PORTFOLIO

MITESHA DANGE

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ABOUT ME

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Dynamic Robotics Engineering student specializing in ROS and industrial automation. Finalist in national competitions (B&R Open Automation Challenge) with projects including agricultural drones, low-cost prosthetics, and climb-bot. Research focused on human-centered robotics solutions.

SKILLS AND TOOLS

Technical: ROS, Python, Arduino, OpenCV, B&R Automation Studio, MATLAB, Creo, SimTalk, Gazebo

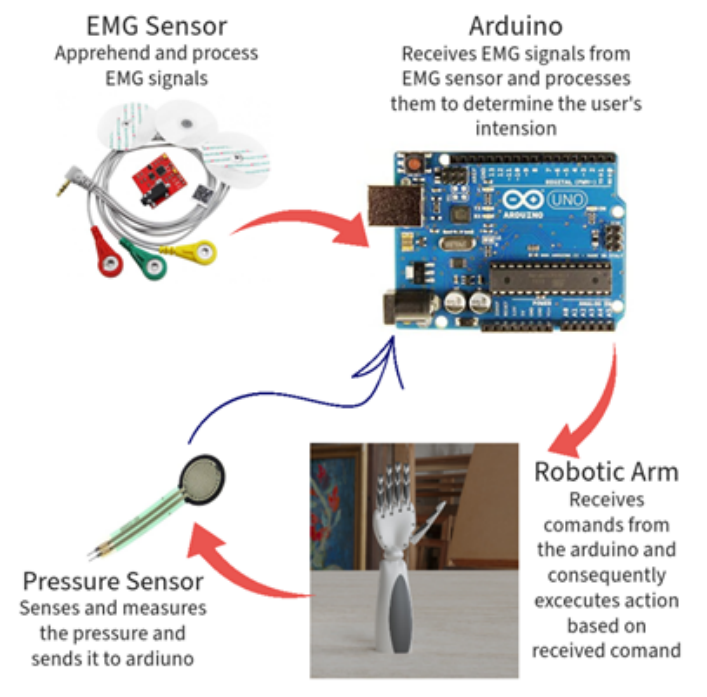
Soft Skills: Team Leadership, Research Communication, Agile Problem Solving, Communication

LOW-COST MYOELECTRIC PROSTHETIC ARM

Team Name: W team
Team Project | Role: Developer & Systems Integrator
Duration: 2023–2024
Institution: AISSMS COE, Pune
Guide: Dr. N. G. Shekapure

Overview

Developed a low-cost, 3D-printed prosthetic arm powered by myoelectric sensors, designed for amputees in developing countries. The system translates EMG signals from the user's forearm into natural hand movements using Arduino-controlled servo motors, delivering both functional dexterity and tactile feedback.



Technology Stack

- Hardware: Myo Sensors, Servo Motors, Li-Po Battery, Arduino Uno
- Software: Embedded C for Arduino, Signal Processing Algorithms
- Design: Open-source hand design, customized via 3D CAD tools

