



AI Checkers Robot

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Project Goal

Building an AI robotic arm to play Checkers against a human player.

Design

Machine Vision Algorithm

- Detects the board and all pieces of the input image using OpenCV based on RGB values and geometry.

AI Algorithm

- Uses Alpha-Beta Pruning algorithm to find the best move for the robot out of all the possible moves.

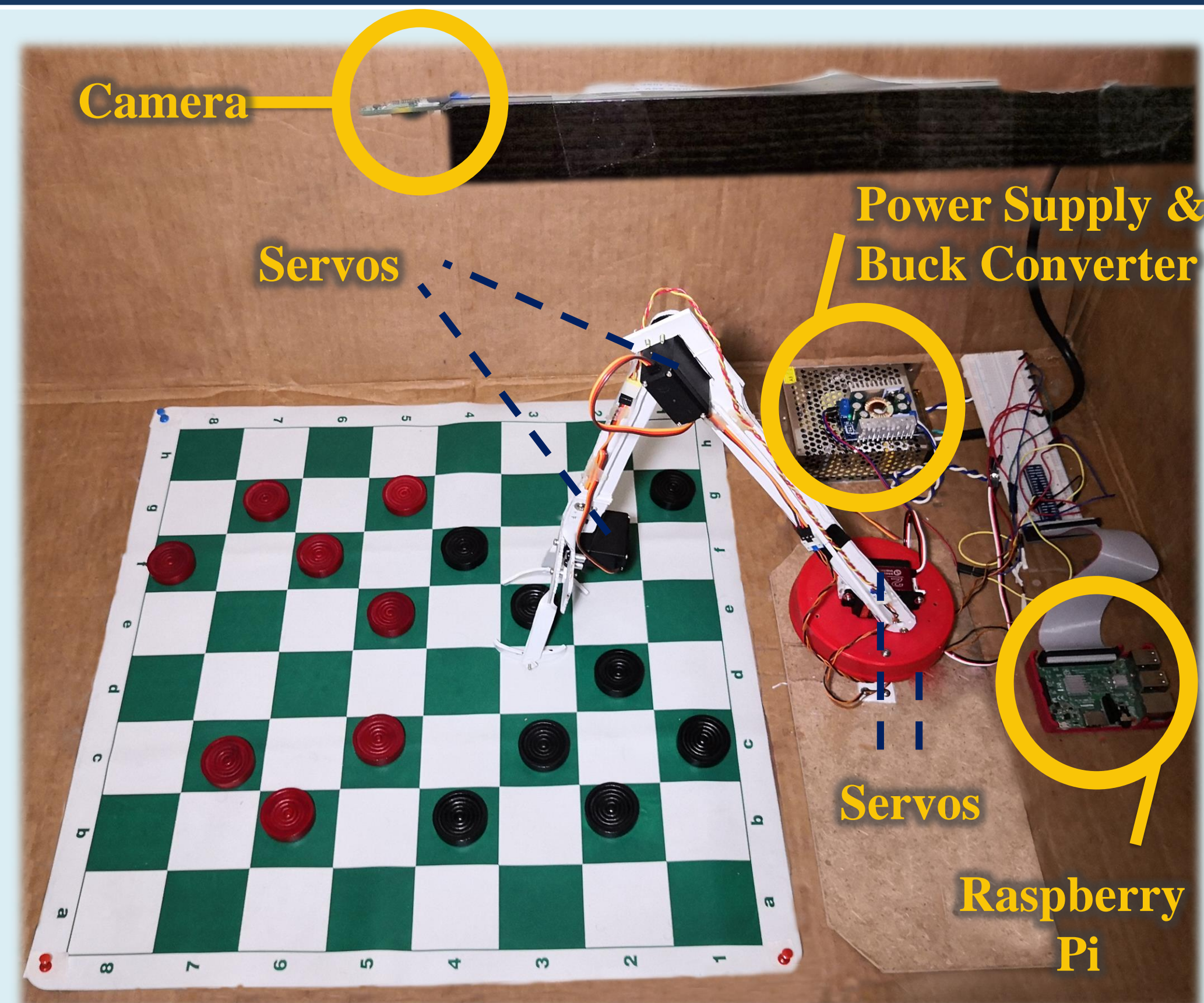
Servo Motors Controller

- Uses inverse kinematics to calculate servo angles needed to move the arm.
- Generates PWM signals to move the servos to the desired position.

