CS 5973 – Intro to Intell Robots Project 1 – Sensing and Movement

Group 4

- Justin Fuller

- Matthew Lawrence

- Rahul Kotmaraju

Team Organization – Task Division

- Justin: Robot Design

- Matthew: Software Design

- Rahul: Complete Documentation

- All Members: Analysis, Prelim Design, Calculations, Testing

Team Organization – Key Features

- Democratic team

- Equal share of responsibilities

Team Organization - Success

- Productive team meetings and brainstorm sessions.

- One person had the holistic view of the robot code.

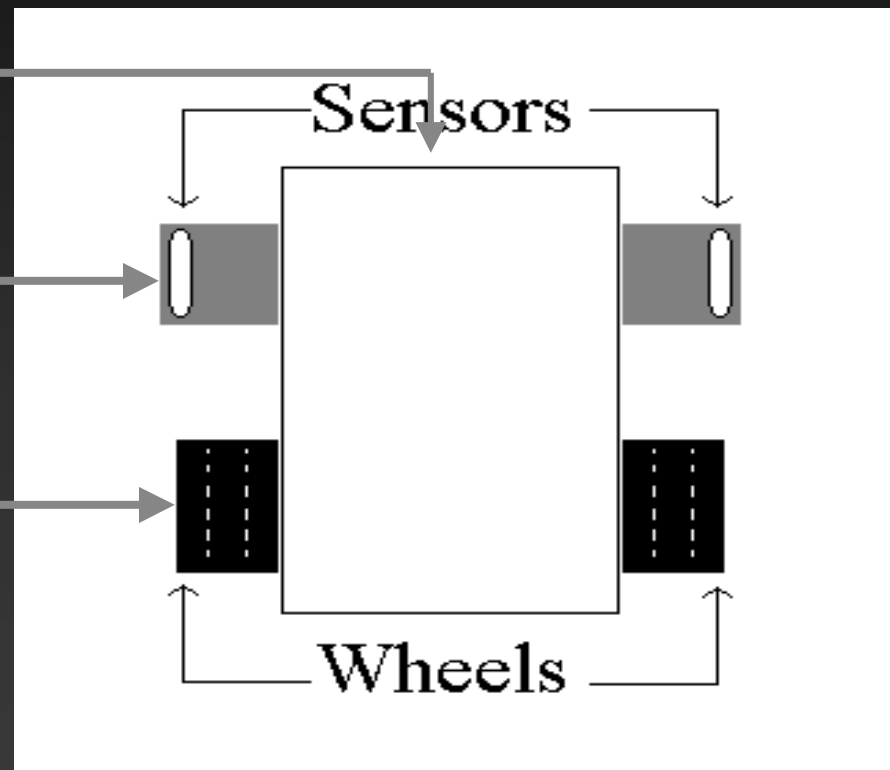- Good understanding and melding of individual ideas.

Robot Design

Initially: Caster Wheel

Later: A rigid leg bounded below by two large pulley wheels.

IR reflectance

Gear ratio - 1:1.67

Sensors

Wheels

Robot Code

Software consists of four phases:

- **Align**
  - Drive robot slowly
  - Align over tape.
  - If timeout occurs then reverse, reattempt alignment.
  - Success - Robot aligned squarely with tape facing target square.

- **Cruise**
  - Drive straight ahead until tape detected or timeout.
  - During low speed, light sensors ignored to ensure robot fully exits square before sensing begins. If robot detects tape, continue ahead briefly so that robot fully inside square.
  - If phase times out, then the robot has veered to one side and has overshot the square.
    - In this case, robot will back up a fixed length.
    - The target square should now be directly to either the left or the right.

Robot Code - continued

- **Turn**

  - Spin the robot 90 degrees clockwise.

  - If the robot not in target square, the square will be either behind or ahead of the robot.

- **Reverse**

  - Drive the robot backward for a fixed time ensuring robot will be behind square when alignment begins.

  - After the reverse phase, the square will be in front of the robot regardless of whether the robot veered off-course during the cruise phase.