Key Features

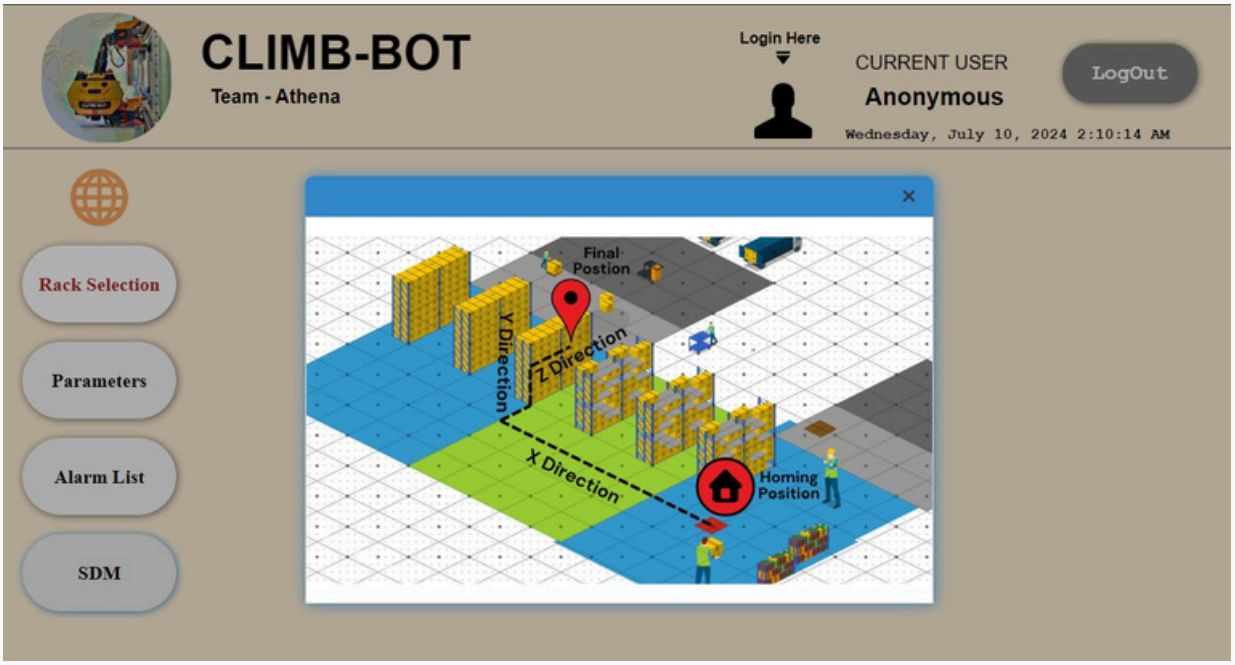
- 3D-Printed Design: Lightweight, anatomically scaled arm using ABS plastic.
- Myoelectric Control: EMG sensors capture muscle signals for intuitive motion.
- Individual Finger Control: 5 DC motors control fingers, 1 servo for wrist.
- Feedback Loop: Fingertip pressure sensors provide haptic feedback to forearm.
- Arduino-Based: Cost-effective control system with real-time responsiveness.
- Water & Dust Resistance: Designed for IP65 compliance.

Outcome & Impact

- 60% cost reduction compared to commercial alternatives.
- Functionality allows users to grip, pinch, and release objects smoothly.
- Designed with replaceable components for ease of repair & long-term use.
- Aimed at future mass-manufacturing using low-cost components.

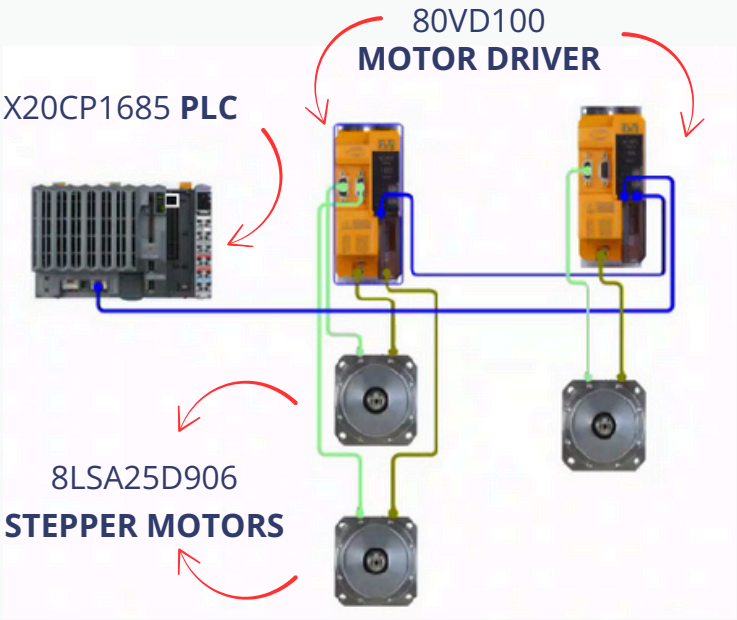
CLIMB BOT

B&R Open Automation Challenge 2024 | National Finalist
Role: Team Leader – UI Programming, Simulation, Report Design, Presentation
Duration: May–July 2024



