FIRE EXTINGUISHER SAFETY SYSTEM IN CAR

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Abstract- During recent times we have read articles about cars are getting fired up due to heat or any other reason like electrical short circuiting, fuel leakage. Similarly, after accident, possibilities are strong and changes are high that a car may set on hazardous fire causing death or injuries if incase explosion may occur.
Thus we may understand that now a days, one of the serious problem in automobile is vehicle fire in various causes. There is no equivalent mechanism as if to avoid such problem. So we are made an automatic fire extinguisher safety system in car to avoid fire accident in car and so ensure the safety of the driver and passengers.
We are using temperature sensor, Arduino micro controller and water Pump to extinguish the fire, when the fire occurs.

INTRODUCTION:

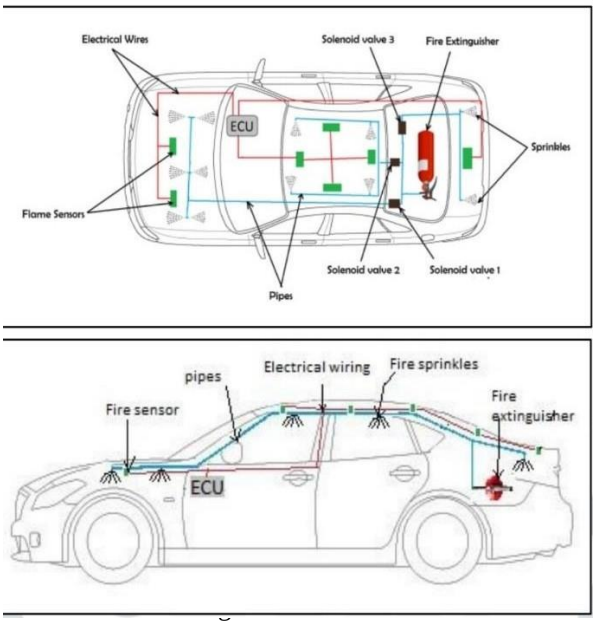
In recent time the cars catches fire due to several reasons like fuel leakage, electrical short circuiting , engine overheating and due to some car crashes so, as the role of the engineer we emerged, many have become responsible for the engineering of safety of a automobile they design. Automotive IQ presents global EV battery fires safety summit 2021.
Hyundai kona EV set to stop sales in korea following battery fires and recalls.
In electric vehicles use lithium ion batteries, the same technology that powers laptop computers, smart phones and hundreds of other devices. Because of the way they are designed. These means they may not catch fire until hours after a collision.
In electric vehicles fires, the batteries can burn at 5,000 degrees and still deliver electric shocks of up to 400volts,according to the U.S,fires administration.

The federal agency advises that electric vehicle fires may reignite as long as 24 hours after the first blaze it put out.It also recommends that once the electric vehicles is towed,it should be stored at least 50 feet from other cars,buildings or combustible items.
Electric cars are still too new and make up too small a percentage of all vehicles for safety experts of all vehicles for safety experts to accurately how they compare to gasoline-powered cars when it comes to fire risks.
Tesla says there have beenfive tesla vehicle fires for every five billion miles driven, while records shows 55 gasoline-powered car fires in that same distance.
But Teslas make up just one-tenth of 1 percent of the 247 million vehicles on the road in the united states, so it hard to get an accurate measure of fire risks.This will likely change as electric vehicles make up a larger percentage of traffic.
Kia and Hyundai models recalled due to fire risks in soul model in year of 2010-2016.The agency has documented 3,125 fires resulting in 103 injuries and at least one death as of April to prevent a car fire.
Major recalls due to vehicle fire risks defective part are responsible for only fraction of vehicle fires, but they have resulted in hundreds of deaths and put millions of consumers at risk. Since 2012, automakers have recalled more that 9.5 million car due to faulty parts or other design issued that could a fires. Kia and Hyundai have recalls 2.3 million vehicles since 2015 due to engine fire risks. Nearly 3 million of the companies vehicles face a federal investigation over potential fire dangers.
The National highways traffic safety administration is investigation engine fire risks in 10 different Kia and Hyundai models built between the 2010 and 2016 model years.
The main causes of vehicle fires more than a third are the result of some unintentional action, either careless behavior or accident.
And nearly a quarter are caused by equipment failure or a heat source in the car or truck
Heat from powdered equipment, the engine or drivetrain, and spark from friction or electrical arcs account for 2 in 3 vehicle fires. Smoking or some other type of flame accounted for 7 percent of fires.
Only adout 5 percent of car fires result from a collision. But those account for 6 in 10 of all fatal vehicle fire. Less than 2 percent start in the fuel.

