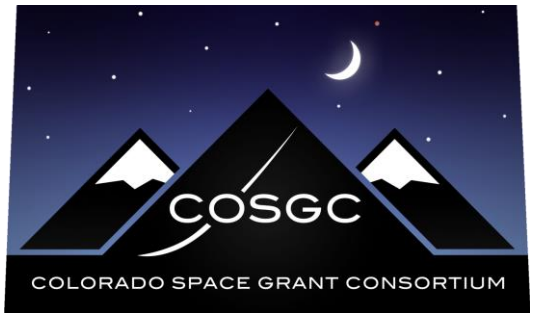

Robocop: Delivering an Autonomous Robot

Tanner Sones, Devin Jackson, Adam Boatner, Benicia Gabell, and Peter Park

Community College of Aurora, STEM Department, 710 Alton Way, Denver, CO 80230

Contact Author's e-mail address: peterbluespruce@gmail.com and tjsones9@gmail.com

Abstract

Robocop is an autonomous robot designed to traverse a Mars-like environment based on specific criteria. The project required a working drive system with suspension, wheels, and motors powered by lithium batteries connected to an Arduino-based control system. Code was implemented to utilize sensors with the driving system for navigation and obstacle avoidance. Designing and building such a project as part of a team was a unique experience.

The team began with multiple conceptual designs that attempted to fit the challenge requirements by weight, size, and autonomous capability. The initial stage of the building required immense trial and error as the chassis (holding control and power system) and legs (holding motors) were 3D printed. Each set of wheels required adapters to connect to the shaft of the motors. Once we wired and connected all driving system parts, the team programmers wrote driving code to get the robot in motion. Integrating all systems proved to be more challenging as we ran into minor errors in the design or program.

Our prototype shows promise, autonomously driving and revealing the potential for simple improvements in each system. The chassis has solid construction while being relatively lightweight, housing the power delivery system alongside the Arduino controllers. The 3D-printed legs were difficult to produce and raised further challenges as their connection method caused a lack of stability. Brackets were designed to attach suspension from the housing unit to the legs to increase stability and stiffen the structure. Lastly, the motor wiring connection point was insufficiently attached, which resulted in constant separation, requiring a job to eliminate the loose connections.