Solar Powered Automatic Fire Fighting Robot

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Abstract: **The main goal of this project isto design a firefighting robot by using remote operation. This robot is loaded with a water tanker and a pump controlled through wireless communication to sprinkle water. For the desired operation, an PIC microcontroller is used. At the transmitter end, push buttons are used to send commands to the receiver end to control the robotic movement, either in forward, backward, right or left direction. The remote control that has the benefit of adequate range up to 100 meters with apposite antenna, while the decoder decode before feeding it to another microcontroller to drive DC motors via motor driver IC for necessary work.**

INTRODUCTION:

In this system the environment can monitor by the Remote communication .The main goal of this project is to design a firefighting robot by using remote operation. This robot is loaded with a water tanker and a pump controlled through wireless communication to sprinkle water. For the desired operation, an PIC microcontroller is used. At the transmitter end, push buttons are used to send commands to the receiver end to control the robotic movement, either in forward, backward, right or left direction. The LCD is used to display the status of the ROBOT action.

LITERATURE SURVEY:

In this movable robot consists of sensor like an Ariduno Flame Sensors are used to detect the fire and distances on its way towards fire. In this for the mobility of the Robot , two wheels made of Nylon and a caster ball is used. This is mainly a rear wheel drive type of vehicle. The water container has the capacity to contain at least 1L water. It is made of strong cardboard which has water resistant property.[1] A fuzzy controller is used to control an obstacle avoidance of Vehicle. The aim is to guide the Vehicle along its path to avoid any static environments containing some static obstacles in front of it. Obstacle avoidance in real-time is a mandatory feature for Vehicle in an unknown environment.[2] In this the human can control the robot by using the GPS module. The GPS module is work with the android application. In this the GPS model communicate application by using driving motor, Arduino mega, voltage divider, tires , GPS, motor driver.[3] In this there are three different types of system unit is use 1. GPS system 2. Fire detection system 3. Extinguishing system 4. Communication system. The GPS system is used for obstacle detection and four ultrasonic range finder to find the distance between obstacle and system. Fire detection system is used for the detection of fire in this the gas sensor is used. Extinguishing system is for successfully extinguish the fire.[4] In this paper A Pic micro controller sensor, motor driver, gear motor, Relay driver, GPS module, pump

and sprinkler are used. To program Pic micro controller open source software pic controller IDE is required. The detection and extinguishing was done with the help of Pic micro controller in which the sensor, gear motor and its driver, relay driver etc. are interfaced. The "solar powered automatic fire fighting robot" can be used easily in everyday life such as in homes, laboratories, parking lots, supermarkets, stores, shops etc. Important function of the robot is patrolling. Limitation of the robot is Bluetooth range and water capacity.

MODULE:

Obstacle detection Module:
➢ Check whether there is obstacle in front of the robot.
➢ If obstacle is within the certain range then stop the robot.

Fire detection Module:
➢ The robot will move in the room and detect the fire.
➢ If the temperature at certain place is more than the threshold set then start the water sprinkler.
➢ Else detect the fire inside the room.

Fireman Module:
➢ When the robot will be moving inside the room it can be controlled by the pic micro controller.
➢ When obstacle detected the robot will be guided by the GPS where to move.

