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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

A PROFESSIONAL DEVELOPMENT PROGRAM

- **TOPIC:** *ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING*
- **DATE:** 4th and 18th AUGUST 2018
- **VENUE:** B.B.P.S. TRAINING CENTRE
- **ORGANISER:** B.B.P.S. PITAMPURA
- **RESOURCE PERSON:** *PROF. MADAN MOHAN PANT*

PROF. MM PANT

➢ PROFILE OF RESOURCE PERSON:

A Ph. D in Computational Physics along with Professional Law Degree. Ex- Pro-Vice Chancellor at IGNOU and faculty of IIT-Kanpur.

➢ INTRODUCTION:

Artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans and other animals. In computer science AI research is defined as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals.

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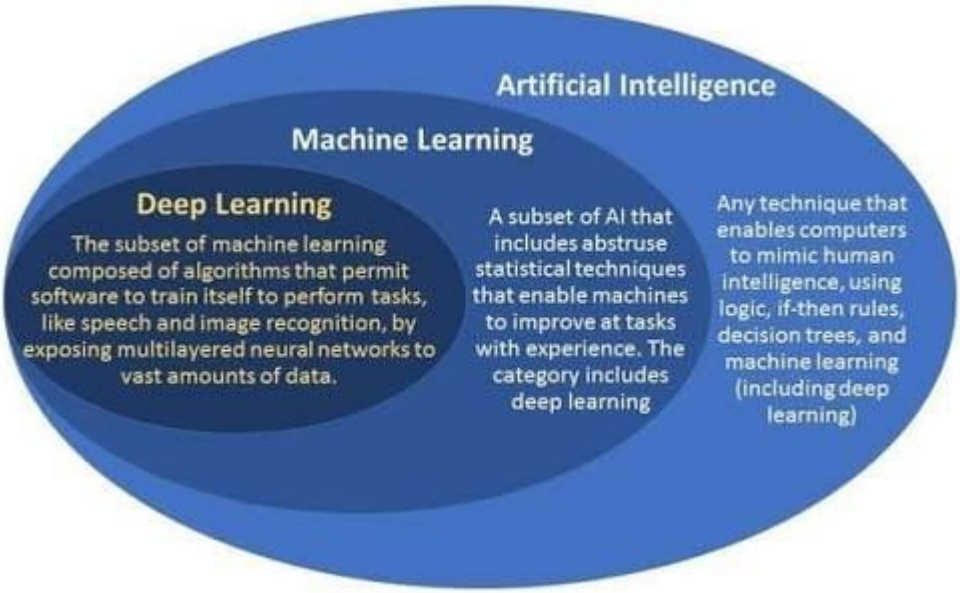
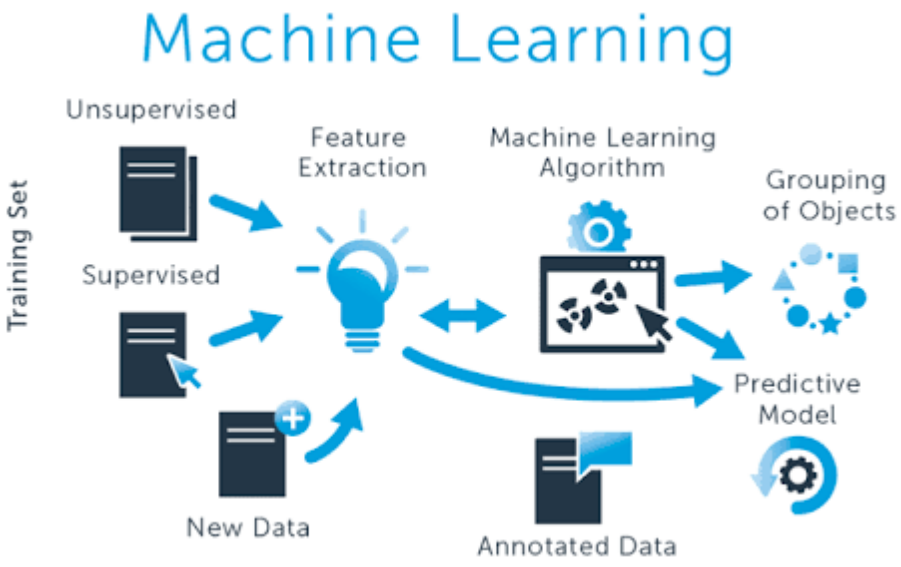


Colloquially, the term "artificial intelligence" is applied when a machine mimics "cognitive" functions that humans associate with other human minds, such as "learning" and "problem solving"



Deep learning (also known as deep structured learning or hierarchical learning) is part of a broader family of machine learning methods based on learning data representations, as opposed to task-specific algorithms.

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Learning can be supervised, semi-supervised or unsupervised.

Some representations are loosely based on interpretation of information processing and communication patterns in a biological nervous system, such as neural coding that attempts to define a relationship between various stimuli and associated neuronal responses in the brain.

