*Skrivet av Evan Saboo och Perttu Jääskeläinen*

Artificial intelligence (AI) is a way of creating a computer, computer-controlled robot or software that intelligently thinks in a manner similar to the human mind. AI is achieved by studying the patterns in the human brain and by analyzing the cognitive process. The results of these studies develop intelligent software and systems. A computer program must be able to calculate, plan and learn to achieve artificial intelligence. The computer's interaction with the outside world and the computer hardware restrictions must also be considered when developing a AI-system.[[1]](#footnote-0)

Search is an important component of problem solving in AI. There are several search algorithms that use different search techniques to find a way or the shortest way from the starting point to the endpoint [[2]](#footnote-1). Some of these are A\* search, Beam search, Best-first search, Bidirectional search, Breadth-first search, Depth-first search and Dijkstra's algorithm [[3]](#footnote-2). These algorithms are used today in several everyday gadgets or computer programs such as computer games or GPS applications. For example, when you want drive to an address and use a digital map on your phone, a search algorithm is then used to find the fastest route to the destination.

Planning is about decisions made by intelligent creatures like robots, people or computer programs when trying to achieve a certain goal. It's about choosing a sequence of actions to meet the goal [[4]](#footnote-3). When planning, search is an important part of the process. By planning the way to the target use search to find the best way to the goal. Therefore, planning and search have great correlation with each other. By planning the way to the goal, search is used to find the shortest path to the goal. When a shortest path to the goal is found, we also have to schedule the order in how to do it - we cannot just define the steps needed to get to the goal. We also have to complete them in the right order - we cannot perform tasks in any order we please when dealing with certain conditions.

Fundamental AI problems may be ethical questions, among others, that may arise. What will we do at the end of jobs, when automation completely takes over? Will everyone have purpose in life, when there is almost to no work to be done? How will wealth be distributed, since people will no longer be receiving salaries for work that are done by robots. Will the owners of robots be the wealthiest, while others receive a base salary and live with their families? How do we stay in control of a complex intelligent system, that exceeds human intelligence? These are some issues mentioned in the World Economic Forum[[5]](#footnote-4), which mentions some of the top ethical issues in artificial intelligence.

What is true AI?

True AI (Strong AI) is a term used to describe a certain concept for the development of artificial intelligence. Strong AI's goal is to develop artificial intelligence to the [[6]](#footnote-5)point where the machine's intellectual ability is functionally equal to or exceeding a human's.

What is weak AI?

Weak AI (narrow AI) is a category where most current AI systems you have created lie in. This means that the AI is only knowledgeable in a specific area and can not handle other areas unless it is programmed to do so.[[7]](#footnote-6)

Which search method is A\* algorithm is based on?

A\* algorithm is based on best first search method, as it gives an idea of optimization and quick choose of path, and all characteristics lie in A\* algorithm.[[8]](#footnote-7)

Whats is the turing test?

The turing test is a game proposed by Alan Turing in 1951 which determines if a machine is considered intelligent. The game is a test of a computer's ability to demonstrate intelligence, as measured by whether a human judge can reliably distinguish the computer from another human being by conversing with both in natural language over a terminal.[[9]](#footnote-8)

What is the difference between depth and breadth first search?

BFS starts traversal from the root node and then explore the search in the level by level manner i.e. as close as possible from the root node. DFS starts the traversal from the root node and explore the search as far as possible from the root node i.e. depth wise.[[10]](#footnote-9)

Reflect over one or more of the ethical issues listed below, facing humanity with the advancements of artificial intelligence, mentioned in the top 10 issues article from World Economic Forum[[11]](#footnote-10):

Unemployment:

The issue with unemployment comes from repeated automation - many predictable jobs are being replaced by robots. Many factories are run almost entirely by robots, which will only continue to increase with the advancements of AI. The trucking industry in the USA will soon be faced with the self-driving trucks being developed by Tesla (among others), which may cause millions of americans to potentially lose their jobs to automatic vehicles. How will people be spending their days? Will all people be content with staying home with their families, spending time within their communities and finding ways to contribute to human society? How will humanity as a whole be impacted, once there are no jobs left? Only time will tell. One possible solution, that is also currently being tested in some states in the USA[[12]](#footnote-11) is the concepts such as a “universal basic income”, which gives people a set amount of money each month.

