

# Augmented Reality Chess Engine Interface

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**Abstract**—This paper will take a look at the results of a bodystorming design session for a **Augmented Reality Chess Engine Interface**. This educational tool will use a cell phone to visually display chess moves in **Augmented Reality**.

**Index Terms**—Augmented Reality, Computer Vision, Chess Engines

## I. INTRODUCTION

The app will let users see the best chess moves on their mobile devices. The app is designed to let chess players at all levels have a way to learn and improve their chess skills. It will work by taking a picture of the board, obtained from the AR session and recognizing QR codes on the chess board and pieces to determine where the pieces are. The final app as designed would not need QR codes, but for the prototyping stage this will make the process much easier. Once the camera is able to locate the coordinate of each piece, this is then converted to a type of notation called FEN (Forsyth–Edwards Notation) which allows a full chess position to be written in 1 line of text. For example, the starting position of chess would be displayed as “rnbqkbnr/pppppppp/8/8/8/PPPPPPPP/RNBQKBNR w KQkq - 0 1”. This line of text is then passed on to the stockfish chess engine which will evaluate the best possible move. Once this is done the app will display this move on the board using Augmented Reality. It will place a 3D model of the piece at the location it should be moved to, as well as an arrow to show what piece needs to be moved.

## II. METHODS

In order to conduct the body-storming we had an observer, Alan Dong, and an actor, Mitchel Bloch, take part in it. Due to neither of us living close to the other, we did not have the ability to physically prototype so instead, we decided to use chess.com. The situation the actor came up with was; a new chess player playing against a friend who is considered an average chess player. The average chess player is considered to be rated around 800-1000 elo, in this case, we are going to be using 1000 elo as the average chess player. To keep things consistent, a 1000 elo bot was used as the opponent. The two possible scenarios that might occur were decided to be; the new player plays without a chess engine giving the new player hints on the best move, and the new player plays with a chess engine giving them hints. This was done by both the actor and the observer.

## III. RESULTS AND DISCUSSION

We found out that if it is a player’s first time they will tend to make moves that are very simple and do not utilize the back row much whereas the 1000 elo rated player and the chess engine will tend to utilize the back row more. Even with a chess engine suggesting moves to the player they can decide to not listen to it. Our next steps would be to get the Unity chessboard to snap to a real chessboard which will make the UI of the app a lot more clean and readable. We also need to add stockfish to our app and make sure it works properly.

## IV. APPENDICES

### A. Notes from the Observer

While playing with assistance on, the player is less hesitant with his moves since the assistant will tell them whether the move was good or not, this can build up confidence for the player while teaching them which moves are good at the same time.

### B. Notes from the Actor

I like how the assistance gives you many different options as to which piece you want to move, not just the best move overall. This is good because it still lets you think about the game instead of just helping you mindlessly.

### C. Use Case

People at all levels that want to improve their skills at chess

### D. Persona

A person who wants to get better at chess so he can play with their friends. They are not very good at chess but understand the basics of chess.

### E. What we did

We set up a bot with 1000 elo on chess.com and have players play against it with or without assistance.