HERALD COLLEGE
KATHMANDU

Academic Year	Module	Assessment Number	Assessment Type
A20	Concepts and Technologies of AI (5CS037)	A1	Individual Report

[Artificial Intelligence]

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Submitted on   : 12/02/2021

Acknowledgment

I am very grateful to get golden chance to show my skills in making report on Artificial Intelligence. I would like to express special thanks to our lecture 'Sachin Kafle' as well as module leader 'Prakash Gautam'. I had had a good time on researching on Artificial Intelligence and I have known many things about its features. And now I would like to share what I learn on it to others.

And thanks to all the people who have directly or indirectly helped me in developing the report.

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Abstract

Artificial Intelligence or Machine intelligence is the intelligence that can be found in machines, unlike the natural intelligence that humans and other species exhibit. The activities that are designed to do are learning, speech recognition, making own decisions and solving problems. It is necessary for solving complex universe problems, making a better and faster diagnosis than humans in health sectors and making data more safe and secure. The possibility of creating thinking machines raises a host of ethical issues. These concerns are both concerned with ensuring that such devices do not affect humans and other people morally. And to the moral standing of the machines themselves, the relevant people. We address the various meanings of Artificial Intelligence in this chapter (AI). Then we explain how we can understand artificial intelligence. Finally, the categories of AI and the ethics of our AI preconceptions are discussed.

Artificial Intelligence (AI)

Artificial Intelligence is the main branch of computer science that deals with the development of intelligent machines capable of performing human intelligence simulation tasks. Multidisciplinary research with various approaches, but advances in natural language processing and deep learning are the cause in almost every field, including finance and health care, developments in natural language processing and deep learning are causing a paradigm change.

AI is programmed to think like humans and do tasks like a human. It is related to the human mind, such as learning and problem-solving. Most of the AI examples we know today – from chess-playing computers to self-driving cars – rely heavily on machine learning and deep learning. The computer can be equipped to perform specific tasks using these technologies by processing vast quantities of data. The ability of artificial intelligence can defend and choose the best action of accomplishing goals including learning, reasoning and perception. It makes it possible for machine learning to learn from experience, adjust to new data and perform tasks like a human without being assisted by humans. For example, identifying the image, identifying speech, learning association, predicting system and using regression to calculate the closest possible outcome. Through the absorption of huge amounts of unstructured data such as text, images, or video, deep learning techniques make this automatic learning. (FRANKENFIELD, 2021)

Importance of artificial intelligence

AI is essential because traditionally human capabilities can be carried out in software inexpensively and on a scale for the first time. To allow for new possibilities and efficiencies, AI can be applied to every sector. The importance of AI is given a bellow:

- It enables human capabilities in learning, reasoning, planning, problems solving, perception and language to be undertaken by software increasingly effectively, efficiently and at low cost.

- Automatic Continuous learning and searching through data by AI. There is a difference between the AI and the Robotic. AI needs computer programs to be built to complete tasks that would otherwise require human intelligence. Robots are programmable machines that can typically execute a series of actions independently or semi-autonomously.

- In AI, Deep neural networks help to accomplish unbelievable accuracy. Our daily life example, the more we have interactions with SIRI, ALEXA, the more it will get accurate.

- It adds intelligence to keep going goods. AI won't be marketed as an individual program in most cases. Instead, products you already use will be upgraded with AI capabilities, just like Siri has been introduced to a new generation of Apple products as a feature.

