PHEONIX

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MID YEAR PROJECT

OUR TEAM PROUDLY INTRODUCE TO YOU

AZZA

FIRE-FIGHTING ROBOT

Raising from the ashes

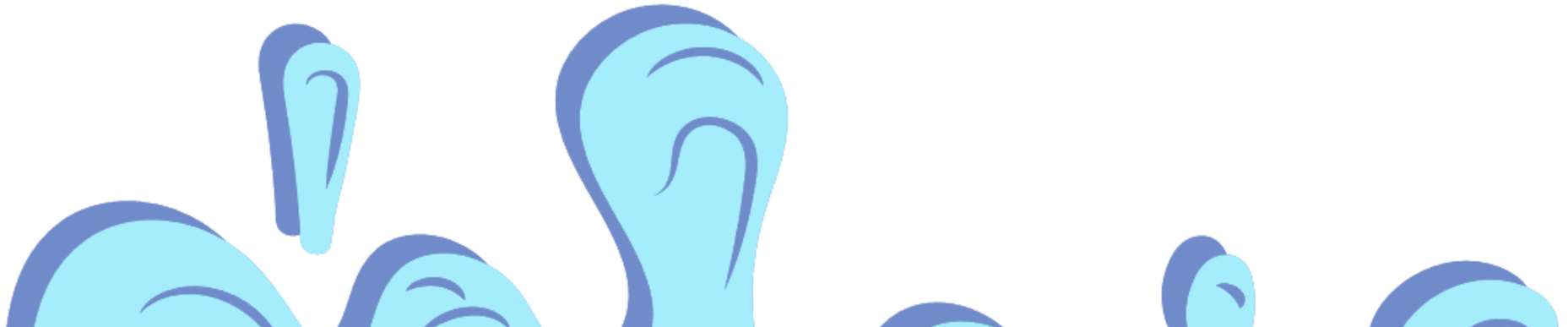
Welcome to the
future to firefighting

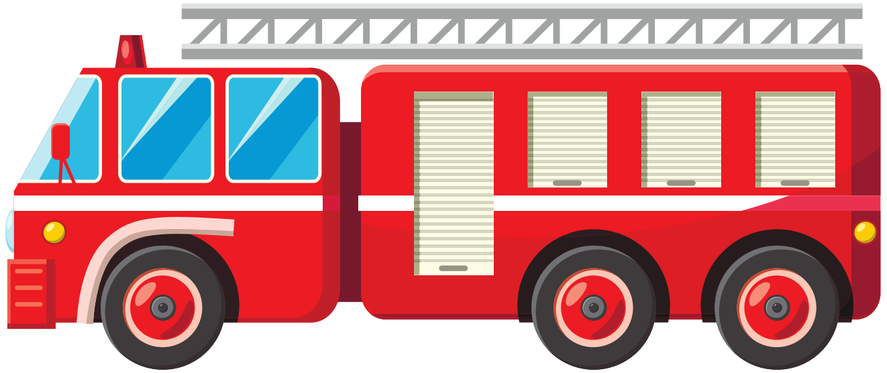
Be aware and stay safe!

You're in emergency

✗ Call 911 ?

✓ Call Azza





Introduction

Robots are equipped with advanced systems to navigate hazardous environments, suppress fires, and offer situational awareness to firefighters.