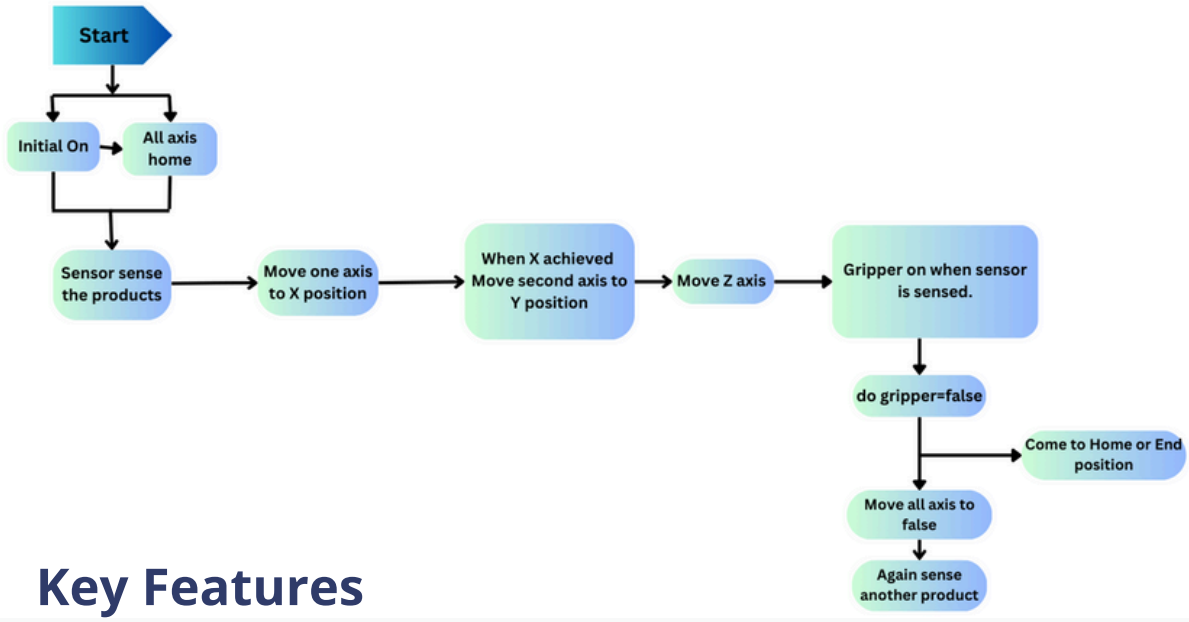
Overview

Climb Bot is an innovative warehouse wall-climbing robot developed for the B&R Open Automation Challenge 2024, hosted by B&R Industrial Automation (ABB Group). Designed to assist in industrial inspection and automation, the bot combines precision movement, virtual modeling, and automated HMI control to navigate vertical surfaces and simulate real-world industrial monitoring tasks.



Technology Stack

- Software: B&R Automation Studio
- Hardware (Simulated): Actuators, climbing mechanism, industrial sensors
- Interface: HMI Screens with real-time data simulation

