# WIZARD CHESS

CMPE 325 – Group 21

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# Table of Contents

## Idea

The goal of the group's project is to build a voice-controlled chess board that will move pieces autonomously. Using a microphone, the user can activate the chess board by saying the key phrase, "Wizard Chess", followed by a command. The key phrase recognition uses an offline library called Snowboy, while the command speech recognition uses the online Google speech recognition. Upon receiving a command, the board will then use its built-in track system, which can move in both X and Y directions, to hold a magnet to the selected piece and move it to the desired location. The machine must be plugged into an outlet for power and connected to Wi-fi for command recognition. This project will allow up to two people to play a full game of chess using only their voices, which creates a more accessible and enjoyable user experience for those with disabilities or limited movement.

## Contributions

| ***Student ID*** | **Name** | **Accomplished Tasks** | **Upcoming Tasks** |
|---|---|---|---|
| *10211533* | Allison Christensen | -Track & Board Design/Construction Team:<br>○ Discussed/designed physical prototype mechanics<br>○ Collected materials (wood, chess pieces, gears/track, drawer sliders, etc.)<br>○ Cut and sanded base board, legs, motor support, and top board<br>○ Screwed parallel drawer sliders for lower axis to base board<br>○ Mounted upper axis drawer slider and support<br>○ Fixed circular gears to x and y axis stepper motors and glued motors to the drawer sliders<br>○ Glued track attachments at appropriate height to meet the gear teeth (both axes)<br>○ Cut and sanded dowel for magnet arm attachment<br>○ Secured magnet/dowel to third stepper motor and mounted the unit to the upper axis slider<br>○ Cut top board to fit square chess board<br>○ Attached legs, top board, and chess board to base<br>○ Drew 10X10 chess grid on board for testing<br>○ Resolved upper axis instability issue<br>-Edited Assignment 3 | - Improve aesthetics of the track<br>-perform board/track testing with integrated speech & logic components<br>- Improve movement efficiency of the track |
| *10194574* | Ryan Kinsella | - Track & Board Design/Construction Team (see complete task breakdown above) | - Improve aesthetics of the track<br>- Improve movement |

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| | | | efficiency of the track<br>-integrate output audio |
| *20013052* | Matthieu Roux | - Wrote speech to text python code<br>-Integrated trigger word speech recognition<br>-Worked on query speech recognition<br>-Configured speech processing integrated microphone and speech recognition software on the pi | - Improve voice recognition<br>- Start planning demo |
| *20000838* | Tom Heysel | -Researched Arduino – Pi communication techniques<br>-Configured and installed Nanpy firmware to Arduino<br>-Wrote test programs to confirm connection between Pi and Arduino is secured<br>-Researched micro stepping modes and determined 1/32 micro stepping is the best for our application to increase precision of control<br>-Installed jumpers to CNC shield to accommodate 1/32 micro stepping mode<br>-Wrote Arduino code to test the movement of steppers<br>-Adjusted potentiometers on CNC shield to optimize current flow to the motors<br>-Wrote Arduino code to test the motion of the track, wrote recommendations for second iteration of track construction<br>-Wrote all Arduino code to facilitate movement control<br>-Wrote all Python code to facilitate communication between devices and integrated communication into game | -Continued board testing<br>- Find and fix all potential bugs |
| *20017666* | Dennis Grajo | - Track & Board Design/Construction Team (See complete task breakdown above)<br>- Wrote Assignment 3 report | - Improve aesthetics of the track<br>- Improve movement efficiency of the track |

## References

The following are reports that the team used as reference for the construction of the track.

Penn State ESE Final Project Report
https://hackadaycom.files.wordpress.com/2011/05/final_project.pdf

Arduino Projects forum https://create.arduino.cc/projecthub/maguerero/automated-chess-board-50ca0f?fbclid=IwAR0nw-yK-LTsae2y53kBv5YnSEP6uuPitmHE2nUapRehlPgFM5mwBwpLqPM