- It is capable of predicting and adapting through algorithms which discover patterns from large amounts of information. It requires the algorithm skill to search structure and regularities in data. The capable of prediction helps the algorithm to teach itself how to play chess. Like that, it can also make its own decisions or teach itself what product to recommend next online. (Jim Goodnight, 2021)

Understanding how Artificial Intelligence works
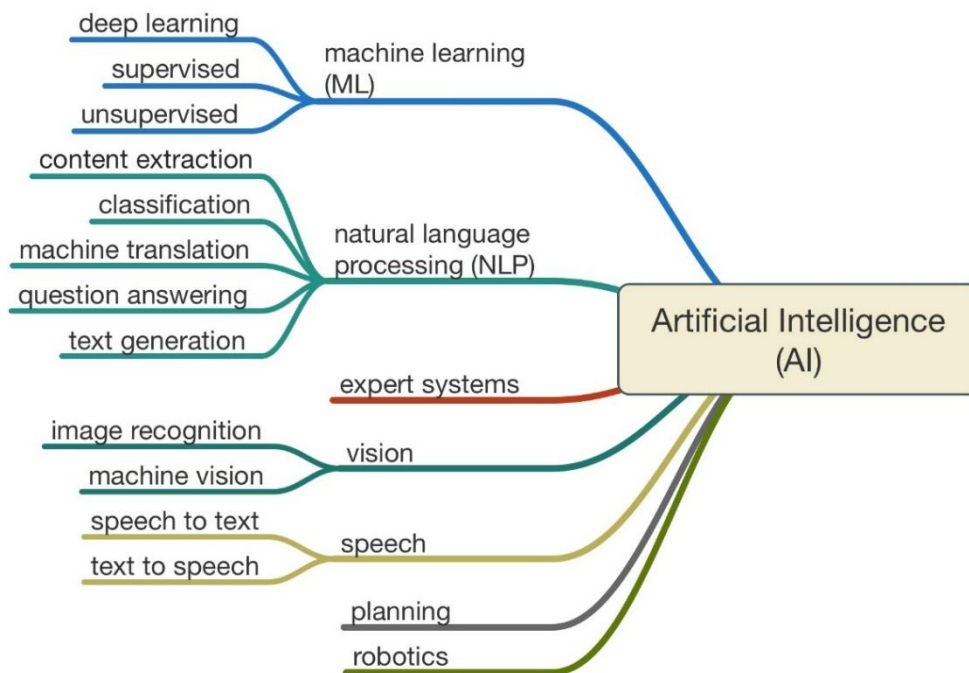
Figure 1: AI Branches (Mills, 2016)

The labelled AI diagram shows that there are several divisions in the sector, with many important connections and commonalities. The most active ones are shows here:

AI works by combining large quantities of data with fast, iterative processing and intelligent algorithms, allowing the program to learn automatically from patterns or features in the data. AI is a broad area of research involving several hypotheses, techniques and technologies, as well as the following main subfields:

- Machine learning (ML) automates the development of analytic models. It uses techniques from neural networks, statistics, studies on operations and physics to uncover secret data insights without specifically programming where to look or what to infer.

- Natural language processing (NLP) is the capacity of computers, including voice, to analyze, comprehend and produce human language. For example, NLP helps computers, for instance, to read the text, hear speech, interpret it, measure thoughts and emotions, and decide which sections are important.

- Computer vision depends on pattern recognition and deep learning to improve recognition of what's in a picture or video. As computers can store, interpret and comprehend images, they can capture photographs or videos in real time and display their environment.

- A neural network is a type of machine learning collection of multiple units (such as neurons) that, by responding to external inputs, process the information and relay information between each unit. To find similarities and extract meaning from unknown data, the method needs several passes on the data.

- Cognitive computing is an AI subfield which strives to communicate with devices in a natural, human-like way. The main objective, using AI and cognitive computing, is for a machine to simulate human processes through the ability to understand pictures and voice, and then speak in response concisely.

- APIs or applications programming interfaces would be the most numerous in sectors where a significant proportion of time is spent gathering and synthesizing data: financial services, retail and trade, technical services, manufacturing and health care. In the transport sector, AI applications of AI-powered computer vision will be especially important.