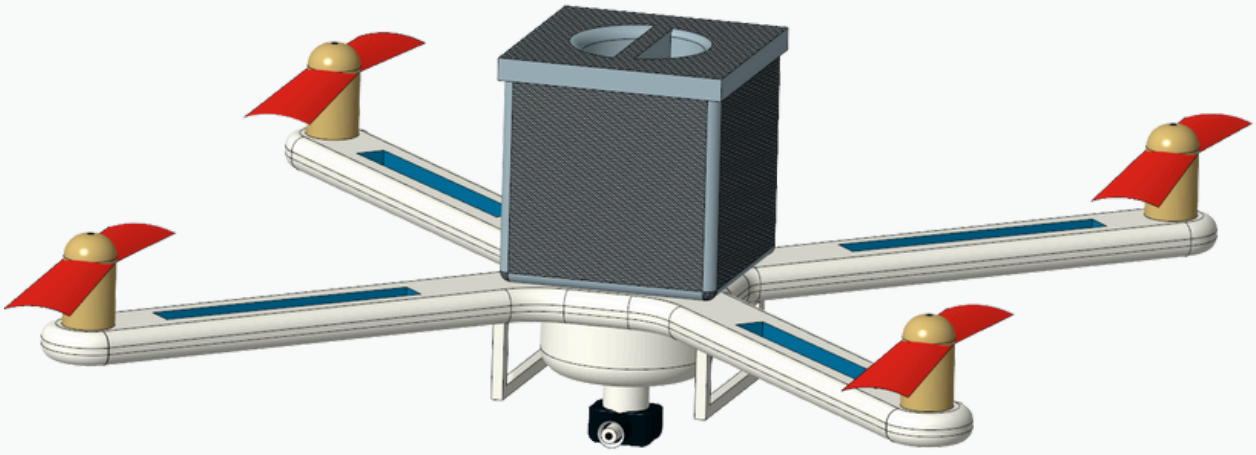


Key Features

- Wall-Climbing Mechanism: Suction- or magnetic-based climbing system to traverse vertical surfaces.
- HMI Interface: Intuitive control panel using B&R's Automation Studio HMI for live status monitoring.
- Virtual Twin: A virtual 3D model was created to simulate and test movement paths.
- Automation Studio Programming: Developed ladder logic and control flow for movement and operation.
- Presentation & Reporting: Complete documentation with a tech report and live demonstration.

DRONE-BASED AGRICULTURE MANAGEMENT SYSTEM (FALCON)

Role: R&D Head
Project Type: Innovation Competition | Ideathon Finalist
Duration: 2025
Team Size: 6 | Cross-functional (Tech, R&D, Business, Marketing)



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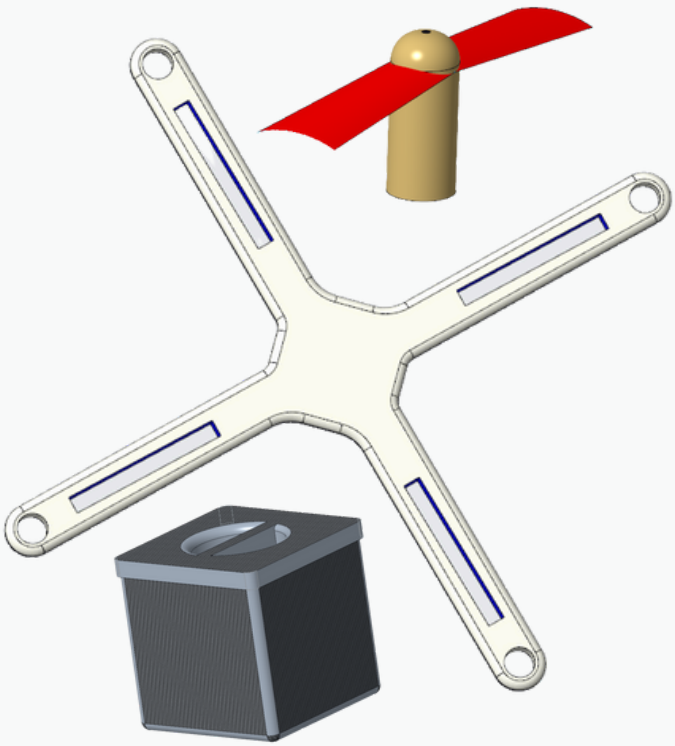
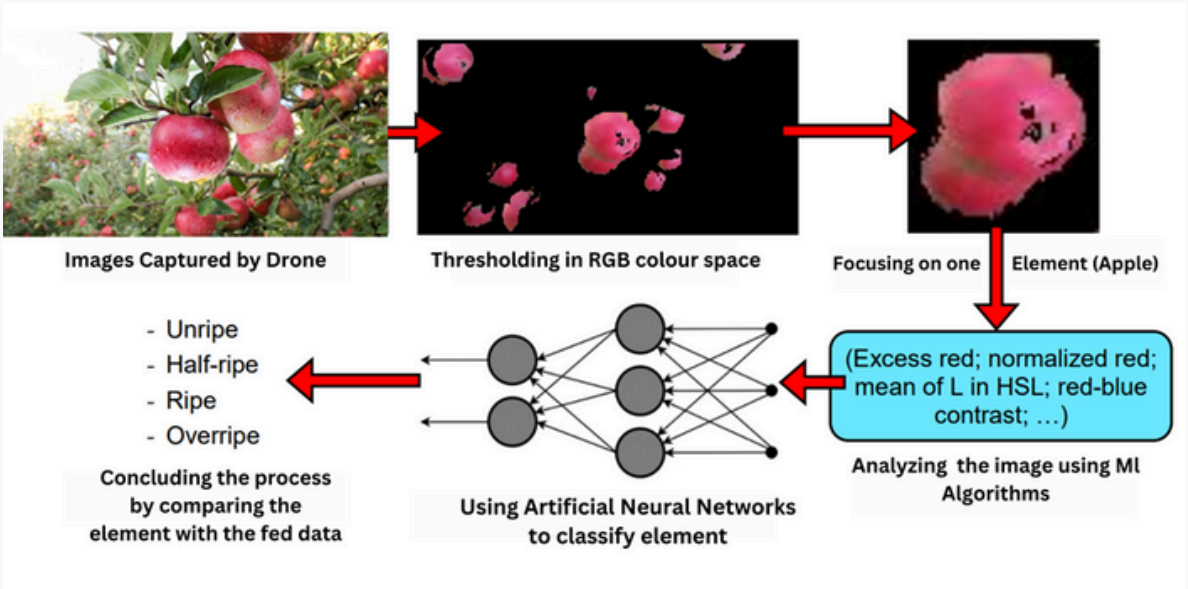


