

Avik Bag
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Prof. Brian Stuart
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HW Assignment 1

Part 1: Written Problems

1.A Watson

There are definitely other applications of Watson outside the realm of Jeopardy. As mentioned in the article, this can be used as a method of sifting through massive piles of data and providing the appropriate data to the user. For example, this can be used by doctors to speak into a system and then have it parse the sentence using natural language processing after which it can use that information to pull out the right data from the right data resource. The main point to note is that this system is able to pull up data from a very large dataset, as big as 15 Terra Bytes. The fast response to a query is what makes this system effective. Some other applications could be in data managements systems for companies, fast data querying by search engines like Google, medical, legal and so on. It has the possibility to scan data at an extremely efficient rate.

Even though chess is a much tougher game for humans as compared to Jeopardy, to be able to build an Artificial Intelligent system that can parse human language and then search for data would be rather difficult. There are several difficult steps. Starting with natural language parsing. Having the system figure out what the verb is, what the object is, can be a very confusing task as people tend to differently contextualize words. Another issue is for the system to use it's past learning to implement the new knowledge for the future. On the other hand, chess is essentially a bunch of possibilities from a certain position for the given state of pieces. It's a matter of being able to draw out the path to ensure the system is on it's way to victory while updating its current state for every time the opponent makes a move. There is no ambiguity in this form of processing. It's all about being able to handle the vast calculations that are involved in predicting drawing out it's strategy. This ambiguity that is involved in the natural language processing is what makes the AI system for the Jeopardy game more difficult than building an AI system for a chess game, comparatively speaking.

1.B Chinese Chess Room

This is a proposition by John Searle against the statement that any program can have a conscience or a mind by taking in a bunch of inputs and then provide the right output exactly the same way a human mind behaves. In the crux of the argument against this statement, he talks about a certain scenario. In this scenario, he is assumed to be locked in a room where the only instructions to get out of the room was in Chinese. It was also assumed that said person did not know any amount of Chinese, and the only way out of the room was by comprehending these instructions. He then supposes that there are a set of English rules that he could use to correlate these Chinese symbols with another set of symbols. These rules apparently are assumed to be so precise that it would convince the posers of the questions that the responses are being provided by an actual person, thus passing the Turing Test. This is the gist of the Chinese Chess Room argument.

I feel that the argument is a valid one. I don't believe that no matter how effective a computer program might be; it will not be able to replicate the actions of the human mind. The human mind is more complex than simply putting one and one together. For example, I might eat a tub of ice cream, even though it might be logically harmful for my body, yet I went ahead and ate it regardless. Why? Because when it comes to how humans process information, there are more aspects involved besides just plain logic, such as emotions and experiences. The experiment mentions how there is an English book, or a computer program, that can correlate Chinese symbols to another set of Chinese symbols. This is where another major flaw exists. One great example in would be Google translate. Google translate uses literal grammatical and vocabulary to convert a set of words or symbols from one language to another. In literal translations, meaning of words are translated to it's counterpart, but the context of the sentence loses it's meaning. The argument mentions that the person stuck inside the room doesn't understand Chinese. How can it be a mind if it doesn't understand? Being able to literally translate something without understanding it can lead to loss of contextual meaning. For me, I don't think a program can replicate the thought processes behind how a human mind works. Essentially, a computer program being a strong AI is not possible. It cannot have the ability to understand.

1.C Problem Definition

Small Towers of Hanoi

- Performance Measure – The game requires that we move the discs from one tower to another tower, or in this case, rods. To measure its efficiency, every movement from one tower to another will count as 1 point. The end goal should be to get the lowest possible total points after the end goal is achieved.

- Environment – The environment is mainly the three rods that hold the discs in place. The state of the environment changes every time each disc is moved from one rod to another.
- Actions – These are mainly going to be movements of the discs from one rod to another. A source rod, and then the destination rod.
- Sensors – The sensors will be responsible for making sure that only one disc may move from one tower to another at any given time. Also, to add to that, it can only move the upper most disc from a rod and can place it into another rod if the disc that exists there is not smaller than the current disc. Essentially, these sensors are in place to ensure that the rules of the game are enforced appropriately.

Pacman

- Performance Measure – To be able to finish this in the least possible movements that will be required to consume all the pellets.
- Environment – it's mainly a 2 dimensional environment, and can be easily represented as a vector, like so (2, 3).
- Actions – the main actions are going to be move up, down, left, right.
- Sensors – the sensors are responsible for making sure pacman doesn't run into the wall. If it senses the wall, movement to the direction should be restricted. It should also be able to pick up when pacman gets to eat the pellets.