Deep learning architectures such as deep neural networks, deep belief networks and recurrent neural networks have been applied to fields including computer vision, speech recognition, natural language processing, audio recognition, social network filtering, machine translation, bioinformatics and drug design, where they have produced results comparable to and in some cases superior to human experts

So, with the use of deep learning and artificial neural networks, today's AI can do many interesting things. AI can see and hear, and even hold conversations. We all use Siri, Cortana, Alexa, Google Home etc. for simple tasks. Professor Ashok Goel had created an AI powered teaching assistant labelled Jill Watson, and the recent Google Duplex can have a 2-way conversation.

We need to go to Computational Thinking to bring about the economic progress with AI usage pointed out by Paul Krugman that was referred to in the earlier post.

For example, if you thought of a certain application with drones; shooting movies, making product deliveries or saving humans or elephants from accidents, you would apply Computational Thinking to identify the components of your solution.

Once we really appreciate all the things that Machine learning can do today, it requires Computational Thinking to design useful applications in the entire spectrum of the economy. It is also becoming clear that even more important than the algorithms is the data collection, organisation and management as well as the user experience when computers are used to solve real life complex problems.

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➢ ABOUT THE PROGRAMME:

An introductory 10-hour programme for learners of class 11 consisted of 15 sessions of 40 minutes each. The sessions were as follows:

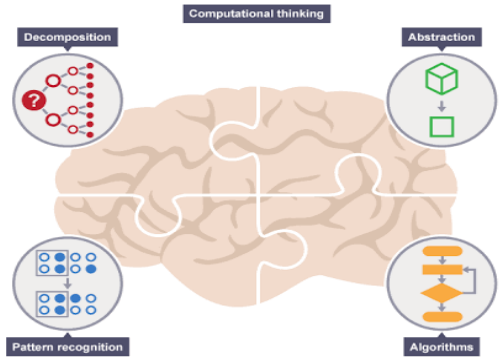
Session 1 - The Evolution of AI to its present state.

Artificial intelligence and robotics are two "overnight successes" that have been decades in the making, and their intersection will soon change a multitude of industries. The evolution of smarter AI and more-versatile robotics has helped both technologies to push past repetitive tasks to take on adaptive and more intelligent applications.

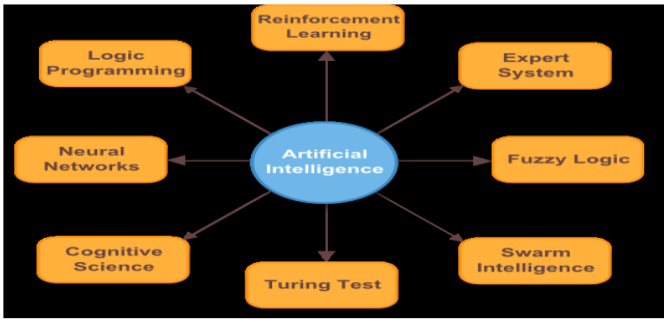
Session 2 - Why school students should learn - about AI, ML and CT?

- Build Problem Solving Skills
- AI will be critical in all fields of human activities
- Many students can actually make significant contribution towards Problem Solving.

Session 3 - Computational Thinking: Meaning and Definitions.



Session 4 - Computational Thinking: In the context of AI and ML.



Session 5 - Relationship Between AI, ML and DL.

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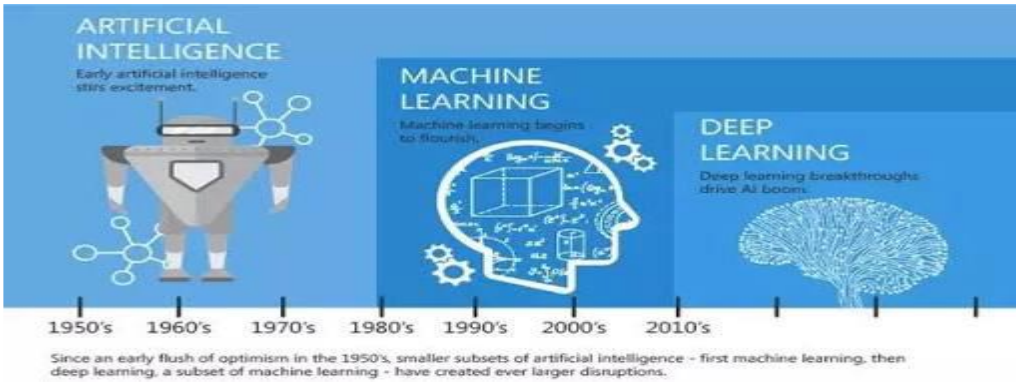
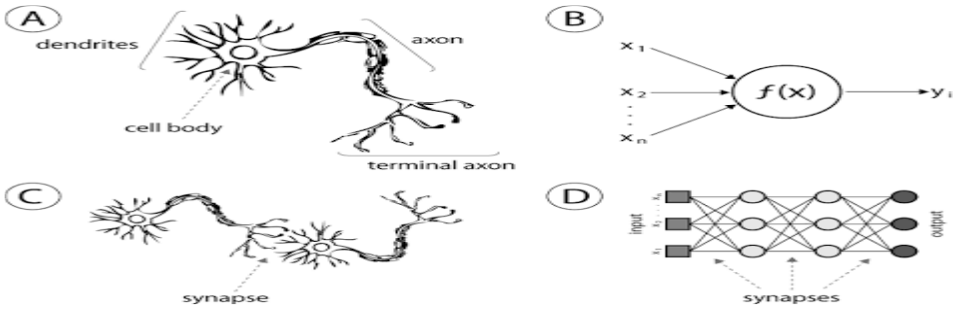