Goals

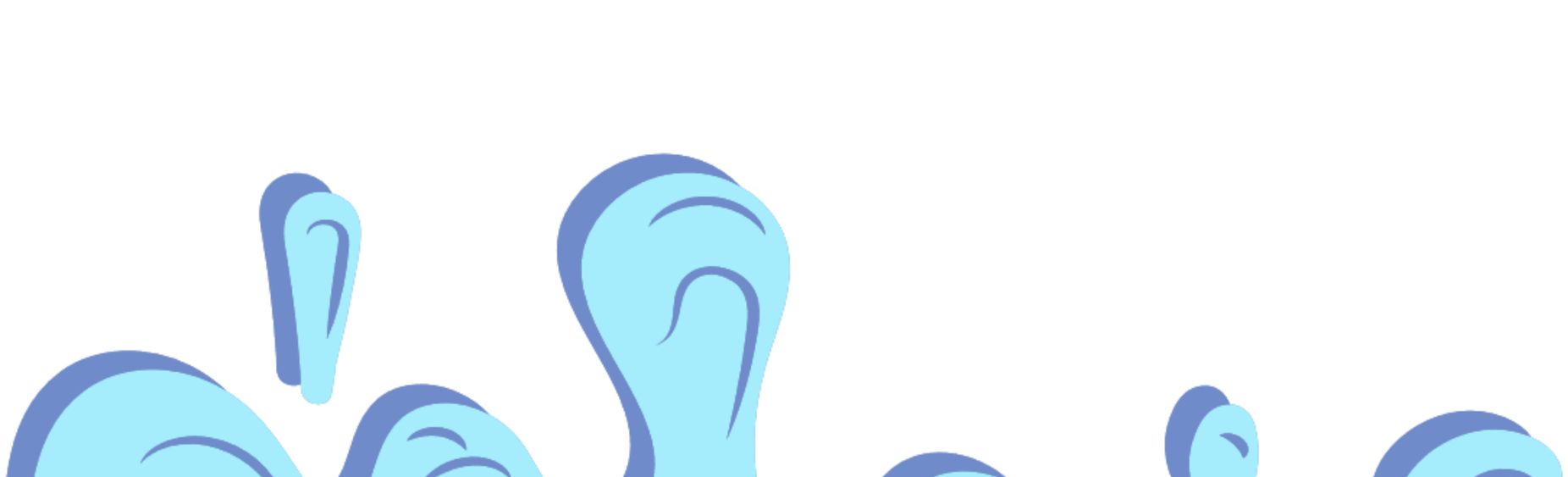
- Enhancing Firefighter Safety
- Search and Rescue Operations
- Remote Operation and Telepresence
- Post-Fire Analysis and Cleanup

Current Challenges

Traditional firefighting methods face numerous challenges, including risk to human lives and limited access to dangerous areas

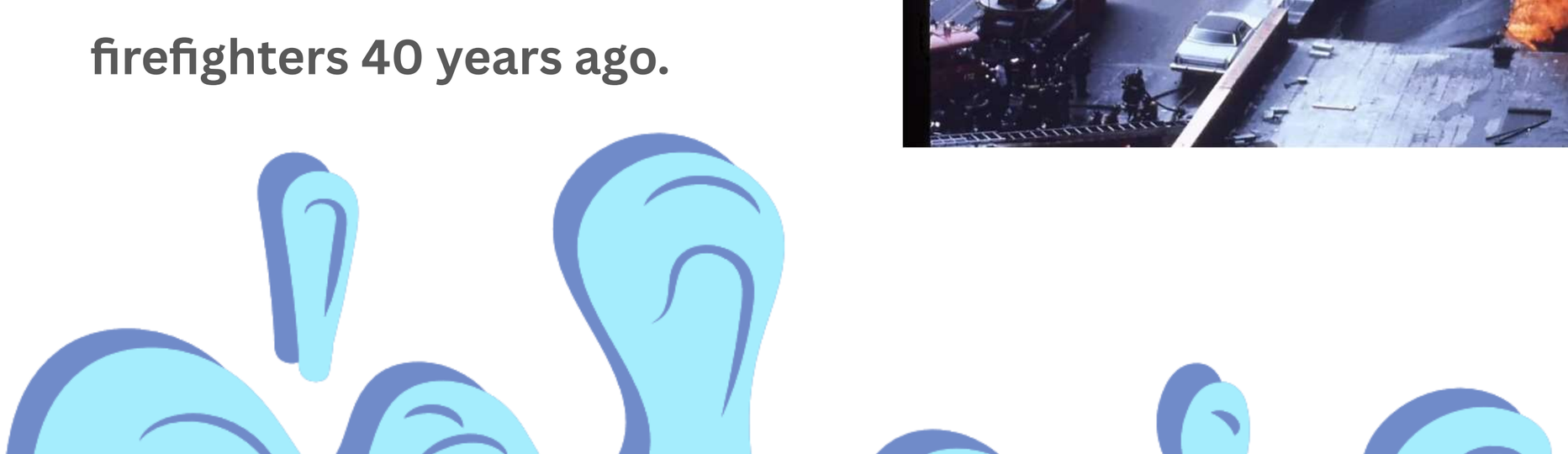
These challenges call for a revolution in firefighting technology to ensure safer and more efficient operations.

