

ARTIFICIAL INTELLIGENCE: IN ROBOTIC TECHNOLOGY

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ABSTRACT

Artificial Intelligence is a collection of advanced technologies that allows machines to sense, comprehend, act and learn. A high-level overview of AI to learn how Machine Learning provides the foundation for AI, and how you can leverage cognitive services in your apps. Artificial Intelligence will define the next generation of software solutions. This computer science course provides an overview of AI, and explains how it can be used to build smart apps that help organizations be more efficient and enrich people's lives. AI is the science and engineering of making intelligent machines, especially intelligent computer programs. Robotics is an area that is evolving with artificial intelligence technology. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable. All artificial intelligence designs are at least superficially inspired by the human brain, as by definition artificial intelligence is about mimicking some aspect of intelligence.

Keywords: *Artificial Intelligence, Intelligent machines, Robots, human intelligence, Machine Learning*

I INTRODUCTION

Artificial Intelligence is an area of Computer Science concerned with making the computer perform tasks which, to be successfully done by human beings, require intelligence. There are various forms of artificial intelligence (AI) out there today. It is a tough question what to even call an AI and what to merely call a software program. There is a tendency in software, where when something that used to be called "AI" matures and integrates itself into the technological backdrop, it doesn't get called AI anymore. The programmers of the 1950s might call numerous embedded software in our world "artificial intelligence" - for example, the microchip in your car that regulates fuel injection, or the database at the supermarket. One of the key feature that distinguish us, humans, from everything else in the world is intelligence. This ability to understand, apply knowledge and improve skills has played significant role in our evolution and establishing human civilization. But many people believe that the advancement in technology can create super intelligence that can threaten human existence. The biggest mystery to solve when we are creating such an intelligence is that one should be able to figure out how human brain works. Means exactly how it works. That itself can make creating a General

artificial intelligence much more tougher than one could ever imagine. Human brain is a state of the art machine which is a product of millions of years of evolution. Some of us confuses between Machine Learning and Artificial Intelligence. Machine Learning is a type of artificial intelligence where we no longer write rules to generate intelligence rather we will create algorithm that can learn from data. In conventional programming we write a logic and give it an input, the program produces the output. In Machine learning we will give the system a set of inputs and outputs that is associated and the system will generate code for matching these input to output. Once that is done we can use the system to produce output from another set of input. The process is very similar to Data Mining.

II APPLICATIONS

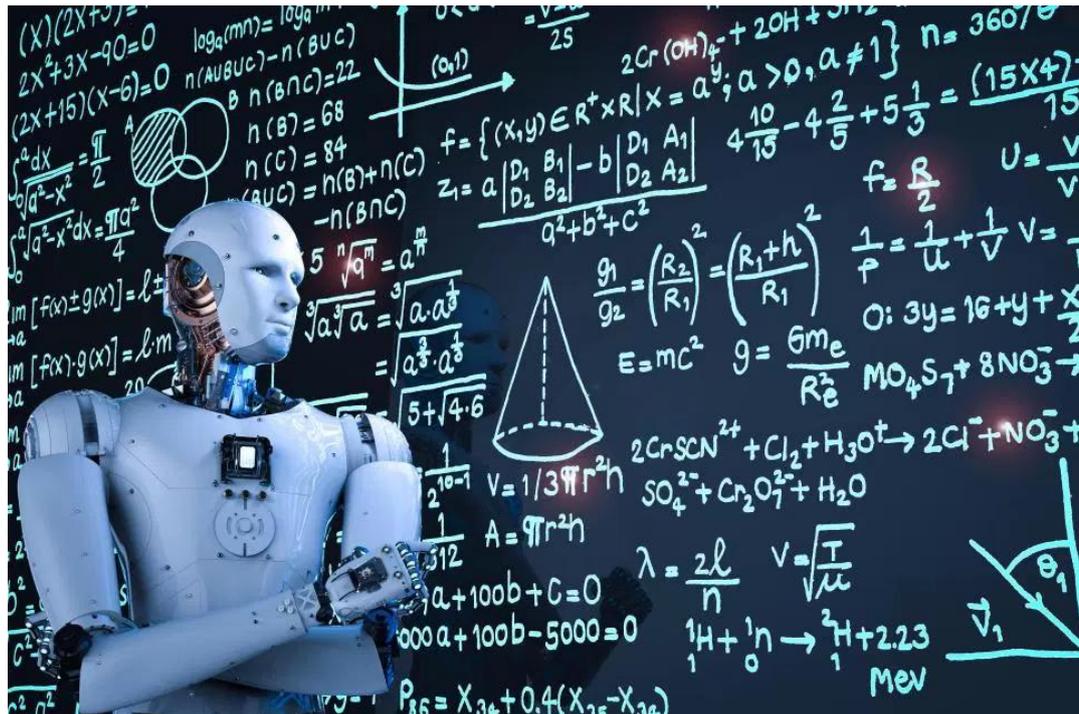
AI research applied in various fields. Artificial Intelligence is the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages. Here are some fields used AI.