Session 6 – Artificial neural networks.



Session 7 – Mathematics for AI and ML.

Artificial intelligence (AI) is much broader than ML so the maths there may also include the following:

- Discrete maths.
- Graph theory.
- Computational complexity.
- Game theory.

Session 8 – Object recognition and computer vision.

Object recognition – technology in the field of computer vision for finding and identifying objects in an image or video sequence.

Session 9 – Autonomous transportation: How does it work?

Autonomous cars combine a variety of techniques to perceive their surroundings, including radar, laser light, GPS, odometry, and computer vision.

Advanced control systems interpret sensory information to identify appropriate navigation paths, as well as obstacles and relevant signage.

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Session 10 – Robots and Drones.

Session 11 – Speech recognition and conversational interfaces.

Conversational UI takes two forms — voice assistant that allows you to talk and chatbots that allow you to type.

Session 12 - Chatbots and machine translation.

There are three types of machine translation system: rules-based, statistical and neural.

Natural Language Processing:

• Syntax (morphological segmentation, part of speech tagging, parsing, sentence breaking,

• Semantics (lexical semantics, named entity recognition,

Natural Language Understanding)

• Discourse (automatic summarisation, coreference

resolution, discourse analysis)

• Speech (speech recognition, speech segmentation)

Session 13 - The technologies from IBM Watson, Google Tensor Flow, Amazon and Apple.

Session 14 - What is trending in AI today?

One in 3 Smartphones will be AI enabled in 2020

Session 15 - The implications of AI: Social, Ethical and regulatory issues.

INTERACTIVE SESSION WITH STUDENTS

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➢ LEARNING OUTCOMES:

The programme was very knowledgeable. Students came to know about Artificial Intelligence, its different aspects, its uses in day to day life and why this generation should learn this concept. The technologies used by various firms with the help of AI were discussed. Students learned the different uses of AI like Autonomous transportation, Object recognition, chatbots and others. Students also came across different concepts like Machine Learning and Deep Learning. Thus, it prepared the students to prosper and flourish in the Fourth Industrial Age driven by A.I., Machine Learning, Deep Learning and other disruptive technologies.

Students came to know about “what is trending in AI today?”

1. AI will become a political talking point.
2. Logistics will become increasingly efficient.
3. Mainstream auto manufacturers will launch self-driving cars.
4. DARPA will develop advanced robo-warriors in plain sight.
5. Machine learning will aid knowledge workers.
6. Content will be created using AI.
7. Peer-to-peer networks will create transparency.
8. Consumers will become accustomed to talking with technology.
9. Demand for data scientists will surpass demand for engineers.
10. AI will fight challenging diseases.

THE GROUP

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➢ Comments and suggestions (How do you think the workshop/Seminar could have been made more effective?)

It was a great opportunity to understand new upcoming technology landscape.

The programme was definitely knowledgeable but we as the students felt that there should have been more practical exposure along with theoretical concepts. Hands-on is a must.

Though there can be more parameters to score these type of advance tech trainings but we expect it to be related to existing & upcoming career options along with how these type of techniques will help in day-to-day life of common man and what flavour of advancement it will offer in consumer focussed applications like smart cars, AI based video games, smart homes etc. If we can initiate this journey with any innovative project using basic AI/ML is what we were looking for and we are still far from it.

➢ Was the advance briefing about the workshop/Seminar appropriate?

GENERAL FEEDBACK	YES,	NO	NOT SURE
• The workshop/Seminar was applicable to my job	❍	❍	❍
• I will recommend this workshop/Seminar for other faculty members.	❍	❍	❍
• The program was well paced within the allotted time	❍	❍	❍
• The material was presented in an organized manner	❍	❍	❍
• The resource person was a good	❍	❍	❍

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communicator			
• The resource person was knowledgeable on the topic	❍	❍	❍
• I would be interested in attending a follow-up, more advanced workshop/Seminar on this same subject	❍	❍	❍
• I will be able to conduct follow up workshop for the benefit of fellow Staff Members	❍	❍	❍

Report submitted by:

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