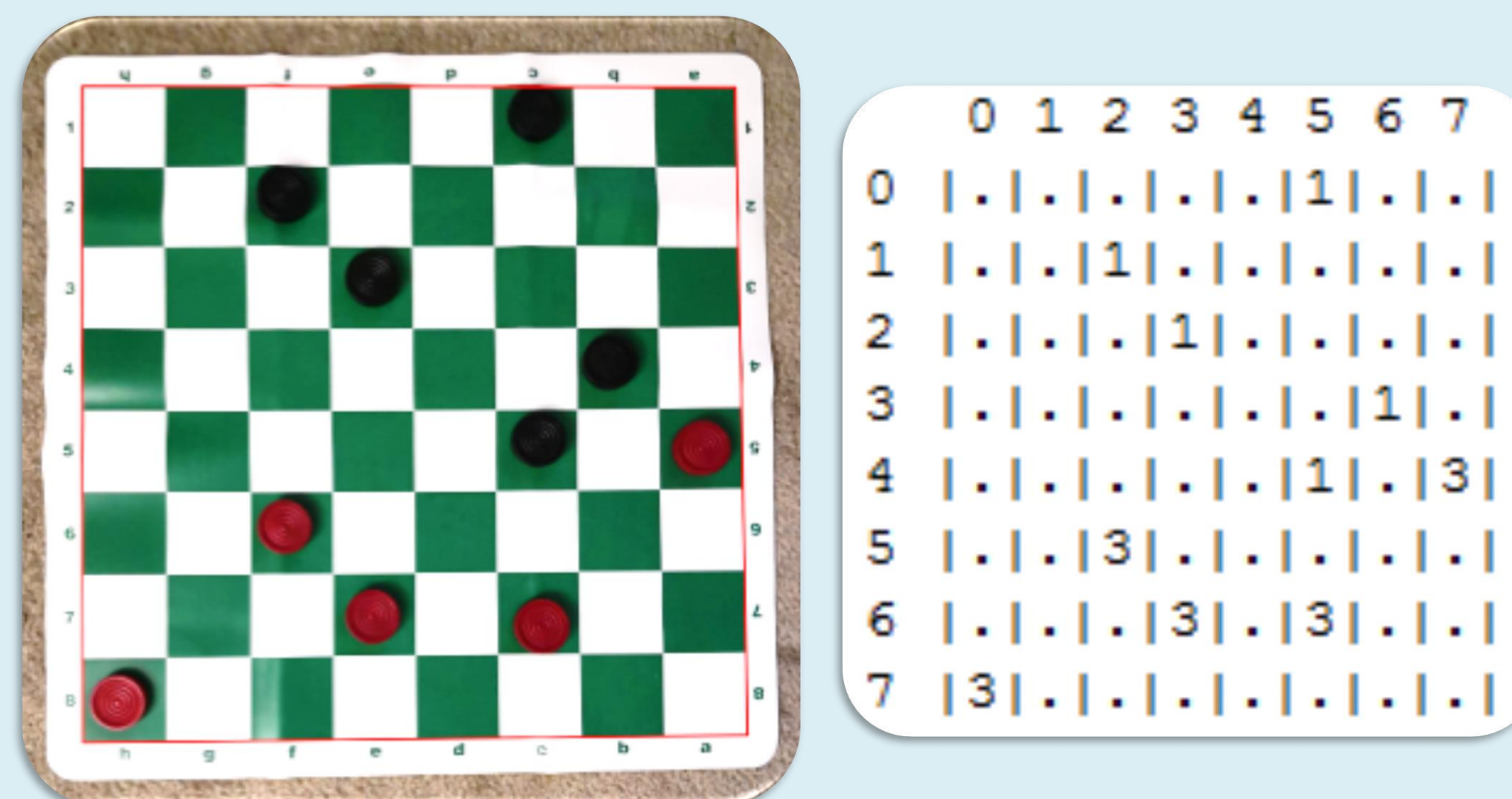
System

- Runs on a Raspberry Pi and is powered by a 12V power supply.

