Online Over The Board Chess

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Abstract: Connecting two physical chessboards with Wi-Fi and granting them the ability to register, transmit and receive moves to enable over the board play with an opponent online, against another physical board or against a chess bot.

Introduction

This project aims to enable physical chess play over long distances by providing two chessboards with the ability to display and transmit moves and connecting them trough the internet.

Description of the setup

To not have 2 identical chessboards and make optimal use of available components both chessboards will feature a unique mode of operation. The first board will be equipped with hall effect sensors [1] and magnetic pieces to send the moves and an text display to receive moves, time and budget permitting this will be upgraded to a hidden XY-gantry or a SCARA mechanism [2] with an electromagnet to move the pieces. To read the hall effect sensors multiplexers will have to be used as a chessboard has sixty-four spaces and the psoc6 does not have sixty-four input pins. To achieve sixty-four selectable data lines four sixteen-to-one multiplexers will be used with chip enable lines coming from a two-to-four decoder. Four bits plus two bits from the decoder grants us sixty-four options. The second board will feature LEDs to display the received move the opponent made and show what moves are possible with a selected piece. In this bord the user will use buttons to select a piece and then select a move with that piece which is then transferred back to bord one and displayed on the text display.

Figure 1: *An example of a chessboard that lights up and reacts to pieces moving.*

Overview

- **Inputs**
  - Hall effect sensors
  - Selector Buttons
- **Outputs**
  - LEDs
  - Text-Display
  - Manipulator with electromagnet (expansion)
- **Processing**
  - Calculating possible moves
- **Connectivity**
  - Wi-Fi
- **User interface**
  - Custom Webpage

References

[1] "Reed Switches and Hall Effect Sensors," [Online]. Available: https://www.kjmagnetics.com/blog.asp?p=reed-switches-and-hall-effect-sensors.

[2] "What Is a SCARA Robot? The Background and Benefits," [Online]. Available: https://robodk.com/blog/what-is-a-scara-robot/.