Replacement for the human factor



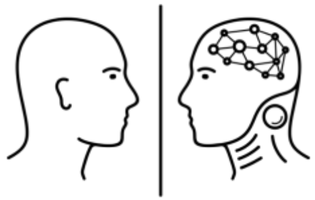
Waldbaum's supermarket fire

Waldbaum’s: 40 Years LaterAug. 1, 2018Deputy Chief John “Jay” Jonas reviews the tragic Waldbaum's Supermarket fire that claimed the lives of six FDNY firefighters 40 years ago.



Waldbaum's supermarket fire

There was a one-story extension on the exposure 4 side that was being constructed. The main store had a mezzanine that was used for office space and a compressor room for the air conditioning.



Advantages over human factor

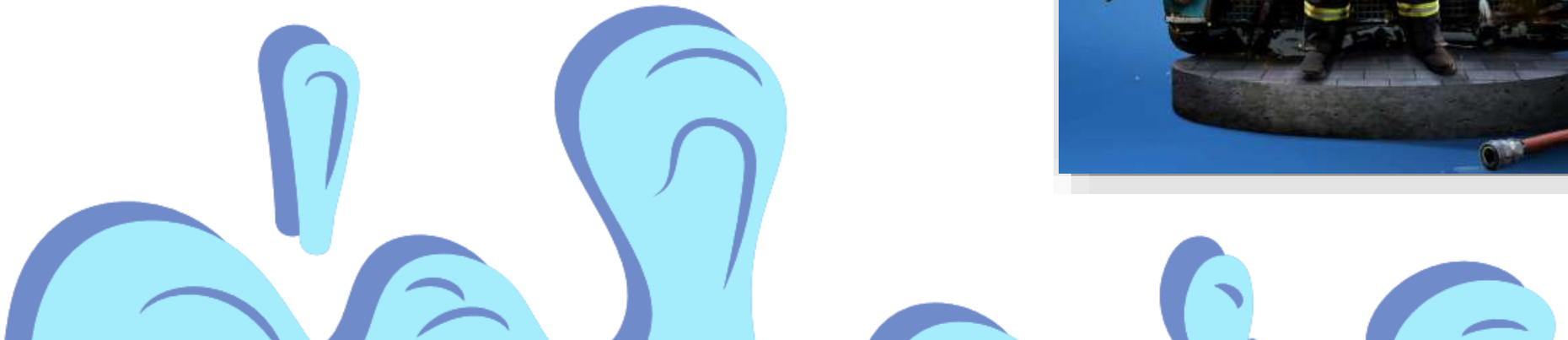
1- Efficiency in Hazardous Environments.

2- Remote Operation.

