AI Chess Robot Workthrough –

Chess Artificial Intelligence –

* able to understand basic chess rules and principles
* look ahead to predict next moves and course of action
* understand where it can move on the board
* play to win
* possibly neural network implementation to learn best moves – learning?
* Python based
* Firstly implemented maybe in gamemaker then move to standalone application?
* Take chess piece location – maybe translate it into a virtual/ emulated board and run the algorithm on that
* **TEST**

Object detection algorithm –

* Using tensorflow model
* And open cv
* Webcam input
* Get raw images, scale and classify them using guthub classifier and python script
* Train the model on chess pieces and then verify using training set and validation set
* Test video feed in being able to recognise chess pieces and keep training
* Train it on other datasets if possible
* Webcam placed birdseye view of chess board – possible second webcam on robot to see its movement
* **TEST**

Chess board recognition –

* detect the board and segment it into 64 little squares
* Canny edge detector
* Hough line detector
* After Hough, you can calculate all the intersection points, run agglomerative clustering, pick out the corner points, do a perspective shift, and then divide by 8 horizontally and vertically to get your squares.
* Then identify chess piece on each of the squares using object detection model
* **TEST**

Robot movement –

* Using ROS – Robotic operating system
* Design robot in solidworks
* Export to URDF file and initialise joint positions
* URDF details the configuration of joints, links, textures, physical constraints
* Import into MoveIT
* Add joints and gripper movement
* Test in simulations the inverse kinematics and motion planning
* Use rosnode to convert data and use firmware to output to real-life model
* Move robot in simulation first and then output to real robot
* **TEST**

Robot build –

* Designed in solidworks
* 6DOF
* Stepper motors for body joints and a servo for gripper
* 3D printed
* Arduino mega
* Still to be worked on
* Big
* **TEST**

A picture containing crossword puzzle

Description automatically generated