BLOCK DIAGRAM:
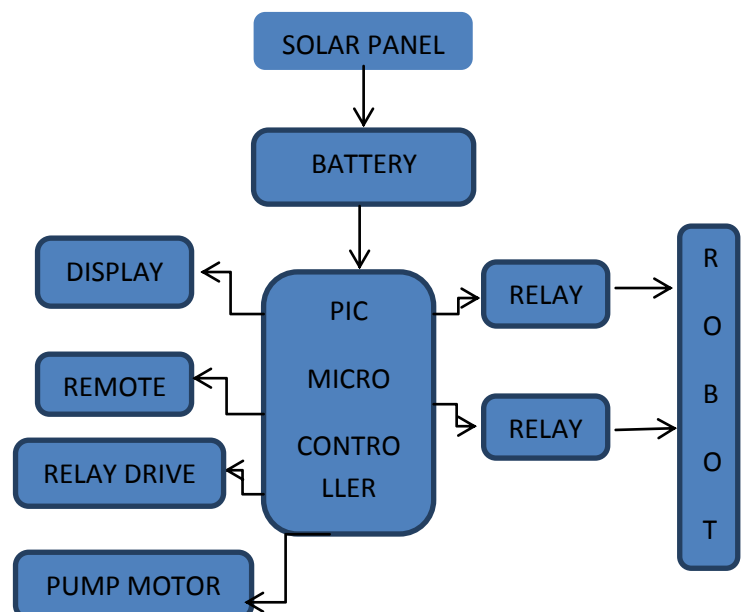
FURTURE SCOPE:

➢ To make the remote access secured with a 2-step verification and Login ID-Password system
➢ To enable regular scrutiny sessions using scripting in the internal dock system so that manual involvement can be completely removed.
➢ Adding layers of protection to make it more fire efficient and robot
➢ In future, the system can be added on a hovercraft to fight fires at sea due to oil spills, fire on ships etc. It will thus minimize human effort to actually go deep into the sea and extinguish fire.

ADVANTAGE:

➢ The robot will be used at places where it is dangerous for humans to enter.
➢ It can move automatically inside the room without any supervision.
➢ The automatic water sprinkler will start where ever the fire is detected.
➢ The robot is fire resistance and can be used at situations where temperature is 120 degree Celsius.
➢ It can be controlled by android phone externally.

MIRCOCONTROLLER:

Microcontroller has a big family and 8051 is one of the names that family. The device which we used in our work was the'AT89S52'which is a typical 8051 microcontroller and it is manufactured by Atmel™. The 89S52 has 4 different ports, each one port having 8 Input/output lines providing a total of 32 I/O lines. Those ports can be used to output DATA and orders do other devices, or to read the state of a sensor, or a switch. Most of the ports of the 89S52 can be used for two different functions and these are known as dual function. The first port is to perform input/output operations and the second port is used to execute special features of the microcontroller like interrupting the execution of the program according to external events, counting external pulses, performing serial data transfer or connecting the chip to a computer to update the software. From the software point of view each port has 8 pins and will be treated as an 8-bit variable called 'register', each bit being connected to a different Input/output pin. This microcontroller is easily available in market.

EXTINGUISH:

Fire extinguisher is a portable device that discharges a foam, gas, jet of water, and other material to extinguish the fire. A fire extinguisher is an active fire protection device used to extinguish or control small fires, often emergency situations. A fire extinguisher consists of a hand held cylindrical pressure vessel containing an agent which can be discharged to extinguish fire. In this work we use water spray extinguisher to extinguish fire. D. System Design And Components: In this paper, the solar powered automatic fire fighting robot consists of hardware and software design. The hardware part deals with the mechanical and construction design, electric and electronic circuitry. The software parts deals with the programming of the PLC to control the movement of the process. For programing we use Keil software to decode it and to run the circuitry.

WHY SOLAR POWERED AUTOMATIC FIRE FIGHTING ROBOT?

1) Impact On Community:

➢ To expose the community about new technology
➢ To create more better life for community
➢ Encourage everyone to innovate new technology

2) Impact On Fire Department :

➢ Protect fireman from risk they life
➢ Provide facility to fire station to extinguish the fire

3) Suitable For:

➢ Fire department
➢ Factory
➢ High explosion area
➢ Chemical industrial
➢ Petrol station
➢ Small business stores or restaurants

4) Innovation Our Project:

The innovation has been made in our project in which we use:

➢ Navigation system
➢ We can remotely monitoring
➢ Using fire extinguisher tank
➢ Using this method to extinguish the fire
➢ Suitable to all types of fire

CONCLUSION:

Thus we will be developing a robot which will be used for solar powered automatic fire fighting purpose. This proposes a great chance for automation and will be useful at places where human cannot reach or is dangerous.

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