



CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

Name(s) Yousuf M. Soliman	Project Number S1425
Project Title GoAI: Creating an Artificial Intelligence to Play Go	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project was to develop an artificial intelligence to play the ancient Chinese board game, Go. The game is played on a nineteen by nineteen tiled board and players alternate placing pieces on the board, a players goal is to capture the opponents pieces by surrounding them with his own colored pieces. Go takes minutes to learn, but years to master. Go is one of the few games in which a computer to date, has not been able to successfully beat a human player without uncertainty.</p> <p>Methods/Materials The only material necessary for this project is a computer running a Linux based operating system. One must first set up the development environment. Once set up, one can begin to program the artificial intelligence. After it is fully written and debugged, it must be tested. The AI will run one million games against 1 Dan professional human players on the KGS Go Server, Fuego GOAI, and GNUGO.</p> <p>Results The artificial intelligence ran on the online KGS GO Server, one million games. Out of these one million games, the 'Go' artificial intelligence won a whopping 893917 games. The win to lose ratio for this artificial intelligence is .893 and an 89.3% win. The artificial intelligence is playing at the 1 Dan level and is winning a majority of the games against the humans it plays. Once the artificial intelligence developed in this project was completed, it was pitted against the other leading artificial intelligence in the game of Go. Against Fuego, one of the most powerful Go artificial intelligence systems available, GoAI was able to win approximately 74% of the time. And against the second most powerful, GNUGo, GoAI was able to win an enormous 93% of the time. As the artificial intelligence is a little bit more powerful than Fuego, and much more powerful than GNUGo, the artificial intelligence is currently in a very good standing.</p> <p>Conclusions/Discussion As the application was able to compete and play against the human player, along with that the application uses artificial intelligence to determine its move, therefore it would be a success. The application is very advanced in the terms of the artificial intelligence. The biggest changes include a much more powerful opening sequence artificial intelligence, as when there are many positions open and without any immediate dangers the computer needs to be able to anticipate many moves into the future.</p>	
Summary Statement The purpose of this project, GoAI, is to create an artificial intelligence to play the game of Go.	
Help Received I would like to thank my computer science teacher, Mrs. Najwan, for teaching me the basics of code. Along with that I would like to thank my mother, Wafaa Eldereiny, for helping me with my board and driving around to get me the materials.	