Technology Stack

- Tools: OpenCV, Python, TensorFlow, DroneKit
- Hardware: RGB Camera, Thermal Sensor, Barometric Sensor
- Data: On-field imagery + weather APIs
- Cloud Integration: Firebase/Node for real-time sync (proposed)



Key Features

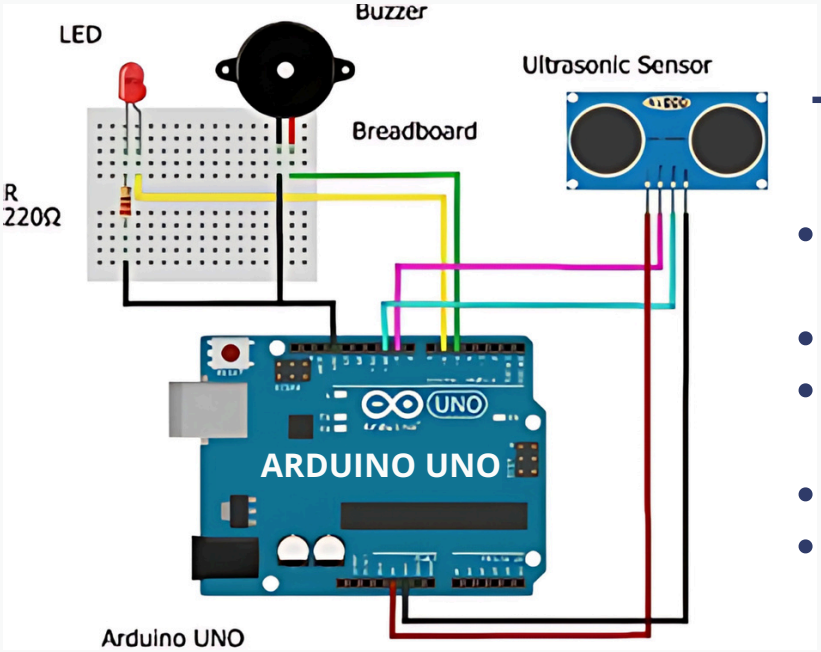
- Drone Hardware: Multi-sensor equipped UAV for aerial scanning
- Computer Vision: Crop health monitoring using OpenCV & ML
- Real-Time Data Analytics: Integrated weather & soil condition data
- Farmer Dashboard: AI-generated reports with alert system
- Precision Farming Support: Supports targeted spraying and irrigation decisions