I. METHODOLOGY

A. Working

- The temperature sensor will sense the temperature changes while accident.
- If the temperature exceeds optimal temperature, the sensor sends the signal to the arduino microcontroller.
- The microcontroller triggers the fire extinguisher to spray the water through nozzle.
- Water pump is used to pump the water though nozzle.
- Hence it reduced the temperature to avoid fire hazard.



COMPONENTS

A. POWER SUPPLY:

It is 12v battery or USB adapter used to supply power to temperature sensor and microcontroller

B. TEMPERATURE SENSOR:

The temperature sensor is a electrical device that measures the temperature of the environment and convert the input data into electrical signal to record monitor

LM35 TEMPERTURE SENSOR

- The minimum and maximum input voltage 35v
- Can measure temperature range -55 to 250 degree celsius
- Low cost
- The LM35 series are precision integrated circuit temperature devices with an output voltage linearly proportional to the centigrade temperature

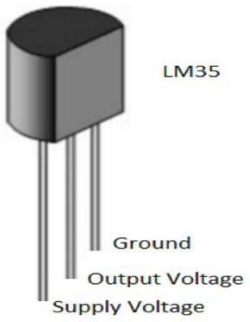


Fig2: LM35 TEMPERTURE SENSOR

APPLICATION

- Measure temperature of a particular environment
- Engine and battery temperature measured

MICROCONTROLLER

- A microcontroller is a computer present in a single integrated circuit which is dedicated to perform one task and execute one specific application.
- It consist of memory programmable input and output peripherals as well as process.

ARDUINO UNO MICROCONTROLLER:

- Arduino is a open source electronic platform based on easy to use hardware and software.
- Arduino consists of both a physical programmable ,circuit based and piece of software or IDE, That runs on your computer, used to write and upload computer code, to the physical board.
- Arduino consist of both a physical programmable circuit board and piece and piece of software that runs on your computer.

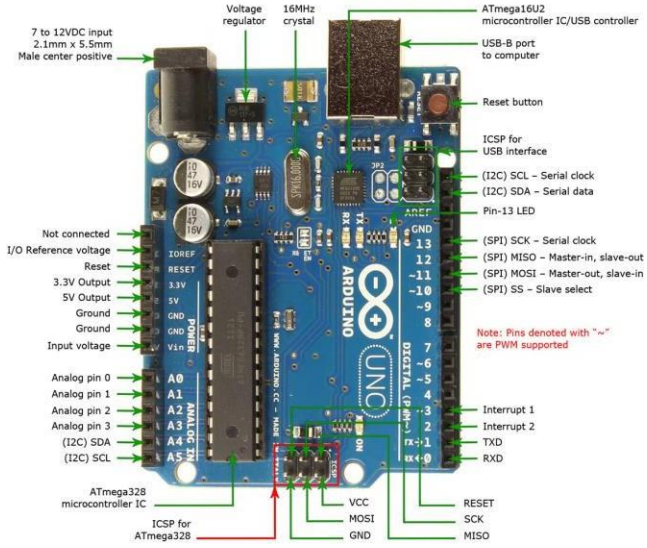


Fig3: ARDUINO UNO MICROCONTROLLER

FEATURES OF ARDUINO UNO MICROCONTROLLER

- Microcontroller: ATmega328.
- Operating Voltage: 5V.
- Input Voltage: 7-12V.
- Digital I/O Pins: 14 (of which 6 provide PWM output).
- Analog Input Pins: 6.
- DC Current: 40mA.

- Flash Memory: 32 KB.
- SRAM: 2 KB.
- EEPROM: 1 KB.
- Clock Speed: 16 MHz

WATER PUMP

- A water pump is a device that moves water by mechanical action typically converted from electrical energy into hydraulic energy.
- The working principle of water pump mainly depends upon the positive displacement principle as well as kinetic energy to push the water.
- These pump's use AC power.
- These pump's are used to transfer the huge amount of water from one place to another place.

Fig4: WATER

II. CONCLUSION

The following conclusions can be drawn from the study:

- The fire accident in vehicle may occurs in many ways based on the cause and other reasons . the reasons are differentiate based on place where the fire occurs.
- Based on these conditions we will identified the major reason and place of the vehicle where the fire accident occurs.
- By using the reasons and the major causes of the fire accident we made an embedded system with temperature sensor to solve the fire accident and ensure the safety for the driver and the passengers.

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