- 1) Computer Programming: Computer scientists have created AI programs capable of writing their own code. AI researchers have created many tools to solve the difficult problems.
- 2) Robotics: AI is arguably the most exciting field in Robotics. It reduces the human work. Robotics is more like Mechanics thing and AI is the human like perception which is in code indeed. Robots learn Grasping by sharing their hand-eye coordination experience with each other.
- 3) Self driving cars: AI in transportation is expected to provide safe, efficient, and reliable transportation while minimizing the impact on the environment and communities. Self-driving cars will also mean lesser road accidents as they are programmed to focus more on safety than human drivers.
- 4) Medical field: For improving healthcare, artificial intelligence in medicine is a great idea that can advance the patient communication and healthcare professionals. It helps to Fast & Accurate diagnostics, reduce human errors, design treatment plans, drug creation, etc. Microscope uses Artificial Intelligence to find cancer cells more efficiently.
- 5) Smart Reply: Smart Reply will automatically suggest short replies for incoming messages. Google's Inbox launches 'Smart Reply' to suggest reply message automatically using AI.
- 6) Finance: Financial institutions have long used artificial neural network systems to detect charges or claims outside of the norm, flagging these for human investigation. Use of AI in banking. AI has also reduced fraud and crime by monitoring behavioral patterns of users.
- 7) Aviation: The Artificial Intelligence supported Design of Aircraft. It is used to help designers in the process of creating conceptual designs of aircraft. This also helps to people who fear flying can rest assured that practically no one is controlling the plane in any way.
- 8) Gaming – AI plays crucial role in strategic games such as chess, poker, tic-tac- toe, etc., where machine can think of large number of possible positions based on heuristic knowledge.
- 9) Natural Language Processing – It is possible to interact with the computer that understands natural language spoken by humans.

10) Handwriting Recognition – The handwriting recognition software reads the text written on paper by a pen or screen by a stylus. It can recognize the shapes of the letters and convert it into editable text.

Intelligent Robots – Robots are able to perform the tasks given by a human. They have sensors to detect physical data from the real world such as light, heat, temperature, movement, sound, bump, and pressure.

An intelligent robot can be programmed with its own expert system, e.g. a factory floor is blocked with fallen boxes.



III CHARACTERS

The term Artificial Intelligence (AI) implies a machine that can Reason. A more complete list or AI characteristics is

1. Reasoning: the ability to solve problems through logical deduction
2. Knowledge: the ability to represent knowledge about the world (the understanding that there are certain entities, events and situations in the world; those elements have properties; and those elements can be categorized.
3. Planning: the ability to set and achieve goals (there is a specific future state of the world that is desirable and sequences of actions can be undertaken that will affect progress towards it)
4. Communication: the ability to understand written and spoken language.
5. Perception: the ability to deduce things about the world from visual images, sounds and other sensory inputs.
6. Natural Language Generation: Producing text from computer data. Currently used in customer service, report generation, and summarizing business intelligence insights. Sample vendors: Attivio, Automated Insights, Cambridge Semantics, Digital Reasoning, Lucid works, Narrative Science, SAS, Yseop. Visiting this source is a must.

7. **Speech Recognition:** Transcribe and transform human speech into format useful for computer applications. Currently used in interactive voice response systems and mobile applications. Sample vendors: NICE, Nuance Communications, Open Text, Verint Systems.

8. **Virtual Agents:** “The current darling of the media,” says Forrester (I believe they refer to my evolving relationships with Alexa), from simple chatbots to advanced systems that can network with humans. Currently used in customer service and support and as a smart home manager. Sample vendors: Amazon, Apple, Artificial Solutions, Assist AI, Creative Virtual, Google, IBM, IPsoft, Microsoft.

9. **Machine Learning Platforms:** Providing algorithms, APIs, development and training toolkits, data, as well as computing power to design, train, and deploy models into applications, processes, and other machines. Currently used in a wide range of enterprise applications, mostly involving prediction or classification. Sample vendors: Amazon, Fractal Analytics, Google, H2O.ai, Microsoft, SAS, Skytree.

