

Write at least a two page paper using Times New Roman 12 font double spaced that presents your impressions of Watson's performance on Jeopardy, the current state of Artificial Intelligence (AI), what limitations Watson has, and future applications for the use of AI technology. The paper should also answer the following questions:

- a. Why is simply understanding the Jeopardy questions a difficulty for Watson?

Jeopardy questions are tricky because they contain jokes, double meanings, and puns that are difficult to write traditional rules based algorithms to solve. The subtleties of human language are very difficult to translate into a finite set of rules that a computer can understand. Human language is a mine field for computers. Consider this sentence: I shot an elephant wearing my pajamas. Who was wearing the pajamas? What is meant by shot? If it was a photographer shooting it means something very different then a hunter shooting. There is a lot of ambiguity in natural language which is based on context and computers have difficulty with context.

- b. Why don't rules-based algorithms work for programming artificial intelligence computers?

Algorithms to solve problems that have well defined rules, parameters, and goals like the game of chess are effectively solved with rules-based algorithms, but natural language is based on so many things that we as humans know or understand that are difficult to capture into rules. There are just too many common sense rules that would need to be defined to create practical rules-based solutions to getting the computer to understand natural language. One computer scientist has been leading a team trying to define all the rules of knowledge for human common sense and currently has 6 million rules that make up about 3% of the total number of rules needed by the

computer to understand human common sense. After 25 years of efforts it is clear to most computer scientists that rule alone will not be enough to build artificial intelligence.

- c. What method of programming is used to improve on rule-based algorithms?

Watson uses a more powerful and flexible method to solve AI problems called machine learning. Machine learning is simply programming the computer to create its own rules by giving millions of examples of a concept. In this way computers are able to recognize patterns of the concept. Watson was trained to recognize patterns using tens of thousands of old Jeopardy questions along with their correct answers. Watson finds patterns between the questions, answers, and the type of evidence used to support those correct answers. Then weights are given to the patterns to determine on average which solution is most likely to be the correct answer to a brand new question Watson has never heard before.

Computer learning plays a role in many modern computer applications like weather prediction, recommendations from Amazon or Netflix. Speech recognition is another example of machine learning where thousands of examples of word pronunciations are given to the computer to search for patterns to make speech recognition more accurate.

- d. What final piece of information did Watson need to help it fully understand the question categories on Jeopardy?

To boost Watson's performance the correct answers to questions solved by other contestants are feed as an electronic text message back into the program. This final piece of feedback helped Watson to understand the categories of questions and the form of their answers by learning a new pattern on the fly.

Future applications of AI technology such as Watson could be a computer that professionals such as medical doctors might speak to verbally posing question that the system uses to search huge databases of journals and emerging clinical research along with patient history to help diagnose illnesses or recommend treatments that the doctor may not even be up to date on because of the fast pace of developments in the field.