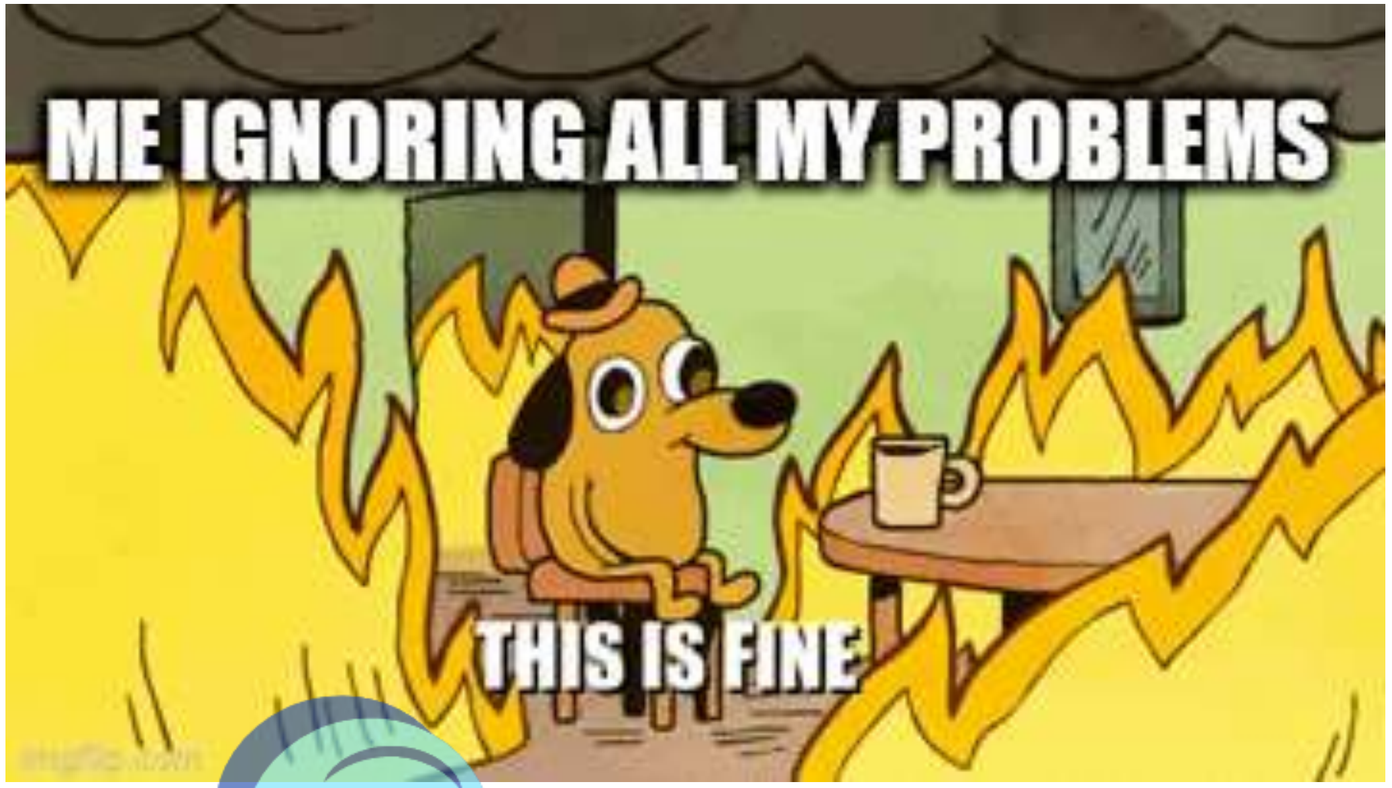
3- Risk Reduction.

4- Environmental Impact.

5- Cost-effectiveness.

