Tartan's Gambit

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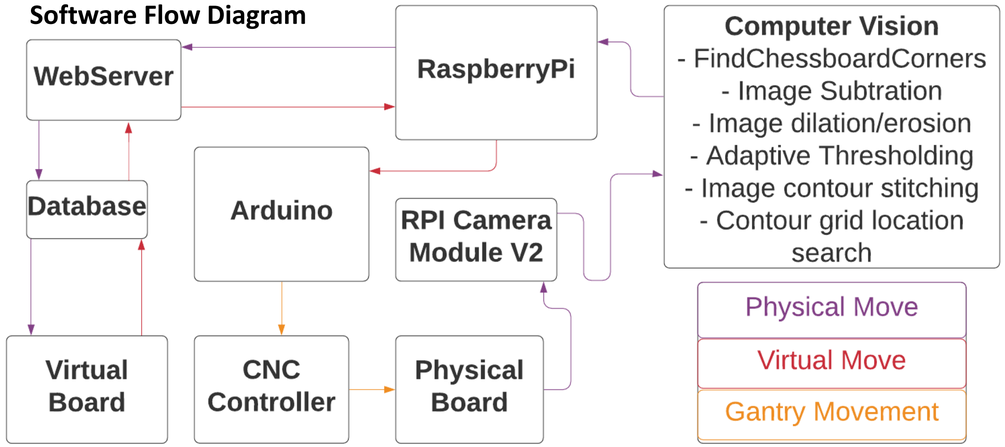
Product Pitch

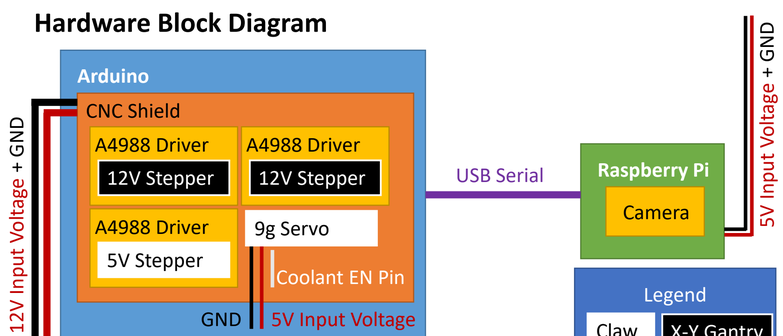
Tartan's Gambit is an integrated software and hardware system that enables a user to play a physical game of chess with a remote opponent via a web application. Due to the pandemic, it can be difficult to see people in person, and an in-person game of chess cannot be played while maintaining 6-feet of social distance. Hence, we have created Tartan's Gambit. One player makes moves via a **web application** while the other player makes moves on a **physical chessboard** with actual pieces. The **moves made in the real world are detected using computer vision** and are translated to be reflected on the web application. The moves made by the **web player** are communicated to the **gantry system** which performs the web player's move on the physical board world.

System Architecture

Software Flow Diagram

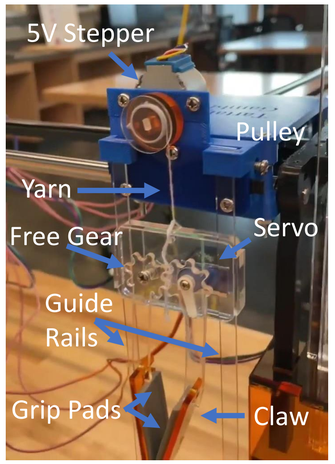


Hardware Block Diagram

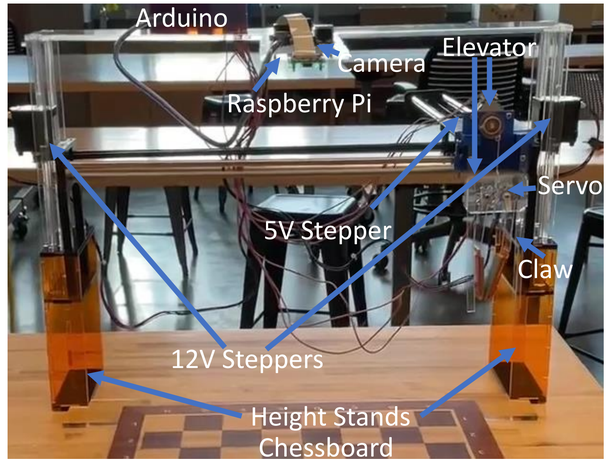


System Description

Elevator Gripper Close Up



Front View of Entire System



System Evaluation

Requirements Met

Requirements	How it is Met
Remote play	Physical and virtual boards communicate via http requests and sockets.
Synchronous board states	Webserver synchronised with the physical board every 5 seconds
Low false positives from move detection	OpenCV pauses calculations while movement is occuring within its field of view
Gantry does not interfere with other pieces	Each piece is lifted above the height of the tallest piece (King) before commencing any XY movement
High accuracy of move detection	OpenCV bases the location of the moves on where the center of the pieces lie, minimizing edge cases
No turns detected if player decides not to place a moved piece	The OpenCV will not report and forward moves to the webserver if only one square is calculated to have been involved

Accuracy Test Chart