

Team 2 / Project 3

Robot Design and Hardware

In this project we completed the design of robot in two stages (1) Prototype design was made to test the feasibility of design and compatibility with code, (2) Final Design was completed after getting feedback from initial testing. Following are the key features of this design.

Chassis:

Design of this robot is based on all wheel drive model with low center of gravity. The main objective behind this design was to provide uniform power to all the wheels to reduce slippage while making turns. Earlier to this design we tried every combination of wheel sizes and tested it for slippage but all of them failed to show uniform performance. We got the optimum performance on all wheel drive with chassis mounted on small broad wheels. Handy board was mounted in the center of the chassis to have uniform distribution of weight on all four wheels. There was claw mounted on the front to grasp the cubes, powered by a small motor. This claw gave robot the ability to move back and turn in all directions while holding cube inside the claw.

Power Transmission and Wheels:

Two back wheels are powered by two motors on the back of the chassis, connected separately and power was transmitted to all four the wheels by gears. Fig 2 shows the gearing arrangement. Motor speed was kept moderate using the gear ratio of 1: 15 but we still had some problems while aligning with black tape. Robot was going either too fast at high power or was not moving well at low motor power.

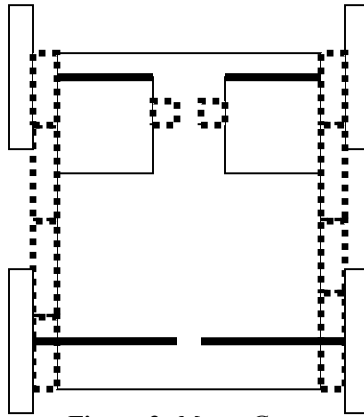


Figure 2: Motor Gearing

Sensors:

In this project we two wheel encoders mounted on the back wheels and two reflectivity sensors mounted on the front of the chassis all at equal distance. CMU cam was placed on a servo at the front the chassis with a fixed angle of view. In last project we used E.T sensors on a adjustable mount, but we had problem because the angle changed frequently when servo rotates at high speed. Using CMU cam on servo gave us the ability of turning around without moving the base and thus reducing the chances of getting lost.