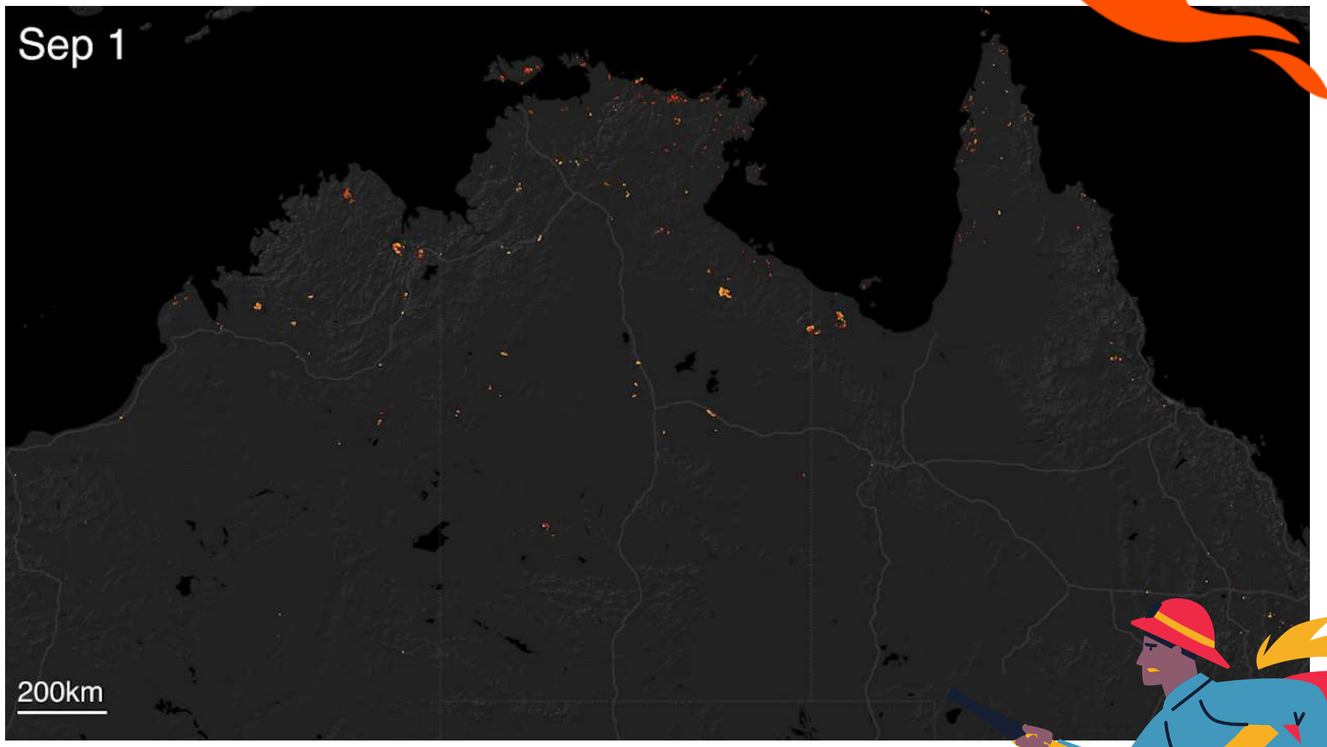


activity time



Situations

Here, you can see the extent of fires animated from the start of September, based on Nasa hotspot data. That is followed by the total burned area for fires for all of 2023, based on North Australia and Rangelands Fire Information (Nafi) data:



Situations

1- Structural Fires.

2- Wildfires.

3- Transportation Accidents

4- High-rise fire

Similar examples in our lives

Firefighting Robot

The Firefighting Robot is a compact and portable emergency responder robot that assists firemen in fighting high-rise fires, especially in highly dangerous environments where it is not safe for people to enter

Remote-controlled drones

The fire-fighting drone features a dry powder fire extinguishing system, 15 kg max load, 45 mins flight time, IP65 protection, and HD 30X optical zoom camera with laser ranging and obstacle avoidance. It can deploy extinguishing remotely and spray dry powder in complex fire environments

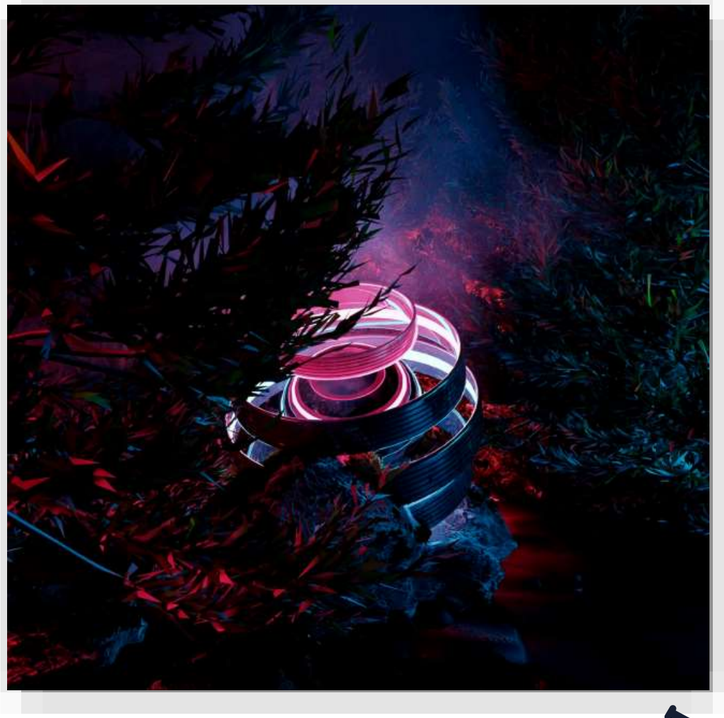
Challenges and Limitations

Despite their potential, firefighting robots face challenges such as power source limitations, mobility constraints, and adaptability to complex environments. Overcoming these obstacles is essential to fully harness the capabilities of robotic firefighting technology.

