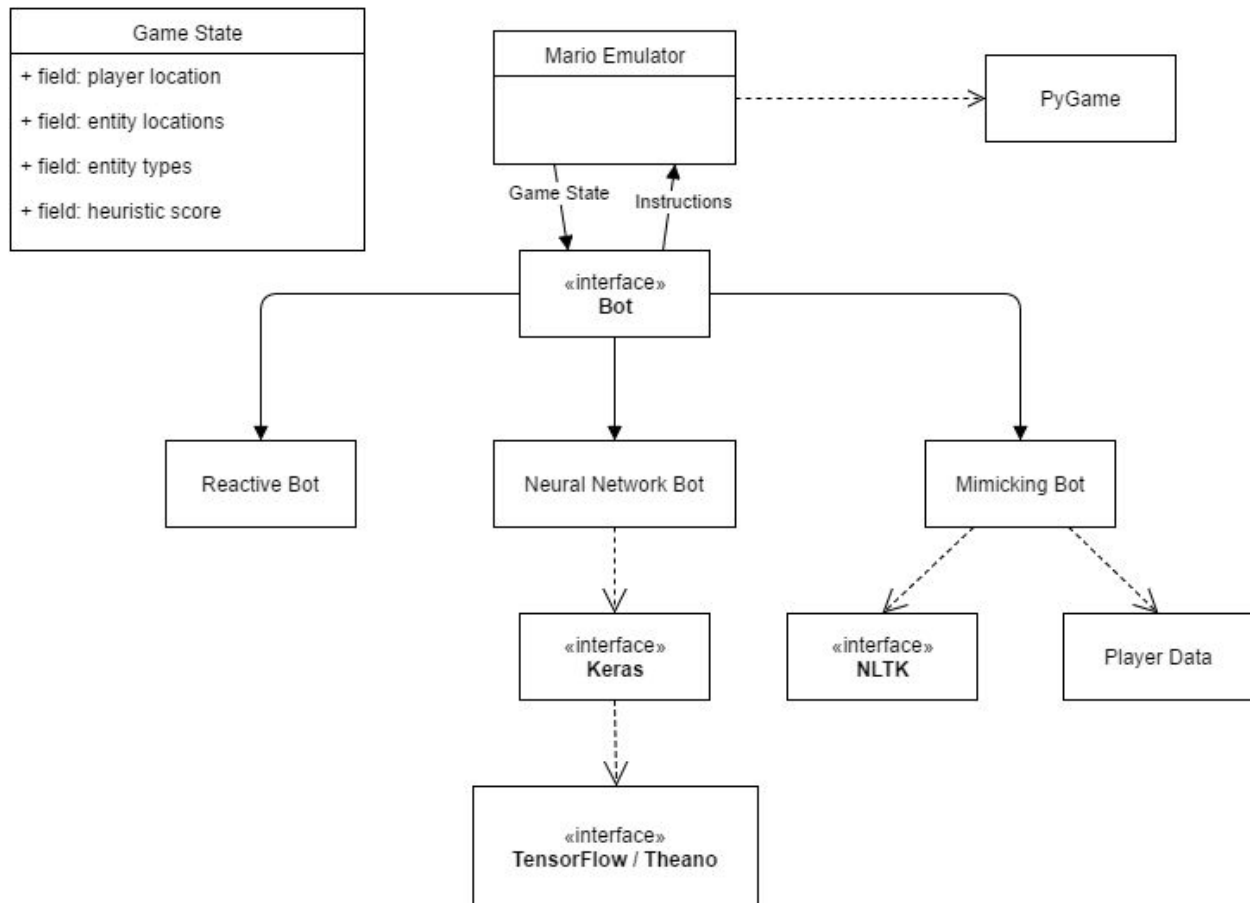


System Design and Architecture

The Super Mario Bros.



The Mario Emulator, powered by PyGame, sends game states to a Bot interface. The game state consists of the player location for that frame, as well as the locations of all the other entities in the level, as well as their types. It also includes the current “score” based on the heuristic. The bot interface transmits this data to whichever of the four bots is selected, receives instructions for Mario, and sends those back into the emulator.

The Neural Network bot interfaces with Keras, a Neural Network library, which in turn is powered by the TensorFlow/Theano backend. The Mimicking Bot also looks at player data, using it to determine how to act based on decisions that a human player made, learning from this data using the Naive Bayes classifier included in NLTK.

The “bot” interface between the emulator and the various bots is a simple python file that imports one of the four AI bots depending on the command line arguments. It has interface

methods that stores a succession of states and the number of frames given by the bot, as well as a method that returns the bot's decision when requested by the emulator each frame. The decision function just calls the matching (required) function in whichever bot it loaded, and the loaded bot can request historical states from the interface whenever that is required.