- Deep learning uses massive neural networks with several processing unit layers, taking advantage of computational power advancements and advanced training methods to study complex patterns in large volumes of data. Popular applications include recognition of pictures and speech. (Jim Goodnight, 2021)

- In a supervised learning model, the algorithm trains on a labelled dataset, giving a response key that can be used by the algorithm to test its accuracy on training data. In comparison, an unsupervised model provides unlabeled knowledge that the algorithm seeks to make sense of by extracting characteristics and patterns on its own. (VanderPlas)
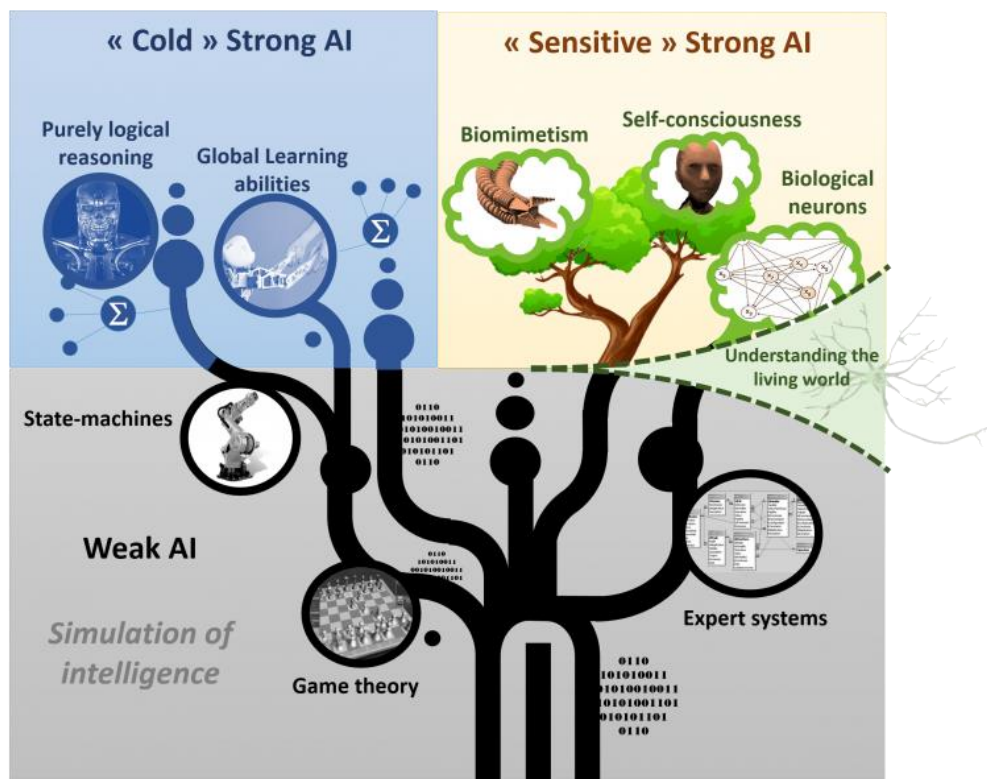
Categories of Artificial Intelligence

Figure 2: Strong and weak AI (Amador, 2017)

The labelled diagram shows the strong and week AI branches. There are several divisions in the sector, with many important connections and commonalities.

You may classify artificial intelligence into two separate categories: weak and strong.

- Weak artificial intelligence

    Weak AI is also known as narrow AI which is not-sentient machine intelligence designed to carry out one particular narrow task. For example, facial recognition, internet search and asking to question personal assistants like SIRI, ALEXA, it answers it to the users.

- Strong artificial intelligence

    Strong AI is also known as Artificial General Intelligence (AGI) which is a machine intelligence design to perform tasks considered to be human-like. This intelligence can be

applied to solve any problem. It is based on functionalities. Some AI is purely reactive which does not store 'memories' or use past experiences to determine future action and perceive the world and react to it. AGI are the source of dystopian science fiction in which civilization is invaded by super-intelligent machines, but experts believe that it is not something that we need to think about anytime soon. Some of the AI memories are limited which can retain data for a short period. This kind of AI can be found in self-driving, chess and hospital operating rooms. (FRANKENFIELD, Artificial Intelligence, 2021)

AI and Ethics

The ethics of artificial intelligence, or AI ethics, comprise a collection of values, concepts, and techniques that use widely accepted standards of right and wrong to direct moral action in the creation and implementation of technologies of machine learning. AI and Ethics search to facilitate informed discussion and debate of the legal, regulatory, and political implications of Ai technologies. The ethics of artificial intelligence, or AI ethics, include a collection of values, concepts, and techniques that use widely accepted standards of right and wrong to direct moral action in the creation and implementation of technologies of machine learning. Its main objective is to find the way AI techniques, tools and technologies are developing and knowing where these technologies may lead in the future.

