HOMEHACK2020(First yr ex)-Project Report-Team Byte

FIREBOT 2.0

TRACK:Arduino/Rpi

- ## Why this track:

  We have always been passionate about microcontrollers and robots.Most of robots that we see have vague functionalities.So we decided to use technology to solve this particular problem that can save many lives.

- ## Uniqueness and practicality of our project

According to National Crime Records Bureau (NCRB), it is estimated that more than 1.2 lakh deaths have been caused because of fire accidents in India from 2016-2020 only. Even though there are a lot of precautions taken for Fire accidents, these natural/man-made disasters do occur now and then. In the event of a fire breakout, to rescue people and to put out the fire we are forced to use human resources which are not safe. With the advancement of technology especially in Robotics it is very much possible to replace humans with robots for fighting the fire. This would improve the efficiency of firefighters and would also prevent them from risking human lives.Here we have built a **Fire Extinguishing Robot using Arduino**, which will automatically sense the fire ,start the water pump and extinguish fire.

- ## Project Description

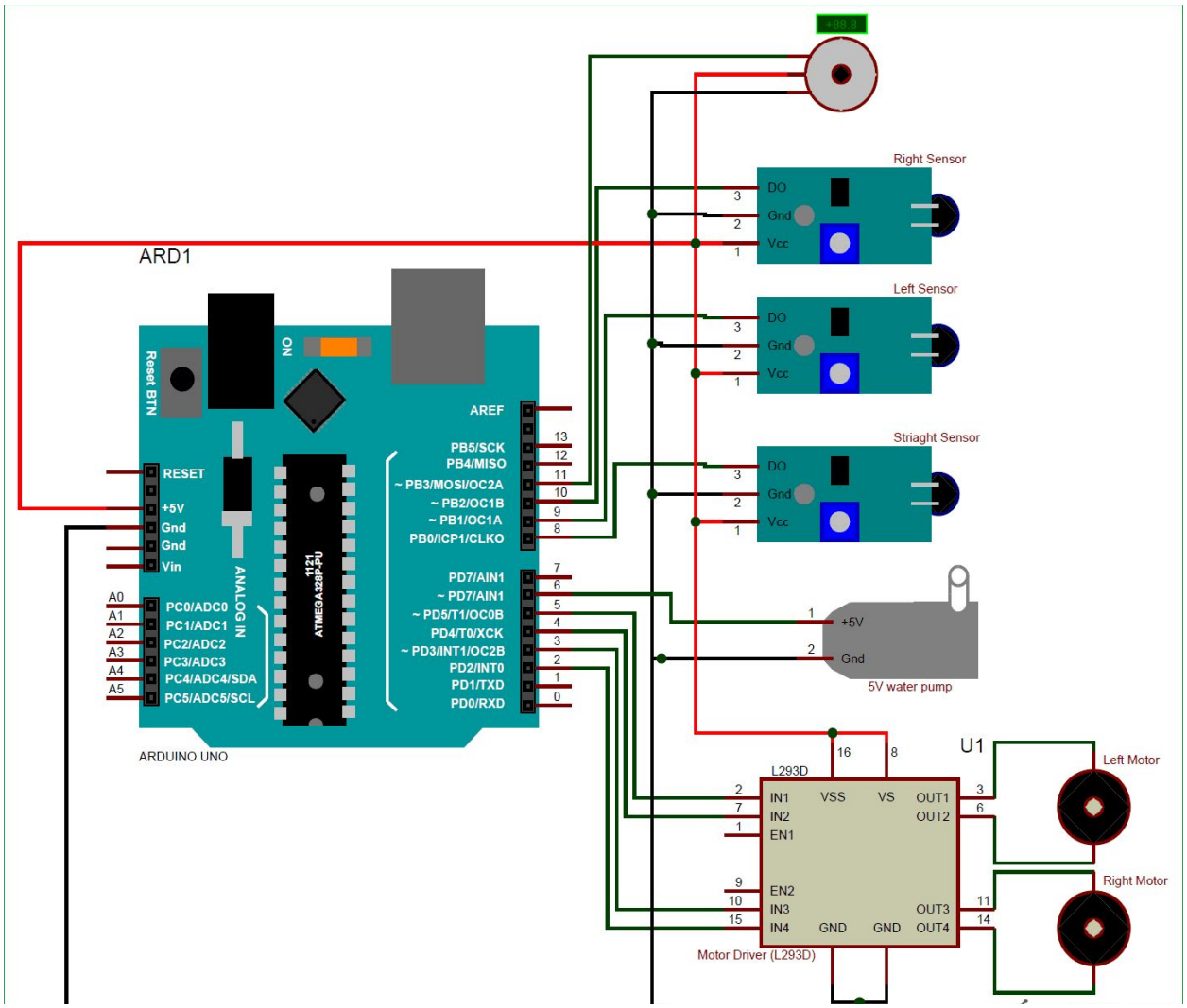
Material Required:

- Arduino UNO
- Fire sensor or Flame sensor (3 Nos)
- Servo Motor (SG90)
- L293D motor Driver module
- Mini DC Submersible Pump
- Small Breadboard
- Robot chassis with motors (2) and wheels(2) (any type)
- A small can
- Connecting wire

Working Concept

The main brain of this project is the Arduino, but in-order to sense fire we use the **Fire sensor module** (flame sensor), these sensors have an **IR Receiver (Photodiode)** which is used to detect the fire. When fire burns it emits a small amount of Infra-red light, this light will be received by the IR receiver on the sensor module. Then we use an Op-Amp to check for change in voltage across the IR Receiver, so that if a fire is detected the output pin (DO) will give 0V(LOW) and if the is no fire the output pin will be 5V(HIGH).We detect the direction of the fire we can use the motors to move near the fire by driving our motors through the **L293D module**. When near a fire we have to put it out using water. Using a small container we can carry water, a 5V pump is also placed in the container and the whole container is placed on top of a **servo motor** so that we can control the direction in which the water has to be sprayed.

Rough Circuit



We used a small plastic bottle to set the pump inside it and poured water inside it. We then assembled the whole can on the robot.
After hardware assembling we uploaded the code.
As we know the fire sensor will output a HIGH when there is fire and will output a LOW when there is fire. So we have to keep checking these sensor if any fire has occurred. If no fire is there we ask the motors to remain stop by making all the pins high.The maximum distance to which the fire can be detected depends on the size of the fire, for a small matchstick the distance is relatively less. You can also use the potentiometers on top of the

modules to control the sensitivity of the robot. I have used a power bank to power the robot you can even power it with a 12V battery.

We have a working model and hereby attaching videos of the same
https://drive.google.com/drive/folders/1mJeiQfev454s6G_u0DB7Vewd8mWKSrZb?usp=sharing

- ## Future Scope,Competitors & Business Model

  This prototype of our's just the base model of what we are going to release in next few years.As next upgradation we are planning to use high quality UV-IR Sensors to improve accuracy and also use more sensors to get 360 degree fire protection.Fire accidents are increasing day by day hence th need for efficient system is our main scope for future.

  We have many competitors in the market(especially from China),but what makes us different from them is the fact that our product is cheap,robust and efficient. What we aim is the future market and the fact that there is not a single stable product as of now increases our chances to top the market in coming years.

  In 5 years we see ourselves as a company with at least 1 Million turnover.

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