Artificial Intelligence Final - Nick Sanford

Artificial Intelligence is a sector of computer science research and development that attempts to create systems that act “intelligent”. Intelligence is very broad when attempting enumerate specify an explicit scale of intelligence so it may be used in an algorithmic sense. Do we evaluate it based on how many problems it can solve? Some humans are considered intelligent because they have a high IQ. In order to determine a computer or a program’s intelligence, should we have the computer or program take an IQ test? There are many ways to determine intelligence for humans, but for computers, intelligence is defined as the ability to solve problems, make decisions, and learn. This fortunately can be used to scale intelligence in humans also. For a computer to be able to mimic a human’s intelligence, we have to teach it to do the same things humans can. This helped us define artificial intelligence in this class as a science that has defined its goal as giving machines the ability to perform tasks that, when performed by humans, require intelligence. These include the ability to solve problems, make decisions, to learn and to understand. (end of 1)

In HW0, I discussed many topics AI is used for. Honestly, I do not believe I deserved the grade that I received on it because I wandered around the question in very different ways, and I do not believe I gave a full, well-spoken answer to what AI is. I began my paper with the statement “Artificial Intelligence is one of those topics in computer systems that not many people understand.” I believe this statement is close to true because people outside of the computer science field do not understand a whole lot about it, but there are many people in the computer science field who understand a lot more than I expected before taking this class. Another statement I used to define AI is: “the development of a program or computer system in the attempt to give the computer the ability to “learn” about the problem it is computing and solving.” I still agree with this statement to an extent. I would rather say that the development of artificial intelligence is defined as the development of a program or system in attempt to teach the computer to assess data, perform tasks, learn, and make decisions based on a problem set, or, in other words, act “intelligent”. (end of 2)

The first topic that defends my answer to defining AI is search, and specifically speaking of heuristic search. Heuristic search is using a regular search algorithm to find an answer to a problem (or make a decision), but adding in some educated helping functionalities into the mix. One of the specific search algorithm heuristic we used that seems to have a decent sized impact in the AI of games and decision making is the MiniMax algorithm. This algorithm solves the current best outcome of certain positions in a game. When we discussed tic tac toe, we figured out the best move from any position in a tic tac toe board. MiniMax specifically defines the decision making portion of AI; it takes in the initial state, and gives the current best possible outcome based on where they are and what the goal is. The computer then presented the user with the best move available to give you the best score possible, or in other terms, helped the user make an educated decision. The second topic that helps show the knowledge of intelligent systems is Knowledge/Reasoning. This is the part of AI that not many people outside of computer science understand or hear about except from people within the AI research field because it is a complex form of decision making. These topics, specifically neural network, are the most impressive parts of AI in the idea of acting intelligent in a human sense. These neural networks attempt to mimic neurons and make decisions based on the previous information it received, and it creates an impressive form of artificial intelligence that is able to make very educated decisions and learn more than basic search algorithms. (end of 3)

Although MiniMax was the most interesting to me because of the knowledge it is able to present through game-playing, the program we had to write was very hard for me to figure out personally. Understanding MiniMax was easy at first because it just seemed as if you were trying to make the best decision in a two player scenario. The concept eventually turned to a more complex system when we had to implement it into code. There was a general term, “event”, used in the algorithm, and the broadness of the term made it complicated to figure out what the best way to describe an event in the sense of Tic-Tac-Toe. I think the most confusing part of AI, in a general sense, we talked about is planning/STRIPS. This is a complicated subject in AI to perfect because it presents such a large, open-ended area of the field. Planning is very close to search with a touch of logic. This presents an issue of needing knowledge in two other large portions of AI before having the ability to learn. Although planning isn’t the most complex form of AI, I believe it is the hardest to perfect because it takes more prior knowledge than any other subject we spoke about in the time period of this class, so I believe it is one of the hardest forms to perfect. (end of 4)

I believe the part of AI that will advance the most once it is perfected is the study of genetic algorithms (GA’s). These, as of now, are limited by time and space. These problems are very computationally expensive and take a lot of knowledge and storage to compute today. Our level of processing speed and storage is one of the biggest bottlenecks in genetic algorithms with current general knowledge as the field advances. With the advancement of hardware and possibly the advancements of knowledge in algorithms, I believe this field will explode and impact the world’s understanding of genetics. GA’s use historical data also, so as time goes up, the pool of genetic history will grow exponentially which in turn expands the knowledge-base of genetic algorithms. This study will be pushed by both computer scientist researchers and medical professionals because GA’s have a large impact on both fields. (end of 5)