- First AI and Ethics study in the field of multicultural, multi-discipline

- Authors and viewers involved in technology, government, law, culture and society will be attracted to Public Policies.

- Technologists, scholars and scientists Welcome all forms of article, including original studies, reviews and opinions /pieces/commentaries. (Maclntyre)

- Results from the algorithm performance of AI actions will be consistent with the expectations of stakeholders that the algorithm performs at the necessary level of accuracy and consistency and does not deviate from the purpose of the system.

- The data used by the resilient infrastructure of AI system components are secured from unofficial access or adversarial attack.

- AI can decide cases and administer justice in a better, simpler, and more effective way than a judge whose decisions are not always intelligible to humans.

- In the process of searching and image of a schoolgirl, it can mostly reveal a page filled with girls and women with sexualized customs. But if 'schoolboy' is typed instead, the mostly result shows ordinary boys.

- AI-systems deliver biased findings. As it collects big data, search engine technology is not impartial and prioritizes outcomes with the most views based on both user desires and location. Thus, the search engine can become an echo chamber which holds biases of the real world's perceptions and further entrenches these online prejudices and stereotypes. (UNESCO, 2019)

As you and your machine learning teams work together to improve a common and general understanding of what is required to answer AI ethical issues, here is a shorter list of questions to recognize:

- Hacking: To what degree is an expected AI technology susceptible to hacking and therefore potentially susceptible to abuse?

- Training information: Have you checked your training information and made sure it is fair and representative?

- Bias: Does knowledge involve potential sources of prejudice?

- Security: Do you have a plan to protect user data and to secure it?

- Emergency brake: Can you shut down this development program if it behaves poorly? (Jägare)

Conclusion

Till now AI does not directly impact the lives of ordinary citizens too much and is limited to such areas as military, space, business, medical, neutral and geological networks.

AI aims to include software that can describe input and output through reasoning. AI will have software-like interactions with humans and provide decision support for specific tasks, but it is not a human substitute and will not be soon. It may offer us a few ethical issues which seem predictable so that we can encounter it.

References

Amador, J. J. (2017, July 02). Retrieved from twitter:
        https://twitter.com/eraser/status/881466742949781504

FRANKENFIELD, J. (2021, january 06). *artificial intelligence*. Retrieved from Investopedia:
        https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp

FRANKENFIELD, J. (2021, january 06). *Artificial Intelligence*. Retrieved from Investopedia:
        https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp

Jägare, U. (n.d.). The Ethics of Artificial Intelligence.

Jim Goodnight. (2021). *Artificial Intelligence*. Retrieved from SAS:
        https://www.sas.com/en_us/insights/analytics/what-is-artificial-intelligence.html

Jim Goodnight. (2021). *what is artificial intelligence*. Retrieved from SAS:
        https://www.sas.com/en_us/insights/analytics/what-is-artificial-intelligence.html

MacIntyre, J. (n.d.). AI and Ethics. *Springer*.

Mills, M. (2016, February 23). *artificial intelligence*. Retrieved from the answer company Thomson
        reuters: https://www.legalexecutiveinstitute.com/artificial-intelligence-in-law-the-state-of-play-
        2016-part-1/

UNESCO. (2019). *Artificial Intelligence*. Retrieved from UNESCO: https://en.unesco.org/artificial-
        intelligence/ethics/cases

VanderPlas, J. (n.d.). Python Data Science Handbook. In J. VanderPlas, *Machine Learning.* Jake
        VanderPlas.