SMART NAVIGATION STICK FOR VISUALLY IMPAIRED

Project Type: First-Year PBL Exhibition | Team Project
Role: Co-Designer & Developer
Exhibited: 2022–23 | AISSMS COE PBL Exhibition

Overview

The Vis-Imp Stick is an innovative assistive prototype designed to enhance mobility and safety for visually impaired individuals. It utilizes Arduino Uno and an ultrasonic sensor to detect nearby obstacles and provide real-time alerts via tactile or audio feedback. Aim was to create a low-cost smart stick that alerts visually impaired users about obstacles in their path, improving navigation and reducing the risk of collisions.



Technology Stack

- Microcontroller: Arduino Uno
- Sensor: Ultrasonic Sensor
- Output: Buzzer or Vibration Motor
- Power: 9V Battery
- Tools: TinkerCAD (for circuit simulation), Basic soldering

Key Features

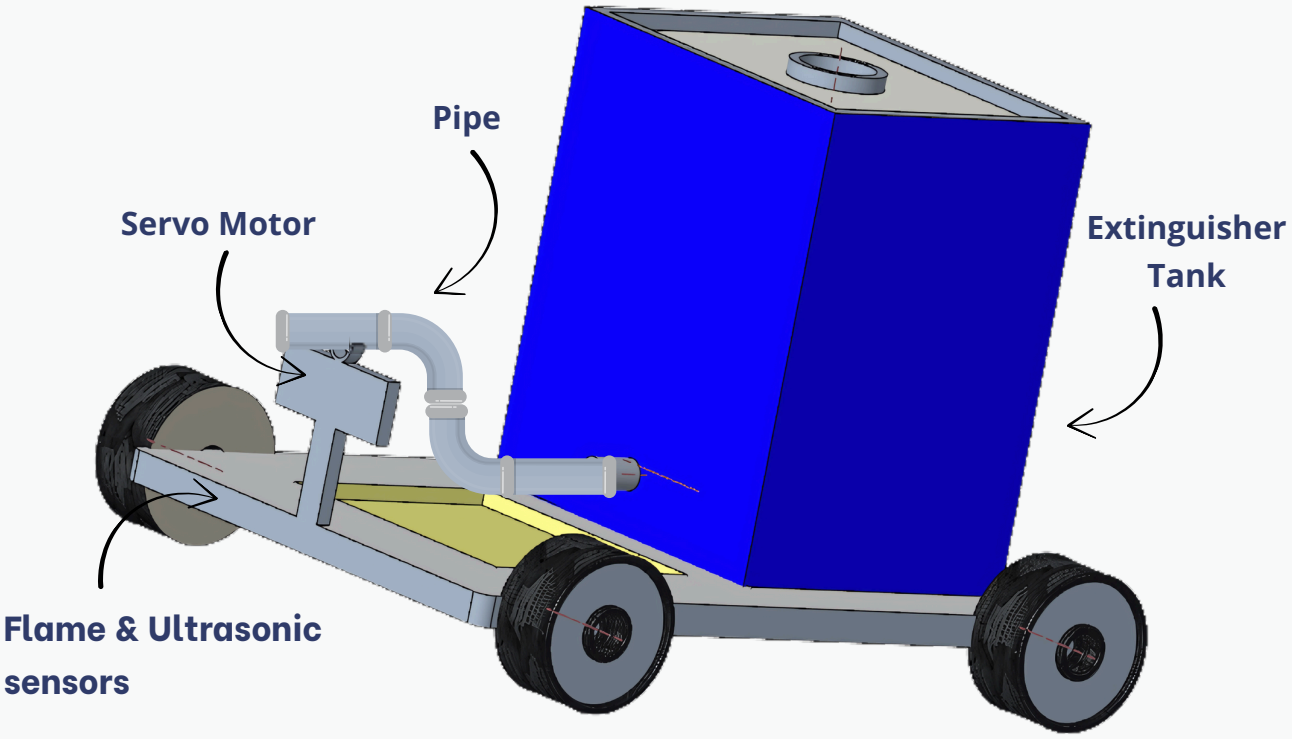
- Ultrasonic Sensing: Detects obstacles in front of the user.
- Arduino-Based System: Offers flexible customization and programmability.
- Real-Time Feedback: Buzzer/vibration modules alert users immediately.
- Compact Breadboard Circuit: Simplified layout for easy replication.

