EduBridge

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

Module 6- Artificial Intelligence

Module Overview

This modules aim to explain Artificial Intelligence concept. After having good understanding of Artificial Intelligence basics, you will explore different industry where the Artificial Intelligence functions.

Module Objective

At the end of the module, you will be able,

- Understand Artificial Intelligence in detail
- Explore different trends and Application in Artificial Intelligence

Understanding Artificial Intelligence

Artificial Intelligence is a way of making a computer, a computer-controlled robot, or a software think intelligently, in the similar manner the intelligent humans think.

AI is accomplished by studying how human brain thinks, and how humans learn, decide, and work while trying to solve a problem, and then using the outcomes of this study as a basis of developing intelligent software and systems.

Goals of AI

➢ **To Create Expert Systems** – The systems which exhibit intelligent behavior, learn, demonstrate, explain, and advice its users.

➢ **To Implement Human Intelligence in Machines** – Creating systems that understand, think, learn, and behave like humans.

What Contributes to AI?

Artificial intelligence is a science and technology based on disciplines such as Computer Science, Biology, Psychology, Linguistics, Mathematics, and Engineering. A major thrust of AI is in the development of computer functions associated with human intelligence, such as reasoning, learning, and problem solving.

Out of the following areas, one or multiple areas can contribute to build an intelligent system.
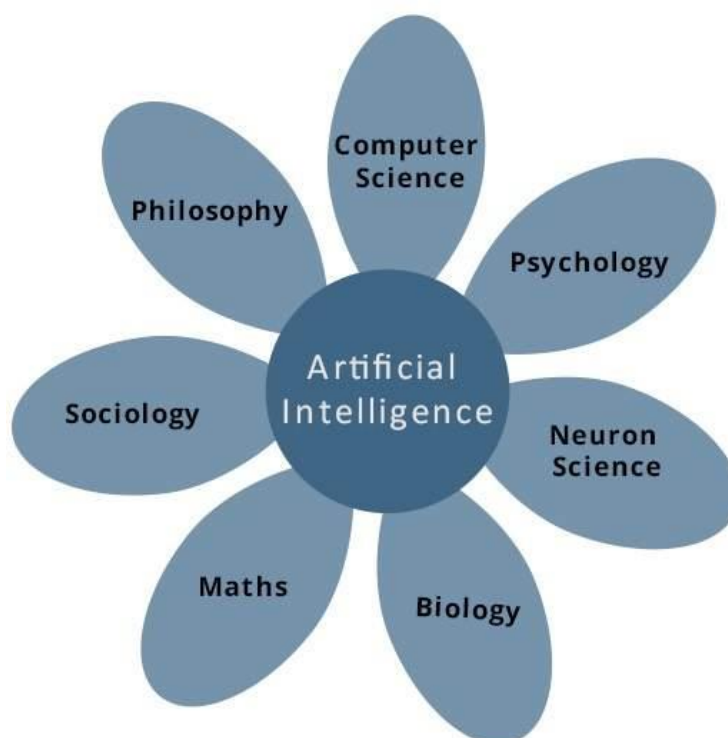
Programming Without and With AI

The programming without and with AI is different in following ways:

Programming Without AI	Programming With AI
A computer program without AI can answer the **specific** questions it is meant to solve.	A computer program with AI can answer the **generic** questions it is meant to solve.
Modification in the program leads to change in its structure.	AI programs can absorb new modifications by putting highly independent pieces of information together. Hence you can modify

Digital Skills   Participants Guide   By EduBridge Learning Pvt Ltd

	even a minute piece of information of program without affecting its structure.
Modification is not quick and easy. It may lead to affecting the program adversely.	Quick and Easy program modification.

What is AI Technique?

In the real world, the knowledge has some unwelcomed properties –

- ➢ Its volume is huge, next to unimaginable.
- ➢ It is not well-organized or well-formatted.
- ➢ It keeps changing constantly.

AI Technique is a manner to organize and use the knowledge efficiently in such a way that –

- ➢ It should be perceivable by the people who provide it.
- ➢ It should be easily modifiable to correct errors.
- ➢ It should be useful in many situations though it is incomplete or inaccurate.

AI techniques elevate the speed of execution of the complex program it is equipped with.

Recent advances in AI have been helped by three factors:

- ➢ Access to big data generated from e-commerce, businesses, governments, science, wearables, and social media

- ➢ Improvement in machine learning (ML) algorithms—due to the availability of large amounts of data

- ➢ Greater computing power and the rise of cloud-based services—which helps run sophisticated machine learning algorithms.

Application in Artificial Intelligence

AI is important because it can help solve immensely difficult issues in various industries, such as entertainment, education, health, commerce, transport, and utilities.