Implementation

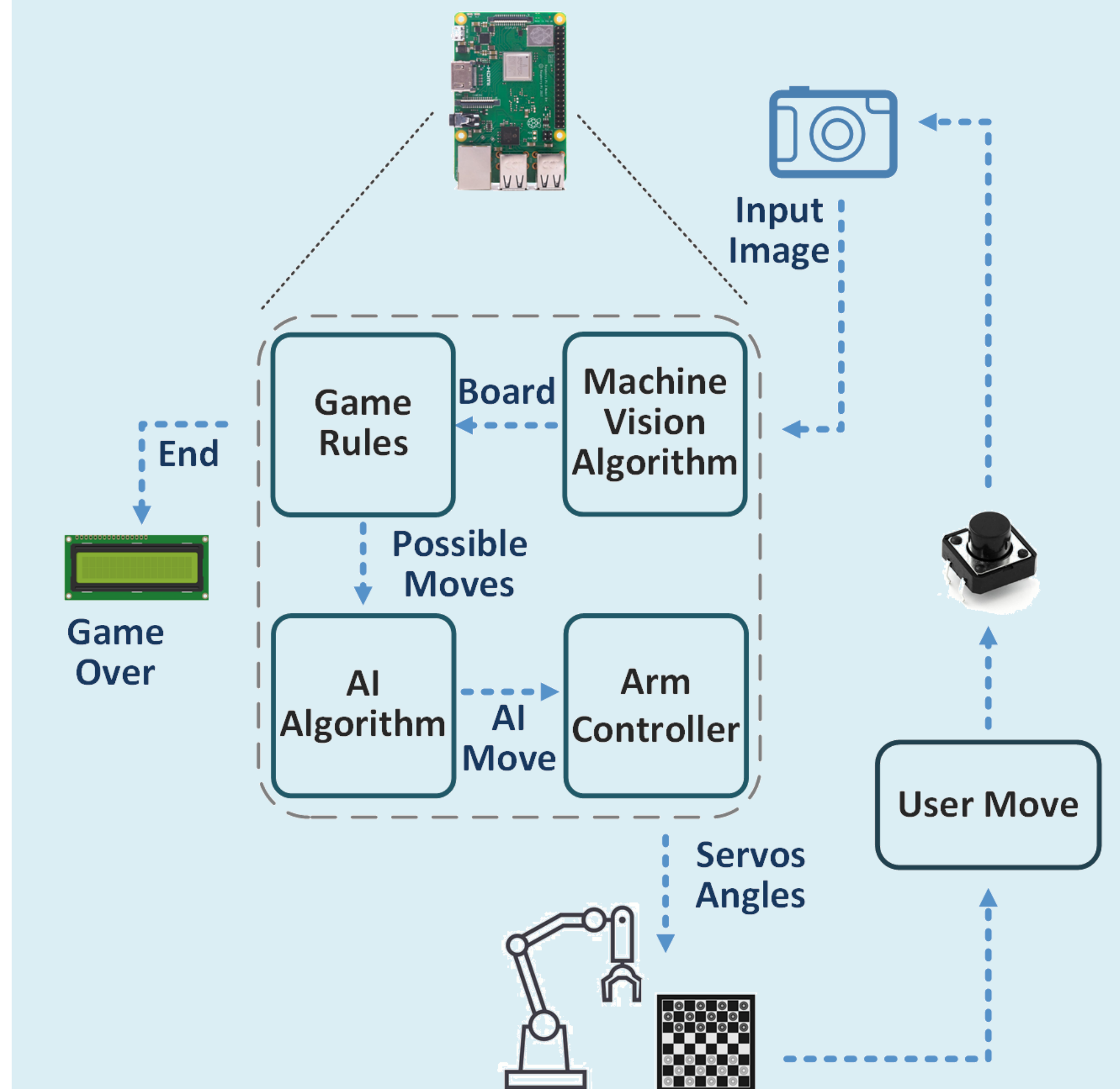


The AI Checkers Robot



Machine Vision Input Image and Output Array

High-Level Diagram



References

- Intel Corporation, Willow Garage, Itseez (2000) OpenCV (Version 4.0) [Source Code]. <https://opencv.org/>
- Arthur Lee Samuel, Alpha-beta pruning [Algorithm]
- Richard Hirst (2013) ServoBlaster (Version 1) [Source Code]. <https://github.com/richardghirst/PiBits/tree/master/ServoBlaster>