FIRE EXTINGUISHING ROBOT

Role: Embedded Programmer & System Designer

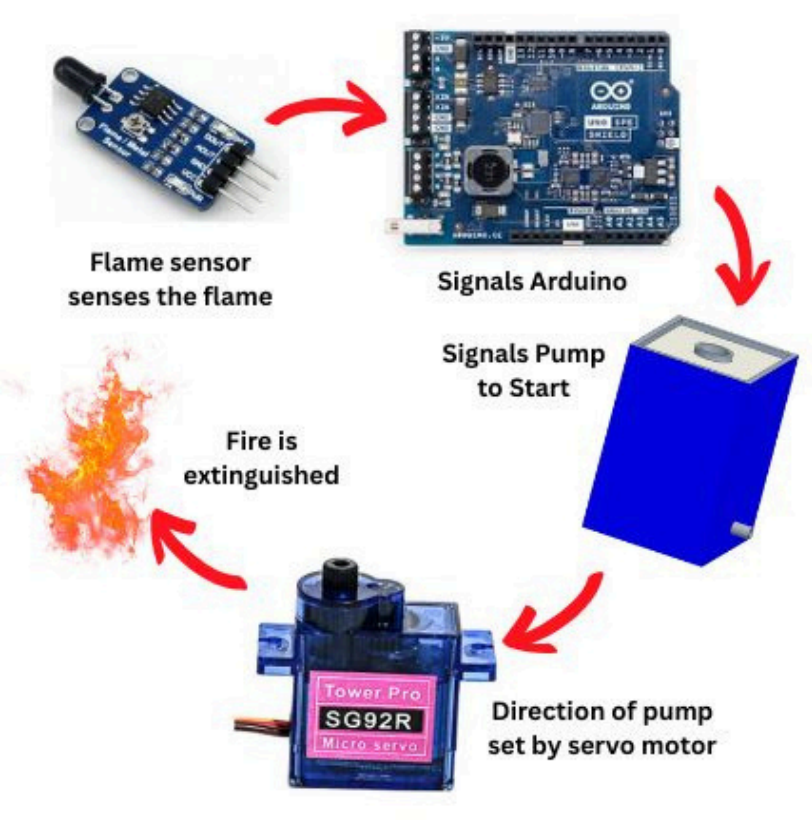
Project Type: Autonomous Robotics Prototype | Arduino-Based

Academic Year: 2023–2024



Overview

The Fire Extinguishing Robot is a low-cost autonomous mobile system designed to detect and suppress fires in enclosed or hazardous environments. It aims to reduce human risk in fire response scenarios by deploying a robotic platform that uses multi-directional flame sensors and an Arduino UNO microcontroller to navigate toward and extinguish fire sources.



Technology Stack

- Microcontroller: Arduino UNO
- Sensors: IR flame sensors (x3)
- Actuation: DC motors, motor fan
- Programming: Arduino IDE (C++)
- Power Supply: 9V battery system
- Architecture: Modular, with communication protocols for scalability

Key Features

- Fire Detection: 3 fire sensors (front, left, right) to detect heat/flame intensity.
- Autonomous Navigation: The Robot moves towards the highest flame intensity detected.
- Extinguishing Mechanism: Simulated with high-speed motor fan (prototype) or real-time water pump (future version).
- Arduino-Controlled Logic: Uses sensor data to adjust motor direction and pump speed.
- Mobility Platform: Designed for smooth indoor traversal and obstacle avoidance.