Chess Teacher

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Product Pitch

Chess Teacher is a system capable of teaching people how to play chess using artificial intelligence. What differentiates our product from the others is that it creates a more realistic environment by having physical pieces rather than playing on a computer. Our system can play chess against a human being on a real chessboard and also recommend moves to help them improve their performance. In this way, it allows for social distancing and a more economical approach than in-person chess tutoring. The system is built on a real chessboard with a camera to detect chess moves, and the computing is done using a computer and FPGA.

System Architecture

Chess Teacher Block Diagram

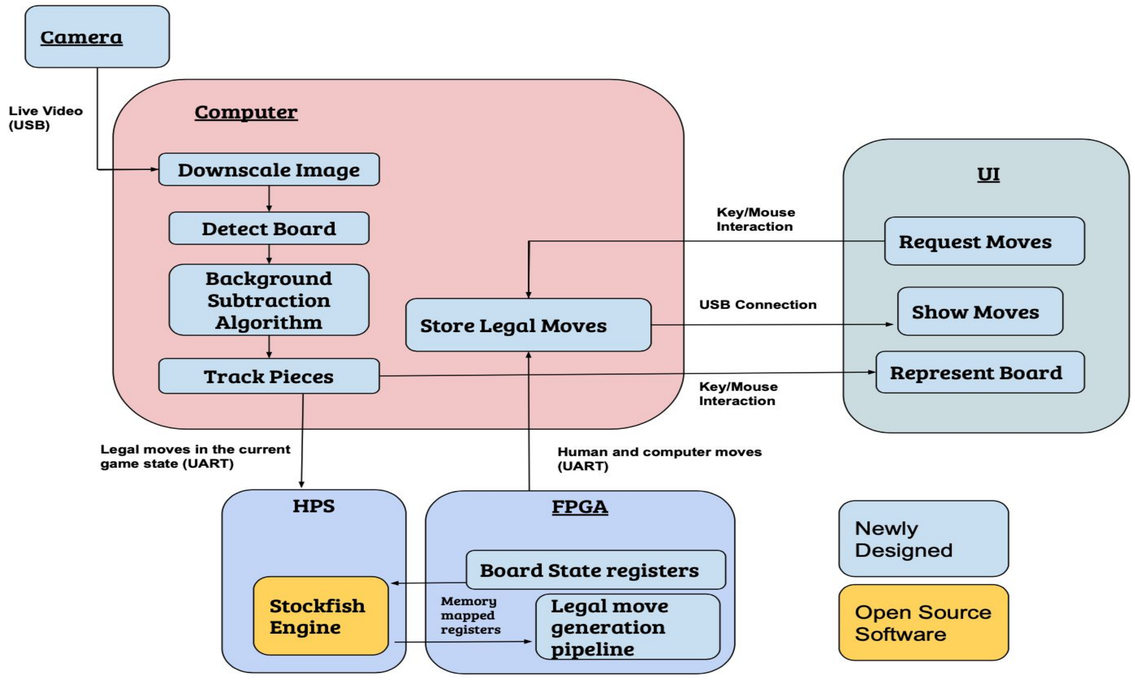

Figure 1: Block System Diagram

System Description

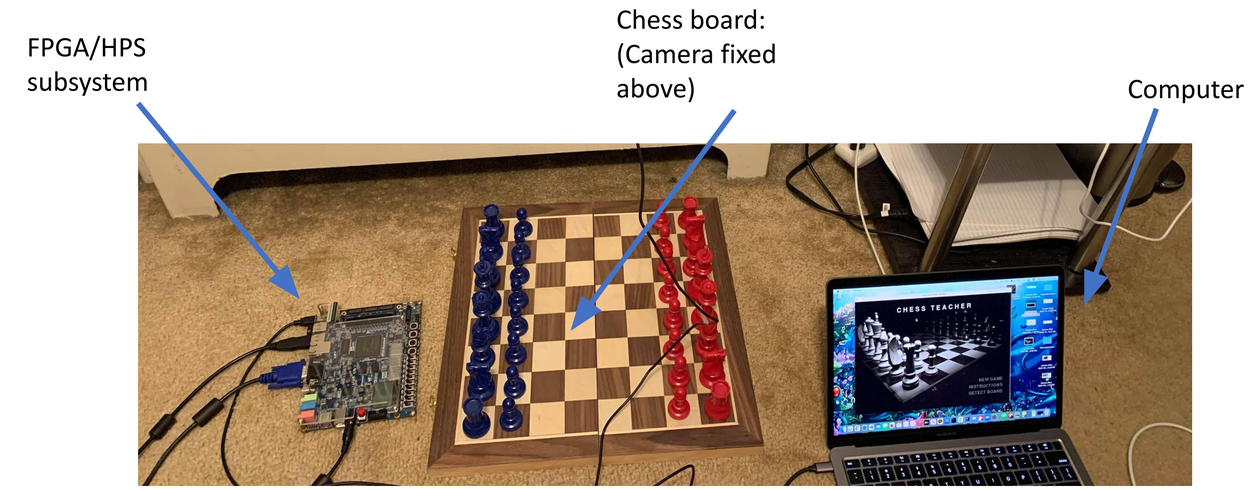

Figure 2: Entire system setup

System Evaluation

Correctness Metrics

Requirement	Testing Strategy	Metrics	Actual Output
Move detection	Software + Visual confirmation => 20 unique moves	99% accuracy in move detection & < 400 ms processing time	20/20 Moves correctly detected
FPGA legal move generation	Hardware testbench (ensure correct legal moves generated) => 10 unique board states	100% Correct	10/10 Board states correctly analyzed
Communication between Computer and FPGA	Hardware testbench (analyze packets are sent correctly) => 15 unique packets	Latency of < 1s & 100% data accuracy	15/15 unique packets from PC to FPGA to PC
UI	Visual confirmation of representing the board correctly => 20 unique moves	100% accuracy in representation of the board	20/20 Moves correctly represented