TECHNOLOGY FOR THE HUMANITY COMPETITION

PRELIMINARY EVALUATION REPORT

CATEGORY NAME: TECHNOLOGY FOR HUMANITY DISASTER MANAGEMENT

EDUCATION LEVEL: HIGH SCHOOL

TEAM NAME: ROBOTIC BOYS

APPLICATION ID:#3039545

TEAM ID:#569205

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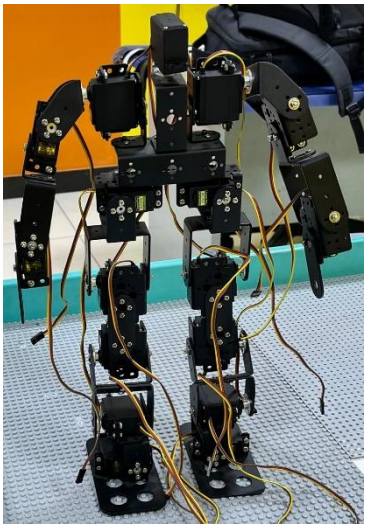
1. PROJECT SUMMARY

1.1. Project Summary and Project Scope



What we created is a HUMAN Robot, the goal in creating such robot is to go into intense fire where humans can not quench the fire to help and report about conditions of trapped people. It is an automatic robot that finds its way by itself and microphone, camera, GPS and sensors are inserted. The components are connected to ESP32 board to analyze situation and report to the Webpage that we made so firefighters can see that from far.

In some cases, fire fighters are unable to save trapped people or find a way to save them, also the trapped people lose their hope too, here our robot jumps in to save people and find a way to enter firefighters. This makes our project unique and related to the Technology for Humanity competition.

1.2. Project Topic and Objective

The subject of our project is to develop an automatic and sensitive robot to help firefighters in where that they can not enter because of intense fire and they can't quench the fire, to help and find a way to help trapped people in the fire. The robot has an unburnable and flexible body to resist in high tempratures and can enter every where. This robot is riched in components to understand and analyze the enviroment situation and reports that to the Webpage, this robot can make a way for firefighters to enter the fire scene and also tell them how many people in which conditions and situations are trapped there.

2. TEAM STRUCTURE

2.1. Team Organization and Task Distribution

NO	TEAM ASSIGNMENT	EDUCATION LEVEL	GRADE	MEMBER ROLE
1	Helps in Coding and Technical challanges	Undergraduate		ADVISOR
2	Manages the work and comes up with ideas for project	High School	11	CAPTAIN
3	Supports the team by providing materials and requirements for project	High School	11	MEMBER-1

4	Designing and devoloping software of the project	High School	12	MEMBER-2

3. PROBLEM/NEED SOLVED

3.1. Problem Definition and Literature Review/ Research

Firefighting is one of the most dangerous professions due to its unsafe and constantly changing environment.Fire, smoke, heat, collapsing structure and poisonous substances are seeable risks for first response teams that can cause serious harms to their health or even can take thier lives, and it is inherently dangerous for human personnel to enter in such situations.Globally, it is estimated that hundreds of firefighters die annually due to fire-related hazards, including toxic gas exposure. Solving these problems is essential for the safety and well-being of firefighters, and can also have enviromental impact and fostering innovation in emergency practices.

3.2. Solution Idea

Taking video from the fire enviroment and reporting enviromental conditions by the robot is a good solution idea that we chose, so human personnels can save theirselves from the enviromental risks. Providing a video streaming from the fire enviroment can help the operators to make correct decisions and find a good way to help people and quench the fire. The camera module provides operators(firefighters) with information about the enviromental conditions and helps search for trapped people. Unburnable and flexible body of the robot is another characteristic that makes our idea different from other existing solutions and helps robot to enter and place itself in everywhere and resist in high tempratures.

4. METHOD AND TARGET GROUP

4.1. Method to be followed

This robot shoots a video using a camera module from fire enviroment. It analyzes the condition by collecting data using sensors and finds a way for entering human personnel to quench the fire and help trapped people. Then reports back to human personnel using ESP32 board to the webpage that are connected via wifi with each other. The data collected is analyzed by ESP32 before sending to the webpage. Combined MG996 servo motors makes the body of the robot that makes it flexible to place itself and go everywhere and can resist in high tempratures.

4.2. Target Audience

The target audience of our project is firefighting agencies or department that the robot can assist to their operation and helping trapped people by sending them real time data. The human personnels can save their well-beings and lives by using this robot from fire, smoke and poisonous substances found in fire enviroment.

5. ORIGINALITY, INDIGENOUS, APPLICABILITY AND SUSTAINABILITY

5.1. Originality and Indigenous

Our project solves the problems by shooting video and sending that to first response team to make a good decision to quench fire and rescue trapped people. Collecting enviromental data using sensors and analyzing them by ESP32 board and sending that to the webpage to be seen by the human team and let them to know about conditions of the enviroment, is a unique feature of our project. Natural fibers are the local components that we used them for insulation and highly protecting cover for our project that helps the robot to resist in high tempratures, these features differentiate our solution method from other existing methods.

5.2. Applicability and Sustainability

Our project uses advanced robotics, video capture and enviromental analysis technologies. Real time video streaming will be integrated with a web-based interface to allow for smooth communaication between the robot and the firefighting personnel. We engineered into the system the necessary sensors that will allow for effective condition assessment. By creating a robust funding strategy and continuously improving the system based on user feedback, we aim to enhance safety and efficiency in emergency response while ensuring long-term viability of the project.

6. PROJECT CALENDAR

6.1. Project Schedule and Work Packages

No	WORK PACKAGE NAME	SUB-ACTIVITIES	BEGIN DATE	FINISH DATE
1	Rasearch and planning for project	Define project scope,budget, resources	10/1/2025	1/2/2025
2	Requirements analysis	Listing and buying requirements	3/2/2025	8/2/2025

3	Hardware development	Connecting components, physical design	28/2/2025	13/3/2025
4	Software development	Develop algorithms, develop the webpage	17/3/2025	20/4/2025
5	Uploading Sketch and testing	Connecting the robot system with the webpage, making prototype, testing in simulated fire scene	1/5/2025	9/6/2025

7. REFERENCES

1. for project idea and literature review we used the book "Firefighting Robots: The Future of Firefighting" by S. J. McCarthy; This book explores the development and applications of firefighting robots, including case studies and future trends.

2. **"**Robotics in Firefighting: Applications and Challenges" **:** this article talks about AI usae in Firefighting problem solutions

3. ResearchGate: An academic social networking site where researchers publish their papers, which include studies on firefighting robots.

4. "Firefighter Rescue & Survival" by Richard Kolomay and Robert Hoff:This is a book that explores modern solutions for firefighting.