Robot Rodeo Thermography Detection

NAVSEA — NAVAL SEA SYSTEMS COMMAND

FATHOMWERX

UCSB · **PIPELINES**

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Project Objective and Intern Contribution:

Our aim was to build a robot that could detect thermal hotspots within an obstacle course (that resembles a naval ship environment) using a Flir camera.

In addition to this objective, we had to ensure that the robot could navigate and overcome obstacles that it would encounter on a naval ship: steep flights of stairs, rocking from the boat, and opening/closing doors.

We started with three potential designs, but narrowed it down to a tank chassis (as seen on the right). To simultaneously control the two motors on our robot wirelessly, we utilized a motor driver, an arduino board, and a bluetooth module; this simplified the construction process tremendously and allowed us to control the robot with our phones. On top of the robot, we installed a crane arm (with its own separate motor board) to allow the robot to manipulate objects in its environment - such as door handles, buttons, and switches.

All of us worked hard to bring the robot from just an idea on the drawing board to the obstacle course. Andres did most of the wiring, Emma did most of the coding, and Eddie did most of the construction.
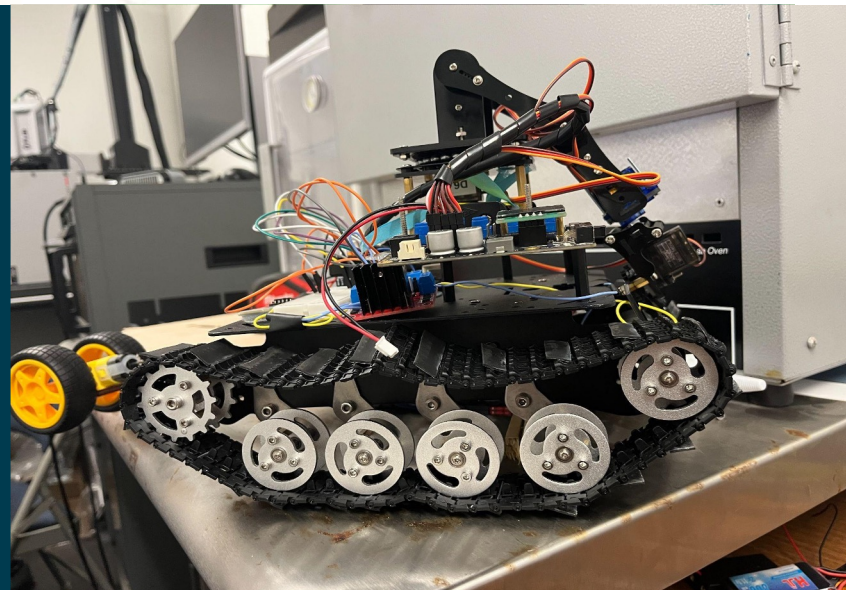
1. What are you most proud of this summer?
Emma: that i got to learn SolidWorks and soldering.
Andres: wiring the tank in order for it to work.
Eddie: definitely the soldering part.

2. Why was the internship valuable?
It exposed us to new fields of technology and improved our creativity and teamwork. Additionally, it taught us new, concrete skills that will help us to continue down our career paths.

3. Advice for future cohorts?
Learning things like SolidWorks and MatLab are an easy way to gain new, incredibly useful skills that will also look great on your resume!

Results / Accomplishments / Next Steps:

We demonstrated that while it is easy to make a robot that can move around and take thermal images, creating one to efficiently and consistently climb stairs and move over obstacles is very difficult and requires more of the Navy's time and focus.
The impact for the Navy is to show one approach to automating maintenance tasks, along with its flaws.
What's most important is applying this tech across the navy to reduce the time and number of people required to perform maintenance. In the future this work will be able to maximize efficiency in the navy.

FLIR ONE Pro IOS Thermal Camera