10. **AI-optimized Hardware:** Graphics processing units (GPU) and appliances specifically designed and architected to efficiently run AI-oriented computational jobs. Currently primarily making a difference in deep learning applications. Sample vendors: Alluviate, Cray, Google, IBM, Intel.

11. **Decision Management:** Engines that insert rules and logic into AI systems and used for initial setup/training and ongoing maintenance and tuning. A mature technology, it is used in a wide variety of enterprise applications, assisting in or performing automated decision-making. Sample vendors: Advanced Systems Concepts, Informatica, Maana, Pegasystems, UiPath.

12. **Deep Learning Platforms:** A special type of machine learning consisting of artificial neural networks with multiple abstraction layers. Currently primarily used in pattern recognition and classification applications supported by very large data sets. Sample vendors: Deep Instinct, Ersatz Labs, Fluid AI, MathWorks, Peltarion, Saffron Technology, Sentient Technologies.

13. **Biometrics:** Enable more natural interactions between humans and machines, including but not image and touch recognition, speech, and body language. Currently used primarily in market research. Sample vendors: 3VR, Affectiva, Face First, Sensory.

14. **Robotic Process Automation:** Using scripts and other methods to automate human action to support efficient business processes. Currently used where it's too expensive or inefficient for humans to execute a task or a process. Sample vendors: Advanced Systems Concepts, Automation Anywhere, Blue Prism, Ui Path, Work Fusion.

15. **Text Analytics and NLP:** Natural language processing (NLP) uses and supports text analytics by facilitating the understanding of sentence structure and meaning, sentiment, and intent through statistical and machine learning methods. Currently used in fraud detection and security, a wide range of automated assistants, and applications for mining unstructured data.

- AI has a great potential to process millions of sensor inputs automatically and constantly. And now from human drive car we have come to driverless car.
- A Human is always greater than a robot and that's why AI powered robot are now being used for some of most hazardous jobs like bomb defusing, welding, intense heat jobs, etc.
- The AI in healthcare is solving a variety of problems for patients, hospitals and healthcare industry overall.

- AI Chatbots is the most big thing. It is basically a computer program that allows to interact via a chat interface.
- AI can be artistic as well as can write stories. And now when there's AI to create art and write fiction, why not create an AI composed music.

Why research AI safety?

- In the near term, the goal of keeping AI's impact on society beneficial motivates research in many areas, from
- economics and law to technical topics such as verification, validity, security and control. Whereas it may be little
- more than a minor nuisance if your laptop crashes or gets hacked, it becomes all the more important that an AI
- system does what you want it to do if it controls your car, your airplane, your pacemaker, your automated trading
- system or your power grid.

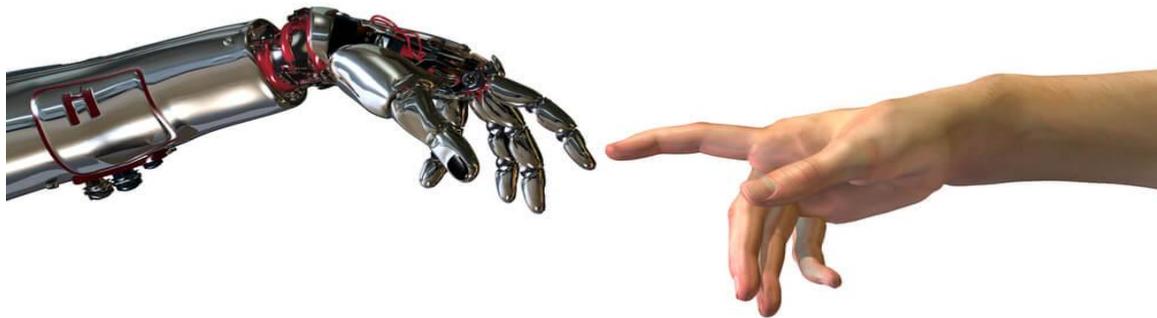
In the long term, an important question is what will happen if the quest for strong AI succeeds and an AI system becomes better than humans at all cognitive tasks. As pointed out by I.J. Good in 1965, designing smarter AI systems is itself a cognitive task. Such a system could potentially undergo recursive self-improvement, triggering an intelligence explosion leaving human intellect far behind. By inventing revolutionary new technologies, such as super intelligence might help us eradicate war, disease, and poverty, and so the creation of strong AI might be the biggest event in human history. Some experts have expressed concern, though, that it might also be the last, unless we learn to align the goals of the AI with ours before it becomes super intelligent.

There are some who question whether strong AI will ever be achieved, and others who insist that the creation of Super intelligent AI is guaranteed to be beneficial. At FLI we recognize both of these possibilities, but also recognize the potential for an artificial intelligence system to intentionally or unintentionally cause great harm. We believe research today will help us better prepare for and prevent such potentially negative consequences in the future, thus enjoying the benefits of AI while avoiding pitfalls.

