



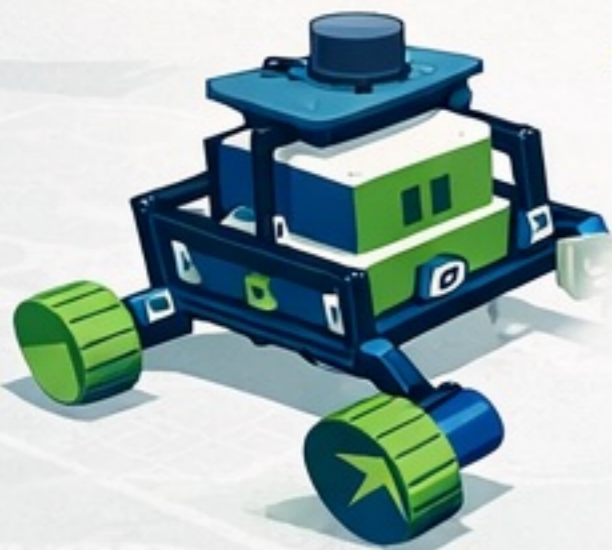
TWO MEN AND A MARSCHINE

Designing an Autonomous Rover for Planetary Exploration and Indoor Navigation

ABSTRACT

The Marschine project aims to develop an autonomous rover capable of navigating unknown terrain, both indoors and in planetary-like environments. The rover is designed to autonomously plan paths, avoid obstacles, and transport samples using sensors such as cameras and lidar.

BACKGROUND



Rover Design

- Four wheel rover with adjustable suspension.
- Onboard Raspberry Pi 4 for processing
- Lightweight, modular frame.



RESULTS

Autonomous Navigation

- Successfully navigated complex indoor terrains autonomously
- Detected and avoided obstacles in real-time



CONCLUSION

The Marschine rover successfully demonstrated its ability to autonomously navigate and collect samples in unknown environments using advanced sensor data processing. Future work will focus on enhancing the rover's efficiency, robustness and expanding its operational capabilities to more challenging terrains.

RESEARCH OBJECTIVES

- Design a rover capable of navigating autonomously through unknown terrain
- Detect and avoid obstacles in real-time
- Localize and map environments using onboard sensors.
- Plan efficient paths to designated goals
- Reliably transport samples upon collection.

METHODS



- 360° Lidar
- Depth camera
- IMU
- Inertial Measurement Unit (IMU) for tracking



Sample Collection

- Transported collected samples to designated drop-off points
- Performed reliable automated sample retrieval and delivery

