors, are devices designed to detect the presence of fire or flames. They play a critical role in fire prevention and safety systems, providing early warning to help mitigate potential damage. Different types of fire sensors employ various technologies to detect flames, smoke, or elevated temperatures. Below are details about some common types of fire sensors.

PRESSURE SENSOR

A pressure sensor is a device that measures the force applied on a surface per unit area and converts it into an electrical signal.

These sensors are widely used in various applications across industries, including automotive, medical, industrial, and environmental monitoring. The key details about pressure sensors include the types, working principles, applications, and considerations:

ROBOT

The term "robot" refers to a mechanical or virtual device that is designed to perform tasks autonomously or semi-autonomously. Robots can come in various forms and are equipped with sensors, actuators, and control systems that allow them to interact with their environment and execute predefined actions. Here are some key aspects and types of robots.

WATER PUMP

A water pump is a mechanical device designed to move water or other liquids from one place to another. It is commonly used in various applications, including residential, commercial, agricultural, and industrial settings.

BUZZER

A buzzer or beeper is an audio signalling device, which may be mechanical, electro mechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke

SOFTWARE DESCRIPTION

ARDUINO IDE

Arduino Software (IDE) Arduino is an open source, computer hardware and software

company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. Arduino boards are available commercially in preassembled form, or as do-it-yourself kits. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project. The Arduino project provides the Arduino integrated development environment (IDE), which is a cross- platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting, and provides simple one-click mechanisms to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus.

CONCLUSION

We've enforced an automatic Fire Fighting Robot using detectors and wireless communication. Fire causes tremendous damage and loss of mortal life and property. It is occasionally insolvable for the fire fighter labor force to pierce the sight of fire because of explosive accoutrements , bank and high temperature. Through this we can conclude that robot can be placed where mortal lives are at threat. The robot can operate in the terrain which is out of mortal reach in veritably short time. In similar surroundings, Fire Fighting robots can be useful for extinguishing fire. The robot directly and efficiently finds the fire within minimal time after the fire is detected. This design presents the design and the perpetration of a firefighting robot that moves towards the fire and pump out water to extinguish the fire.

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