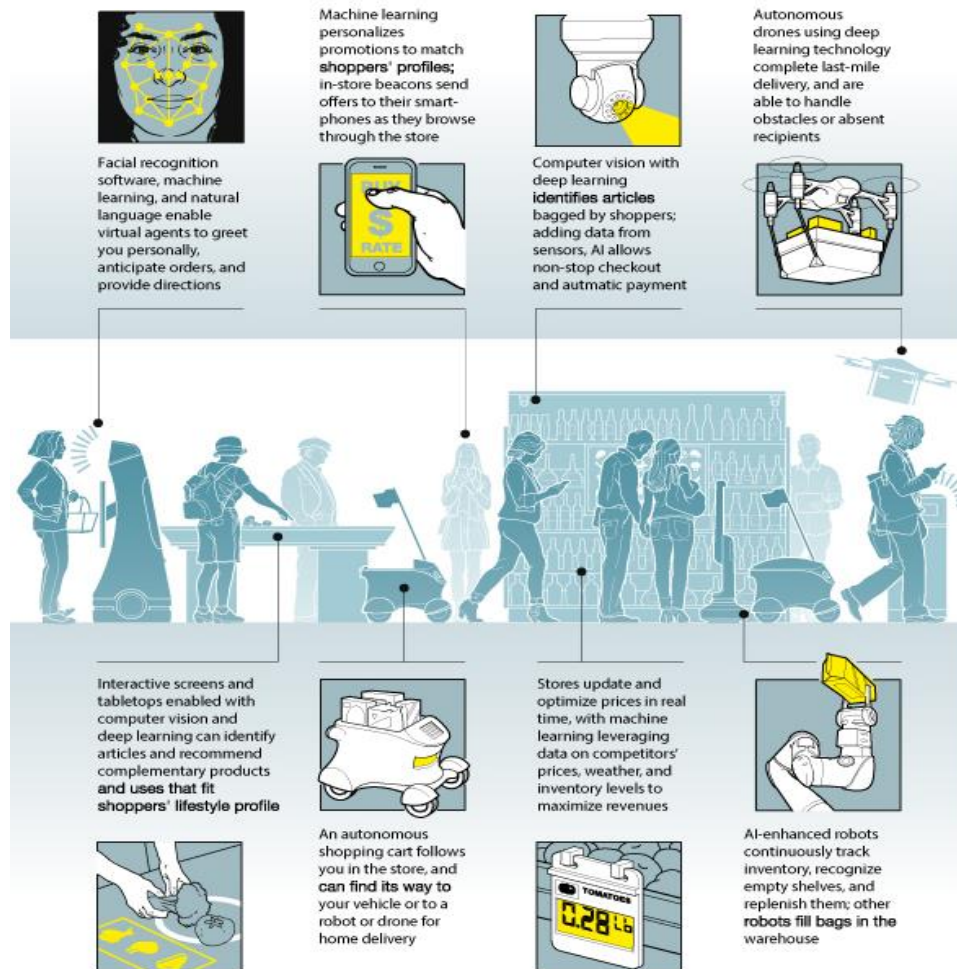AI applications can be grouped into five categories:
- ➢ **Reasoning:** The ability to solve problems through logical deduction. e.g. financial asset management, legal assessment, financial application processing, autonomous weapons systems, games

- **Knowledge:** The ability to present knowledge about the world. e.g. financial market trading, purchase prediction, fraud prevention, drug creation, medical diagnosis, media recommendation

- **Planning:** The ability to set and achieve goals. e.g. inventory management, demand forecasting, predictive maintenance, physical and digital network optimization, navigation, scheduling, logistics

- **Communication:** The ability to understand spoken and written language. e.g. real-time translation of spoken and written languages, real-time transcription, intelligent assistants, voice control

- **Perception:** The ability to infer things about the world via sounds, images, and other sensory inputs. e.g. medical diagnosis, autonomous vehicles, surveillance

Here is an infographic by **Mckinsey** that shows the extent to which AI can be used end-to-end in the retail industry from identifying customers to personalizing promotion to inventory management.

Retailers can know more about what shoppers want—sometimes before shoppers themselves

Facial recognition software, machine learning, and natural language enable virtual agents to greet you personally, anticipate orders, and provide directions

Machine learning personalizes promotions to match shoppers' profiles; in-store beacons send offers to their smart-phones as they browse through the store

Computer vision with deep learning identifies articles bagged by shoppers; adding data from sensors, AI allows non-stop checkout and autmatic payment

Autonomous drones using deep learning technology complete last-mile delivery, and are able to handle obstacles or absent recipients

Interactive screens and tabletops enabled with computer vision and deep learning can identify articles and recommend complementary products and uses that fit shoppers' lifestyle profile

An autonomous shopping cart follows you in the store, and can find its way to your vehicle or to a robot or drone for home delivery

Stores update and optimize prices in real time, with machine learning leveraging data on competitors' prices, weather, and inventory levels to maximize revenues

AI-enhanced robots continuously track inventory, recognize empty shelves, and replenish them; other robots fill bags in the warehouse

Trends in Artificial Intelligence

AI trends in various sectors

A. Healthcare

➢ AI and ML technology has been particularly useful in the healthcare industry because it generates massive amounts of data to train with and enables algorithms to spot patterns faster than human analysts.