How can AI be dangerous?

Most researchers agree that a super intelligent AI is unlikely to exhibit human emotions like love or hate, and that there is no reason to expect AI to become intentionally benevolent or malevolent. Instead, when considering how AI might become a risk, experts think two scenarios most likely:

1. The AI is programmed to do something devastating: Autonomous weapons are artificial intelligence systems that are programmed to kill. In the hands of the wrong person, these weapons could easily cause mass casualties. Moreover, an AI arms race could inadvertently lead to an AI war that also results in mass casualties. To avoid being thwarted by the enemy, these weapons would be designed to be extremely difficult to simply "turn off,"



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of such a situation. This risk is one that's present even with narrow AI, but grows as levels of AI intelligence and autonomy increase.

2. The AI is programmed to do something beneficial, but it develops a destructive method for achieving its goal: This can happen whenever we fail to fully align the AI's goals with ours, which is strikingly difficult. If you ask an obedient intelligent car to take you to the airport as fast as possible, it might get you there chased by helicopters and covered in vomit, doing not what you wanted but literally what you asked for. If a super intelligentsystem is tasked with a ambitious geo engineering project, it might wreak havoc with our ecosystem as a side effect.

IV ADVANTAGES

- 1) Jobs - depending on the level and type of intelligence these machines receive in the future, it will obviously have an effect on the type of work they can do, and how well they can do it (they can become more efficient).
- 2) Increase Our Technological Growth Rate - following on from the point above, AI will potentially help us open doors into new and more advanced technological breakthroughs.
- 3) No risk of harm - when we are exploring new undiscovered land or even planets, when a machine gets broken or dies, there is no harm done as they don't feel, they don't have emotions.
- 4) Their function is almost limitless - as the machines will be able to do everything (but just better) essentially their use, pretty much doesn't have any boundaries.

V DISADVANTAGES

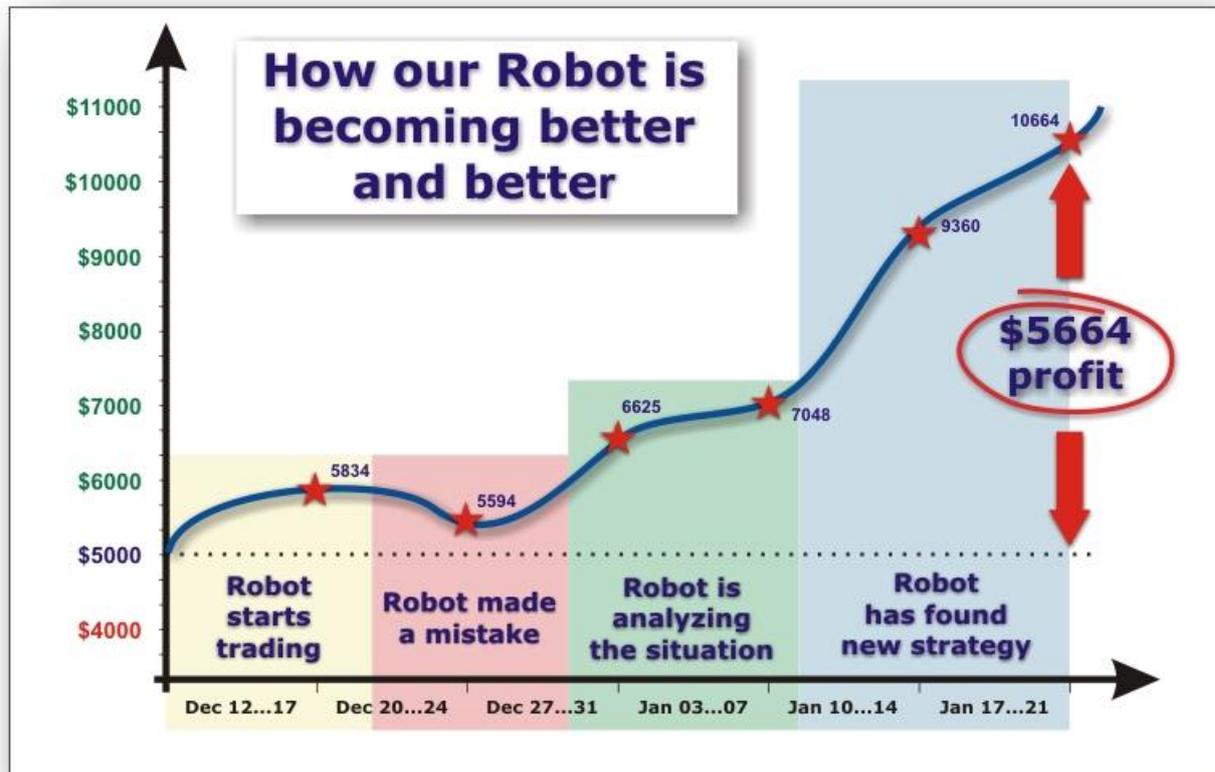
- 1) Over reliance on AI - As you may have seen in many films such as The Matrix, iRobot or even kid's films such as WALL.E, if we rely on machines to do almost everything for us -- we have become so dependent that if they were to simply shut down (or even decide they want to give up this working gig) they have the potential to ruin our economy and effectively our lives.
- 2) Human Feel - As they are machines they obviously can provide you with that human touch and the feeling of a togetherness and emotional.
- 3) Misuse - There is no doubt that this level of technology in the wrong hands can cause mass destruction where robot armies could be formed, or they could perhaps malfunction.