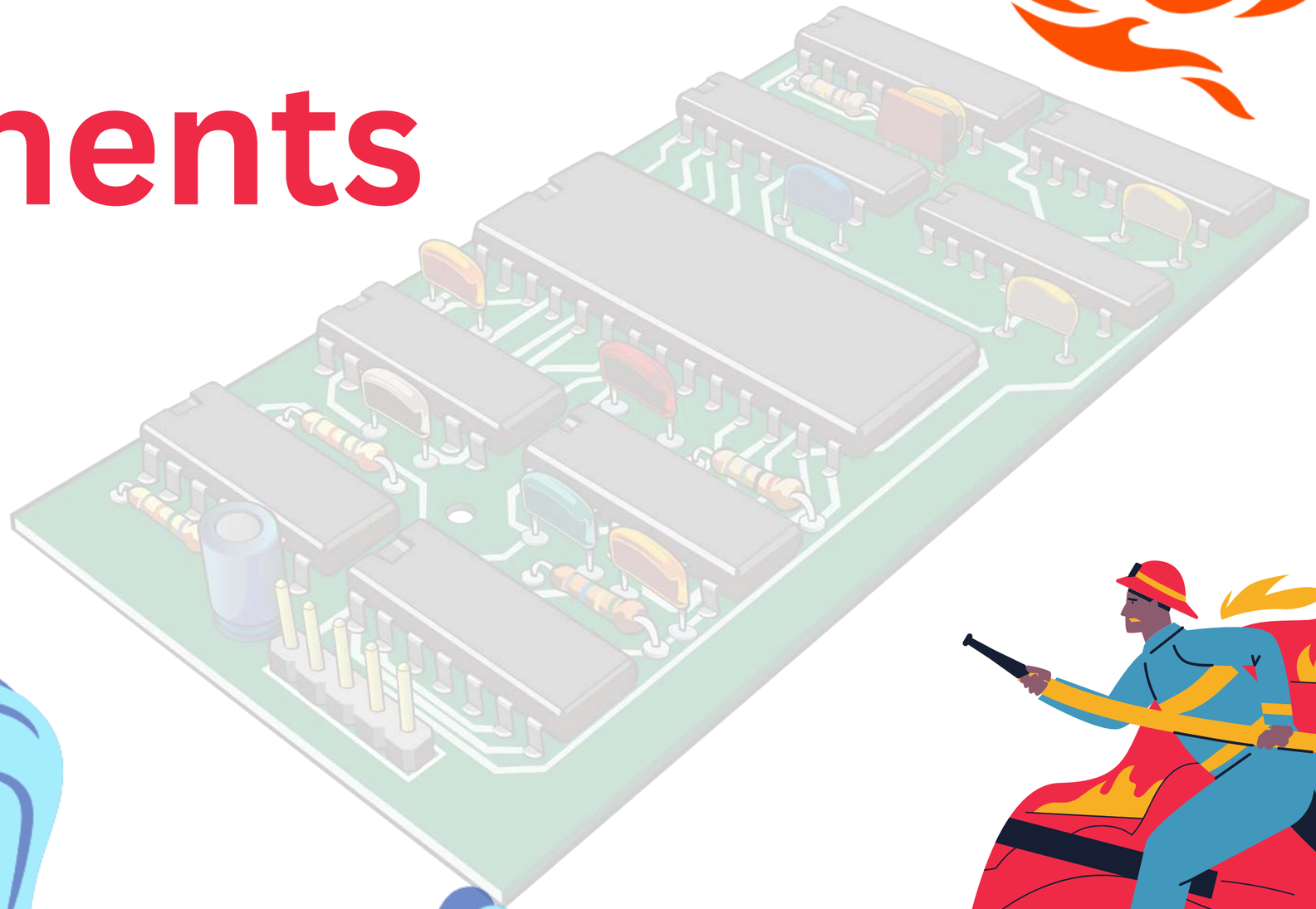
Future Possibilities

The future of firefighting with robots is filled with possibilities.