EduBridge

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

➢ Medecision developed an algorithm that detects 8 variables in diabetes patients to determine if hospitalization is required.

➢ An app called BiliScreen utilizes a smartphone camera, ML tools, and computer vision algorithms to detect increased levels of bilirubin in the sclera (white portion) of a person's eye, which is used to screen people for pancreatic cancer. This cancer has no telltale symptoms, hence it has one of the worst prognoses of all cancers.

➢ NuMedii, a biopharma company, has developed a platform called Artificial Intelligence for Drug Discovery (AIDD), which uses big data and AI to detect the link between diseases and drugs at the systems level.

➢ GNS Healthcare uses ML algorithms to match patients with the most effective treatments for them.

B. Entertainment

➢ A familiar application of AI in everyday life is seen with services like Netflix or Amazon, wherein ML algorithms analyze the user's activity and compare it with that of other users to determine which shows or products to recommend.

➢ The algorithms are becoming intelligent with time—to the extent of understanding that a user may want to buy a product as a gift and not for himself/herself, or that different family members have different watching preferences.

C. Finance

➢ Financial services companies use AI-based natural language processing tools to analyze brand sentiment from social media platforms and provide actionable advice.

➢ Investment companies like Aidya and Nomura Securities use AI algorithms to conduct trading autonomously and robo-traders to conduct high-frequency trading for greater profits, respectively.

➢ Fintech firms like Kensho and ForwardLane use AI-powered B2C robo-advisors to augment rebalancing decisions and portfolio management performed by human analysts.

➢ Wealthfront uses AI algorithms to track account activity and help financial advisors customize their advice.
➢ Chatbots, powered by natural language processing, can serve banking customers quickly and efficiently by answering common queries and providing information promptly.

➢ Fraud detection is an important application of AI in financial services.

For example, Mastercard uses Decision Intelligence technology to analyze various data points to detect fraudulent transactions, improve real-time approval accuracy, and reduce false declines.

Digital Skills   Participants Guide   By EduBridge Learning Pvt Ltd

D. Data security

Cyber attacks are becoming a growing reality with the move to a digital world. There are also concerns about AI programs themselves turning against systems.

➢ Automatic exploit generation (AEG) is a bot that can determine whether a software bug, which may cause security issues, is exploitable. If a vulnerability is found, the bot automatically secures it. AEG systems help develop automated signature generation algorithms that can predict the likelihood of cyberattacks.

➢ PatternEx and MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) have developed an AI platform called AI2 which claims to predict cyber attacks better than existing systems. The platform uses Active Contextual Modeling, a continuous feedback loop between a human analyst and the AI system, to provide an attack detection rate that is better than ML-only solutions by a factor of 10.

➢ Deep Instinct, an institutional intelligence company, says that malware code varies between 2%-10% in every iteration and that its AI model is able to handle the variations and accurately predict which files are malware.

E. Manufacturing

➢ Landing.ai claims to have created machine-vision tools to find microscopic defects in objects like circuit boards using an ML algorithm trained using tiny volumes of sample images. In the future, self-driving robots may be created which can move finished goods around without endangering anyone or anything around.

➢ Robots in factories are often stationary but are still in danger of crashing into objects around it. A new concept called collaborative robots or "cobots, enabled by AI, can take instructions from humans, including instructions that the robot has not been previously exposed to, and work productively with them.

➢ AI algorithms can influence the manufacturing supply chain by detecting the patterns of demand for products across geographies, socioeconomic segments, and time, and predicting market demand. This, in turn, will affect inventory, raw material sourcing, financing decisions, human staffing, energy consumption, and maintenance of equipment.

➢ AI tools help in predicting malfunctions and breakdown of equipment and taking or recommending preemptive actions as well as tracking operating conditions and performance of factory tooling.

F. Automotive industry

➢ Tesla introduced TeslaBot, an intelligent virtual assistant integrated with Tesla models S and X, allows users to interact with their car from their phone or desktop.

Digital Skills   Participants Guide   By EduBridge Learning Pvt Ltd

EduBridge

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

- ➢ Uber AI Labs is working on developing self-driven cars with the help of the best engineers and scientists. Uber has already tested a batch of self-driving cars in 2016.

- ➢ Nvidia has partnered with Volkswagen to develop "intelligent co-pilot systems" in cars that will enable safety warnings, gesture control, and voice and facial recognition.

- ➢ Ericsson predicts that 5G technology will improve vehicle-to-vehicle communication wherein sensors will be implanted in airport runways, railways, and roads.

Activity

Trainer will take the participants to the computer lab and ask the participants to do internet research on Future AI Trends.

Digital Skills	Participants Guide	By EduBridge Learning Pvt Ltd