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Project Proposal - CheckersBot 9000

Objectives:

CheckersBot 9000 will be a magnet-powered checkers board with a built-in AI opponent. It will be able to perform three main tasks:

- Move (and remove) checkers pieces around the board by moving a magnet underneath the board
- Interpret an image of the checkers board and identify the current arrangement of pieces
- Analyze the possible moves, and decide on the best move to make (to a certain degree)

Major Software Components:

- Artificial Intelligence to determine the best possible move to play
- Analyzing an image of the board and converting it to useable data
- Software to control motors, handle input/output, and manage hardware components
- LCD user interface

Major Hardware Components:

- Custom wooden checkers board and pieces for simple analysis
- XY mechanism to move pieces across the checkers board by raising and lowering a magnet from underneath the checkers board
- Mechanism to raise and lower magnet from underneath the checkers board
- Raspberry Pi Camera mounted above the checkers board

Anticipated Challenges:

- Image recognition algorithm to determine arrangement of pieces on checkers board
- Artificial Intelligence may be difficult to implement.
- Determining the right size of the magnet and checkers pieces in order to prevent the robot from moving the wrong piece will be crucial to the functionality of the robot and will most likely require a lot of trial-and-error.
- Designing and building a custom XY mechanism underneath a checkers board will require extensive prototyping and trial-and-error.
- Implementing advanced checkers moves such as consecutive jumps and kinging
- Configuring all the separate hardware to work in unison