CSCI-UA 9472. Assignment 1 – General Introduction

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1 Question 1 (5pts)

Read Turing's original paper on AI (Computing machinery and Intelligence, 1950). In the paper, Turing discusses several potential objections to his proposed enterprise and his test for intelligence. Answer the following questions:

- Describe the imitation game (rephrase in your own words)
- What are some of the advantages of the imitation game that are listed by Turing ?
- What are the restrictions on the machines that are allowed to play the game? (be as complete in your characterization as possible) In particular, what is the interesting variant that Turing mentions?
- What are the three parts of the digital computer according to Turing (describe each part in detail)?
- What was the problem with Babbage analytical engine ?
- What is, according to Turing, a difference between the discrete state machine and Laplace's description of the universe?
- What does Turing mean by a *universal machine*?
- Turing suggests replacing the original querstion "Can machines think" by a more precise formulation ? What is this refined formulation?
- List and provide a short (no more than a couple of lines) summary of the objections that Turing addresses and what are his refutations (2/3 lines summary). In particular, what does Gödel's theorem states ? and what is the answer of Turing to the objection saying that machines cannot make mistakes?
- How does Turing connect artificial intelligence to sub-critical and super-critical piles?
- What is the opinion of Turing regarding rewards and punishments in the design of intelligent programs?
- Can you think of new objections (aside from those mentioned by Turing) arising from developments since he wrote the paper?

2 Question 2 (5pts)

Read Searle's refutation of strong AI (The Behavioral and Brain Sciences, 1980). In the paper, Searle introduces his famous Chinese room Gedankenexperiment. Answer the following questions:

- How does Searle define strong and weak AI?
- What does Searle mean by intentionality?
- What is the main thesis of Searle?
- How would you describe Searle gedankenexperiment ? (rephrase in your own words) In particular, how does Searle use his gedankenexperiment to refute the strong AI view on Shank's program?
- What 1963 paper does Searle cite as an example of an erroneous attribution of intentionality to a program?
- What is the Berkeley reply to Searle's argument? and what is Searle refutation of this reply? What is your opinion on this first reply?
- At some point in the paper, Searle mentions that the two systems (Chinese and English) can be considered to pass the Turing test while the first system exhibits a clear understanding of the language and the second exhibits no understanding at all. What, in your opinion is a danger with such a statement? (hint: you can check the work of Hector J Levesque and the paper "Is it enough to get the behavior right?")
- To provide an additional refutation of strong AI, Searle mentions other organs as information processing subsystems. What point is he trying to make?
- What is, according to Searle, a distinction that strong AI should be able to make? (Searle in particular provides a citation from McCarthy. What is the citation?)
- What is the Yale reply? and the corresponding refutation from Searle?
- What is the Brain simulator reply? and what is Searle's corresponding refutation (in particular what is the water pipe example)?
- According to Searle, what is the problem with the combined reply? (as part of his refutation, in particular, Searle mentions animal consciousness. What is he trying to demonstrate?)
- The other mind reply from Yale provides an answer to the question "How does one know that other people understand a particular language?" What does Searle consider to be essential processes coming on top of the computational processes (over formally defined elements) that make the difference between intentionality and the lack of it?
- Towards the end, Searle compares the brain and the mind in term of information processing. What is his conclusion?
- What is behaviorism? What is functionalism?
- Quite surprisingly Searle connects strong AI and dualism. How does he justify this connection? and why is it at odds with the traditional view on strong AI?

3 Question 3 (5pts)

Read Christine Kenneally's paper Mind Machines from The New Yorker and provide a complete answer to the following questions:

- What is the name and university of the philosopher who gets interested in the case of Legget?
- What are the research interests of this philosopher? (Try to be as exhaustive as possible)
- To what extent was the device NeuroVista able to help Legget with her medical condition?
- What were the main steps of the operation needed to implant the device and what problem initially took place during the first few days after the implant?
- How does Legget describe her relation to the device?
- What are some of the positive and negative side effects of medical implants?
- What was the problem with Hannah Galvin?
- What conclusions would you draw from th opposite experiences of Legget and Galvin?
- What is one of the issues with scientific papers from the medical devices industry and what is the solutions proposed by Gilbert?
- What problem can happen when considering the removal of an implant?
- At the end of the day, and despite the removal of the implant, what did Legget get out of her experience with this implant?