VI SOME BENEFITS

- 1) Data management: AI is extremely helpful when it comes to gathering and analyzing big data to improve efficiency and personalization (the latter of which can also be a risk, however- see below). According to Google's Deep Mind Project, using AI to manage data in the healthcare industry carries the potential to improve equality of access to care, increase the speed of care, open up new methods of diagnosis, and facilitate continual learning and improvement.
- 2) Improving the Internet of Things (IoT) and Cyber Security: According to Sapin , "AI will also help better secure the IoT world by anticipating and fighting intruders more quickly than human beings can." On the flip side, hackers could also use AI to analyze and exploit weaknesses.

VIII SOME RISKS

- 1) Transparency: Journalists wonder about the ethical issues of using AI to help reporting, such as how to disclose information about robotic writing to readers and acquire information legally and ethically. According to Angela Bassa, being transparent often comes at the cost of profit and scalability.
- 2) Personalization: While personalization can also be considered a benefit of AI, it "challenges the concept of news as a public record," such that the news we read is customized to fit our background and preferences.



IX THE FUTURE OF ARTIFICIAL INTELLIGENCE

1. Automated Transportation

We're already seeing the beginnings of self-driving cars, though the vehicles are currently required to have a driver present at the wheel for safety. Despite these exciting developments, the technology isn't perfect yet, and it will take a while for public acceptance to bring automated cars into widespread use.

2. Cyborg Technology

One of the main limitations of being human is simply our own bodies—and brains. Researcher Shimon Whiteson thinks that in the future, we will be able to augment ourselves with computers and enhance many of our own natural abilities. Though many of these possible cyborg enhancements would be added for convenience, others might serve a more practical purpose.

3. Taking over dangerous jobs

Robots are already taking over some of the most hazardous jobs available, including bomb defusing. These robots aren't quite robots yet, according to the BBC. They are technically drones, being used as the physical counterpart for defusing bombs, but requiring a human to control them, rather than using AI.

4. Solving climate change

Solving climate change might seem like a tall order from a robot. Using big data, AI could one day identify trends and use that information to come up with solutions to the world's biggest problems.

5. Robot as friends

At this stage, most robots are still emotionless and it's hard to picture a robot you could relate to. However, a company in Japan has made the first big steps toward a robot companion—one who can understand and feel emotions. The robot was programmed to read human emotions, develop its own emotions, and help its human friends stay happy.

6. Improved elder care

For many seniors, everyday life is a struggle, and many have to hire outside help to manage their care, or rely on family members. "Home" robots could help seniors with everyday tasks and allow them to stay independent and in their homes for as long as possible, which improves their overall well-being.

X CONCLUSION

Artificial intelligence is a driving force to change humanity by helping people and businesses create exciting, innovative products and services, drive critical decisions and achieve key goals. This is the reason why companies are hiring AI professionals at a jaw-dropping rate! One of the central factors influencing the process and the outcome of technology transfer is the nature of the technology being transferred. This paper identifies and discusses the main characteristics of Artificial Intelligence (AI) technology from the point of view of international technology transfer. It attempts to indicate the peculiarities of AI in this context and move towards a framework to assist recipient decision makers in optimizing the formulation of their policies on AI technology transfer. Expensive human skill and enabling technologies are required to develop, maintain and use AI systems efficiently, making such projects highly capital intensive. Artificial intelligence (AI), the ability of a digital

computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience. Applied Intelligence is intelligent technology and human ingenuity applied at the core of business – across every function and process – to address our clients most complex challenges.

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