CSC361: Homework 1
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Problem description

In order for us to understand, build upon and research Artificial Intelligence, we must define it in a way that makes it easier for us to know when a machine exhibits intelligence and when is it not. There has been four main views of this problem, each has their own pros and cons. The four different views presented are:

1. Thinking Humanly
2. Acting Humanly
3. Thinking Rationally
4. Acting Rationally

We adopted the *Acting Rationally* school of defining the field.

Applications

Acting rationally means acting to achieve one's goals[1]. Since the main applications of Artificial Intelligence are cognitive tasks that require the computer to handle previously unseen problems, then the *Acting Rationally* makes the most sense; since humans aren't perfectly rational, modeling human (in the *Thinking Humanly* and *Acting Humanly*) is more cumbersome than modeling rational actions.

A direct application that *Acting Rationally* and *Thinking Rationally* win over the other two definitions is in human biases, humans often make logical inefficiencies, for example, humans can be exploited into buying products with a higher price than their worth by companies that utilize the *scarcity biases*. *The Scarcity Effect* can be defined as the cognitive bias that makes people place a higher value on an object that is scarce and a lower value on one that is available in abundance [2]. So we conclude that *Acting Rationally* and *Thinking Rationally* are superior in some applications.

Methods

Implementing *Acting Rationally* can be difficult, given the range of different tasks and also given that rationally isn't obvious in all situations. But a can be argued that in order for an *agent* to act rationally, it has to have a mental model of it's actions and their consequences, for example,

a chess AI should understand the cause and effect of all movements in the game in order for it to make rational decisions.

Research Directions

The research of *Acting Rationally* should be guided by a number of principles, such as correct inference, since otherwise the agent wouldn't be rational anymore, as well as the agent having a mental model of the world. These principles should guide the research in being more fruitful.

References

1. Artificial Intelligence: A Modern Approach, *Acting rationally*. Peter Norvig and Stuart J. Russell
`https://people.eecs.berkeley.edu/ russell/intro.html`

2. Convertize *The Scarcity Effect*.
`https://www.convertize.com/glossary/scarcity-effect/`