CH-STR (Chess Strategy) Bot

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Introduction

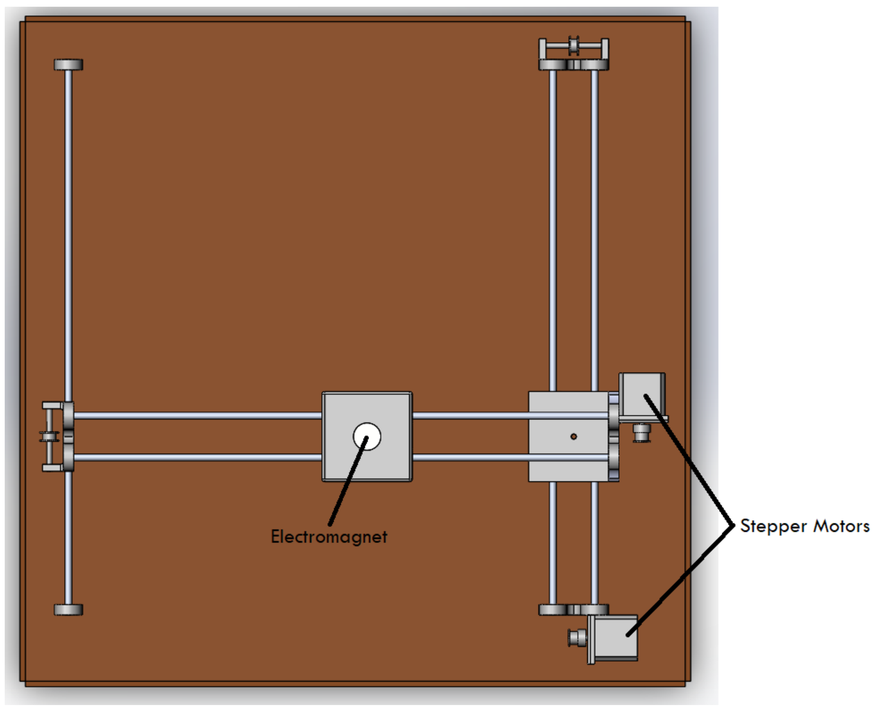
Chess is a simple, yet complex, game based around maneuvering chess pieces strategically around the chess board in order to put the opposing player's "king" in checkmate. It is typically played in one of two settings: with a physical board between two players facing each other or a digital board between two players far from each other.

Objective

The purpose of this project is to meld both the physical and digital board in order to form a hybrid type of play. In doing so leads to an entertaining chess experience in seeing the chess pieces move without the user having to do anything.

Method

CH-STR Bot was built in two levels separated by the chess board. The lower level below the chess board would encase the rail system driven by two stepper motors which would allow XY movement for the electromagnet. The upper level would simply be the top of the chess board with metal below each chess piece. As the player and programmed AI plays chess with a custom digital chess board program ran on the Raspberry Pi 4, signals are sent to control the stepper motors and electromagnet to move the chess pieces from beneath the physical chess board to reflect the movements made on the digital board.



Code

The code was written using Python on the Raspberry Pi 4, which controls the electromagnet and stepper motors as well. The Sunfish chess engine was used as the means to play chess and was altered in order to communicate with the stepper motors and electromagnet to reflect physical movements based on any action that happens digitally through the chess engine.

Discussion

CH-STR Bot was able to perform and move chess pieces without any player interaction with the board. Further improvements that may be made to boost performance would be to increase the computing power of the Sunfish chess engine to increase its difficulty and tightening tolerances to reduce jitter on the physical system.

Acknowledgements

I would like to thank Professor John Caffrey for his support on this project and his recommendations on building the physical system. The Sunfish team for developing the chess engine that would be used to play chess. Jeremy Anunwah for his assistance and recommendations in linking the Sunfish chess engine with the physical system.

And lastly, I would like to thank the Kellogg Honors College for providing this amazing opportunity.