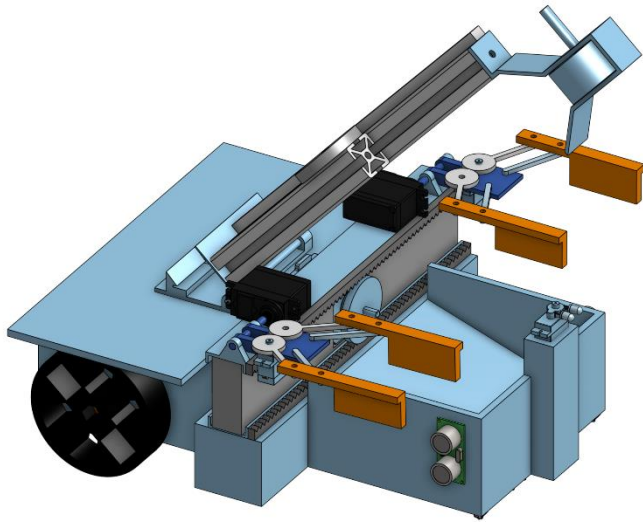


Treasure Collecting Robot

Tools and skills: C/C++, Oscilloscope/Multi-meter, Circuit analysis, Soldering, Control Algorithms

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Links: [Video Demo](#) (download), [GitHub Repo](#), [Course Info](#)

Goal:

Built an autonomous treasure collecting robot capable of line following, infrared signal detection and filtering, magnet detection and autonomous driving.

Outcome:

Semi-finalist robot placed 4th out of 16 teams. Stored and obtained 3 treasures.

Key Features:

Autonomous driving:

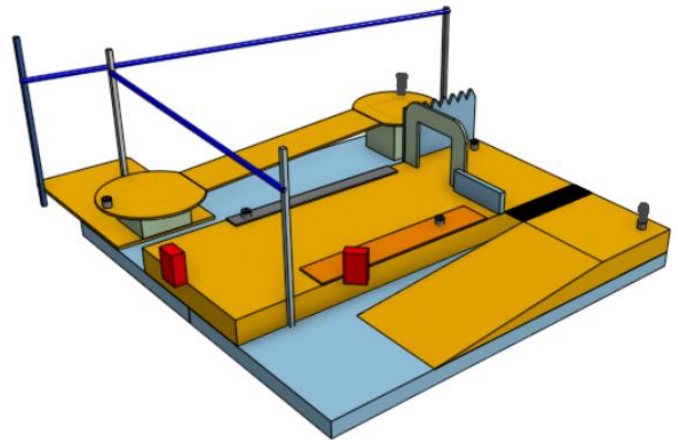
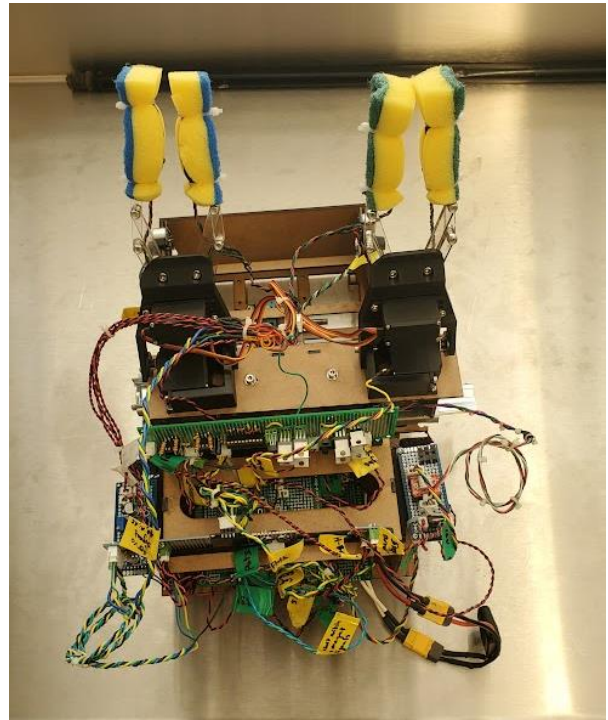
- Programmed a PD controller in C++ for autonomous navigation on STM32 Micro-controller
- Soldered phototransistor circuits for a reflection sensor to navigate following black tape on a white floor
- Infrared sensor circuits captured infrared signals from different beacons

Object detection and sensing:

- Designed and soldered bandpass filter for distinguishing infrared signal frequencies
- Wired sonar sensors to detect treasures
- Hall-effect sensors scanned treasures to detect magnetic fields for false treasures

Claw & treasure capturing:

- Double rack-and-pinion claw mount powered by stepper motor for placement and servo motor for grabbing motion



Competition surface CAD model (above). Side view of robot featuring claw mechanism and laser-cut chassis (below).