From advanced AI algorithms to enhanced mobility and agility,the evolution of robotic technology promises to continually redefine the capabilities and impact of firefighting in the years to come



Components

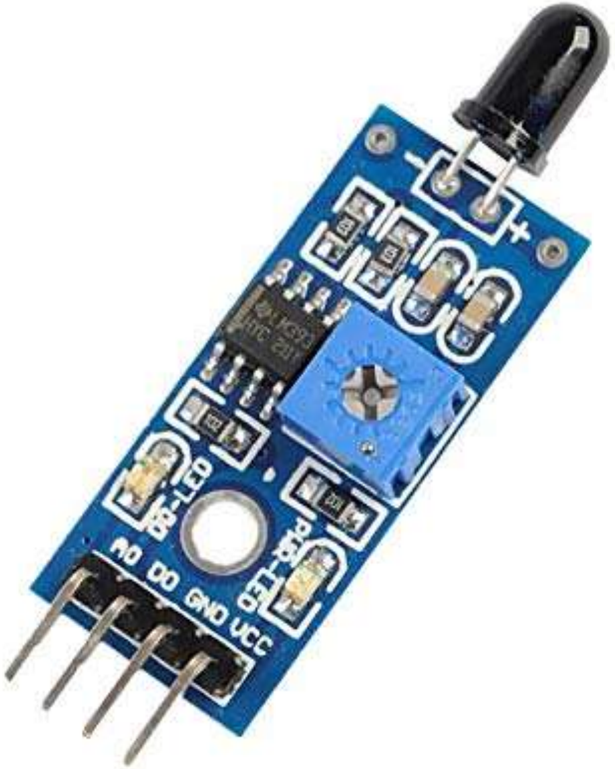


Water pump

A water pump connects to weather H-bridge or a Relay and connect it with the Arduino to power it and pumps water.

Flame sensor

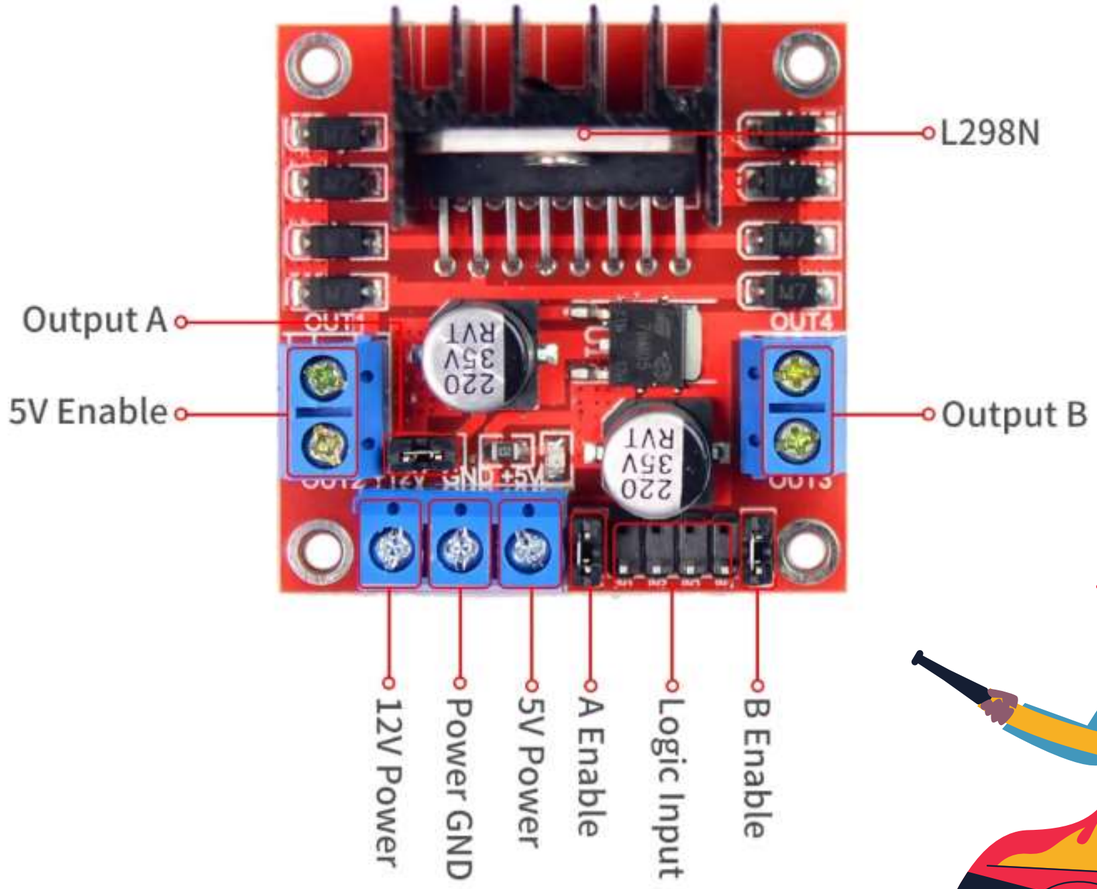
A flame sensor is a device used to detect the presence of a flame of fire. It works by detecting the infrared radiation emitted by a flame by accepting it to its crystal of it.



