

Questions for discussion

IN3050-IN4050 Interactive session, April 28, 2021

Topic 1: The Turing test:

In his *Computing Machinery and Intelligence* (1950), Turing starts with “I PROPOSE to consider the question, ‘Can Machines think?’”

He goes on and concludes that the only way it could be answered “is to be sought in a statistical survey such as a Gallup poll. But this is absurd. Instead of attempting such a definition I shall replace the question by another, which is closely related to it and is expressed in relatively unambiguous words.” He proceeds to describe the imitation game, the digital computers---which were a new invention by that time--- before he presents possible counter arguments and tries to rebut them.

Questions for discussion

- What is your view of the test, is it adequate?
- What will you say of a machine that passes the test? Can it think?
- Can a machine be intelligent without passing the test?
- Do you think a computer will pass the test in the future?
- When?
- Is a cat intelligent?
- Can a cat think?
- Is a self-driving car intelligent?
- Can it think?

Topic 2: Chess and board-games

Board-games, in particular chess, have been on the AI agenda since the beginning. The first chess-playing programs were made around 1950. John McCarthy has referred to chess as ‘the Drosophila of AI’ (fruit fly used in genetics research and developmental biology).

Chess was for a long time considered by many a genuine property of human intelligence. Many believed it to be a task where machines never would achieve human level performance. This included the world chess champion Gary Kasparov. In 1997, however, he was defeated by IBM’s powerful Deep Blue running on state-of-the-art hardware at the time. (Kasparov contested the results, though.)

To many, Deep Blue defeating Kasparov was not sufficient to show AI, e.g., McCarthy around 1990, “Chess programs now play at grandmaster level, but they do it with limited intellectual mechanisms compared to those used by a human chess player, substituting large amounts of computation for understanding. Once we understand these mechanisms better, we can build human-level chess programs that do far less computation than do present programs.” (cited from https://www.chessprogramming.org/John_McCarthy)

Since then, the chess playing programs have become even stronger. In particular, the AlphaZero, learning chess by reinforcement learning playing against itself. When asked whether he thought he could defeat AlphaZero, world champion Magnus Carlsen answered ‘NO’, smiling. Moreover, AlphaZero has introduced new moves compared to human players, and Carlsen has started copying AlphaZero’s moves. (e.g., <https://www.youtube.com/watch?v=uqiaWirgU38>)

Questions for discussion

- How representative and relevant is chess for AI?
- Which aspects of intelligence is proved by chess and which aren’t?
- How do you evaluate McCarthy’s views, that (traditional) chess program did not show human level intelligence, but relied instead on their larger computing power?
- Is AlphaZero creative?
- When the human world champion learns moves from the computer program, which conclusions can we draw?