Explain what artificial planning and scheduling is

Artificial planning is identifying steps to a goal and executing them in the correct order by scheduling them. This can be done by trial and error - one possible path is tested first, if it does not work, the artificial agent may then backtrack and reevaluate its plan.

Explain what the concept of “Superintelligence” is[[13]](#footnote-12)

Superintelligence is the hypothetical artificial agent that would by far pass the intelligence of the most gifted human minds. This means that such an agent would excel over humans in virtually all domains of interest.

Name 3 areas within AI and give examples of existing systems/research in each area.

Speech recognition - consists of AI that can recognize speech patterns and follow commands. Examples of current such systems are Siri on iPhone and Alexa by Amazon.

Multi-agent systems, multiple AI machines working together. An example is for multiple drones to fly such that they, together, represent a predefined pattern[[14]](#footnote-13) by communicating with each other. The machines can either have own goals or a common goal - the thing to note is that they are working and communicating together to achieve the goal(s).

Machine learning - an AI agent that is able to learn from the past and adapt to future situations. A lot of systems are using machine learning, such as Spotify, to identify what songs you could be interested in, depending on previous music that you listened to or liked[[15]](#footnote-14).

1. Artificial Intelligence:A Modern Approach, 3rd ed by Peter J.Russell, 2009. ISBN: 978-0-13-604259-4 (electronic bk.) [↑](#footnote-ref-0)
2. <https://hackernoon.com/search-algorithms-in-artificial-intelligence-8d32c12f6bea> [↑](#footnote-ref-1)
3. <https://en.wikibooks.org/wiki/Artificial_Intelligence/Search> [↑](#footnote-ref-2)
4. <https://users.aalto.fi/~rintanj1/jussi/planning.html> [↑](#footnote-ref-3)
5. <https://www.weforum.org/agenda/2016/10/top-10-ethical-issues-in-artificial-intelligence/> [↑](#footnote-ref-4)
6. <https://medium.com/@jackkrupansky/how-close-is-ai-to-human-level-intelligence-here-in-april-2018-9a6ceaff2f9d> [↑](#footnote-ref-5)
7. <https://www.techopedia.com/definition/32874/narrow-artificial-intelligence-narrow-ai> [↑](#footnote-ref-6)
8. <http://intelligence.worldofcomputing.net/ai-search/a-star-algorithm.html#.W9n58pNKiUk> [↑](#footnote-ref-7)
9. <http://www.psych.utoronto.ca/users/reingold/courses/ai/turing.html> [↑](#footnote-ref-8)
10. <https://techdifferences.com/difference-between-bfs-and-dfs.html> [↑](#footnote-ref-9)
11. <https://www.weforum.org/agenda/2016/10/top-10-ethical-issues-in-artificial-intelligence/> [↑](#footnote-ref-10)
12. <https://www.theguardian.com/cities/2018/jun/27/benefit-or-burden-the-cities-trying-out-universal-basic-income> [↑](#footnote-ref-11)
13. [Bostrom, Nick](https://en.wikipedia.org/wiki/Nick_Bostrom) (2014). [*Superintelligence: Paths, Dangers, Strategies*](https://en.wikipedia.org/wiki/Superintelligence:_Paths,_Dangers,_Strategies). Oxford University Press [↑](#footnote-ref-12)
14. <https://www.youtube.com/watch?v=aOd4-T_p5fA> [↑](#footnote-ref-13)
15. <https://www.redpixie.com/blog/examples-of-machine-learning> [↑](#footnote-ref-14)