- Flame sensors are commonly used in fire detection and safety systems

H-Bridge l298n (motor driver)

The L298N is a dual H-bridge motor driver that allows you to control the direction and speed of the DC (geared)motors or stepper motors.



Dc gear motor

A DC geared motor combines a DC electric motor with a gearbox to deliver high torque at low speeds, ideal for applications requiring precise control over movement and speed.

Code

```
#include <Servo.h>  // include servo.h library

Servo myservo; // declare servo object

int pos = 0;

boolean fire = false;

#define Forward 12
#define LM1 7
#define LM2 6
#define RM1 5
#define RM2 4
#define pump 9

void setup() {

  pinMode(Forward, INPUT);
  pinMode(LM1, OUTPUT);
  pinMode(LM2, OUTPUT);
  pinMode(RM1, OUTPUT);
  pinMode(RM2, OUTPUT);
  pinMode(pump, OUTPUT);
  myservo.attach(8);
  myservo.write(90);  // set initial servo position
}
```

Code

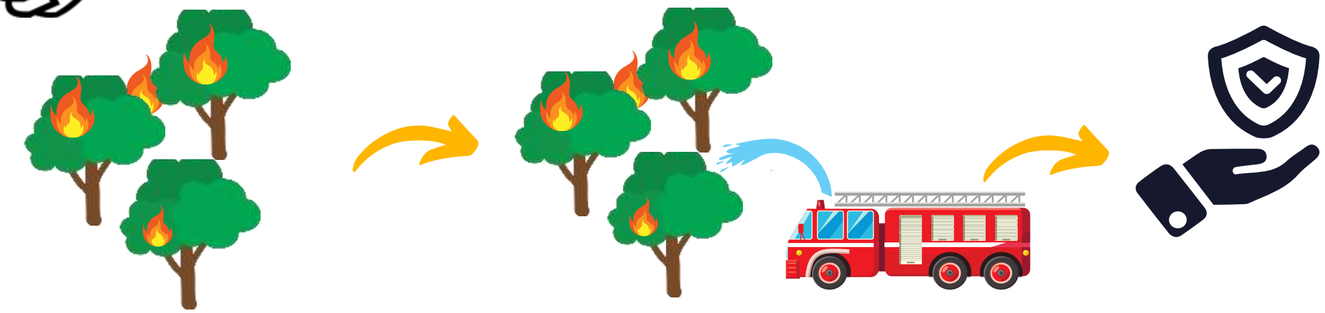
```
void put_off_fire() {
  delay(500);
  digitalWrite(LM1, HIGH);
  digitalWrite(LM2, HIGH);
  digitalWrite(RM1, HIGH);
  digitalWrite(RM2, HIGH);
  digitalWrite(pump, HIGH);
  delay(500);
  for (pos = 50; pos <= 130; pos += 1) {
    myservo.write(pos);
    delay(10);
  }
  for (pos = 130; pos >= 50; pos -= 1) {
    myservo.write(pos);
    delay(10);
  }
  digitalWrite(pump, LOW);
  myservo.write(90);
  fire = false;
}
```

Code

```
void loop() {

  if ( digitalRead(Forward) == 0) {
    myservo.write(90); // set servo to default position
    digitalWrite(LM1, LOW);
    digitalWrite(LM2, HIGH);
    digitalWrite(RM1, LOW);
    digitalWrite(RM2, HIGH);
    fire = true;
  }
  else  {

    digitalWrite(LM1, LOW);
    digitalWrite(LM2, LOW);
    digitalWrite(RM1, LOW);
    digitalWrite(RM2, LOW);

  }

  delay(500); // change this value to increase the distance

  while (fire == true) {
    put_off_fire();
  }
}
```

To prevent this

And help in this



Thank You

Be aware and stay safe!