

All-Terrain Bot for Controlling WildFires. (Integrated-Project)

Deep Trivedi¹, Shivam Joshi², and Yadukrishna³

¹dht258@nyu.edu

²sj3104@nyu.edu

³ybg211@nyu.edu

ABSTRACT

Wildfires are becoming a new culprit of forest depletion and major harm to the environment. In the US alone, there were 46,706 wildfires, according to the National Interagency Fire Center (NIFC) and about 4.6 million acres were burned in the 2019. There is very less research done in the robot-assisted wildland firefighting domain, although there is a plethora of firefighting urban robots and at myriads of types of cranes for cutting tress. We aim to integrate these two fields by conforming to broad guidelines laid down by multiple subject matter experts [1][2][3].

Keywords: Assisted firefighting, Raspberry Pi, Arduino, Remote operation, mobile robot, all-terrain, rocker-bogie, UGV

INTRODUCTION

As we have already worked on the same project for previous two mini-projects, for integrated project we wish to continue the same. The idea is to integrate **Arduino** and **Raspberry-Pi** to build a all-terrain robot which can be accessed from anywhere in the world over the internet. We will create a mobile application to get live-camera feed from the robot at remote location and we can control the robot at remote location using that mobile application. For this purpose we are using a service provided by Google called - **Google Firebase**^[4]. This enables the mobile application to communicate with on-board Raspberry Pi. Moreover, we decided to use a Pi-camera which is compatible with the Raspberry Pi to feed a live video to the user via the internet on a smartphone application. Arduino is also used to receive the commands (Serial Communication) from the Raspberry Pi and perform the control task on the robot actuators.

In summary, Raspberry Pi is used for two primary functions.

1. It transfers video feed from the robot to a web server. This live feed can be seen by the user using the smartphone application.
2. It reads all the commands sent from the firebase database and instructs the Arduino to perform the required tasks.

Arduino has two main functions:

1. Receive sensor readings from different on-board sensors.
2. Perform commands from the Raspberry Pi to move the robot in desired direction.

REFERENCES

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