Artificial Intelligence

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About Course

AI is impacting our lives, from self-driving cars to chatbots and machine learning, AI is revolutionizing various industries. AI, is today perceiving, reasoning, learning, problem-solving, and even creativity.

Gain insights into the different forms of AI that are becoming part of our everyday lives, such as smart speakers and chatbots.

Learn about the relationship between AI and machine learning, and how deep learning is driving advancements in AI technology.

AI Evolution

1942

Bombe unveils the Enigma machine

1961

The Unimate industrial robot

1964

First chatbot: Eliza

1997

DeepBlue Wins Chess Game

2002

Roomba: more than a vacuum cleaner

2011

IBM Watson supercomputer

2017

AlphaGo

Source: https://blog.alana.ai/en/alana-for-innovation/artificial-intelligence-a-brief-history-of-its-evolution-in-the-world/

AI Categorization

Non-Generative AI

Non-generative AI, focuses on analyzing and interpreting existing data. We donot create new content just analyze existing data and based on that make certain decisions.

Generative AI

Generative AI is the artistic side of AI, creating entirely new things based on what it learnt. We actually generate new content the best ex. is ChatGPT, new content can be text, images, video, audio etc.

Non-Generative AI

Non-generative AI, focuses on analyzing and interpreting existing data. Imagine a librarian instead of an artist. This AI excels at tasks like:

- **Recognition:** Identifying objects in images, faces in videos, or spam in emails.
- **Prediction:** Forecasting sales, weather patterns, or machine failures.
- **Classification:** Sorting emails, categorizing documents, or filtering search results.

By crunching numbers and patterns, non-generative AI helps us understand the world around us.

Generative AI

Generative AI is the artistic side of AI, creating entirely new things based on what it learnt. let's call it "inventive AI," is all about creating new stuff. Imagine a painter, not a detective. This AI can:

- Make things up: It can dream up images, compose music, write stories, or design inventions.
- Imagine what's next: It can brainstorm ideas, translate languages more creatively, or personalize experiences for you.

This AI isn't just crunching numbers, it's pushing the boundaries of what's possible.

Evolution of Generative AI

Statistical Machine Learning

Early days of Generative AI, the kind of problems that we used to solve was predicting home price based on factors such as the area of the bedroom and the age etc. this is called statistical machine learning and the factors which determine the price of the home such as area of bedroom, age etc. and these are called features but these are simple features.

Evolution of Generative AI

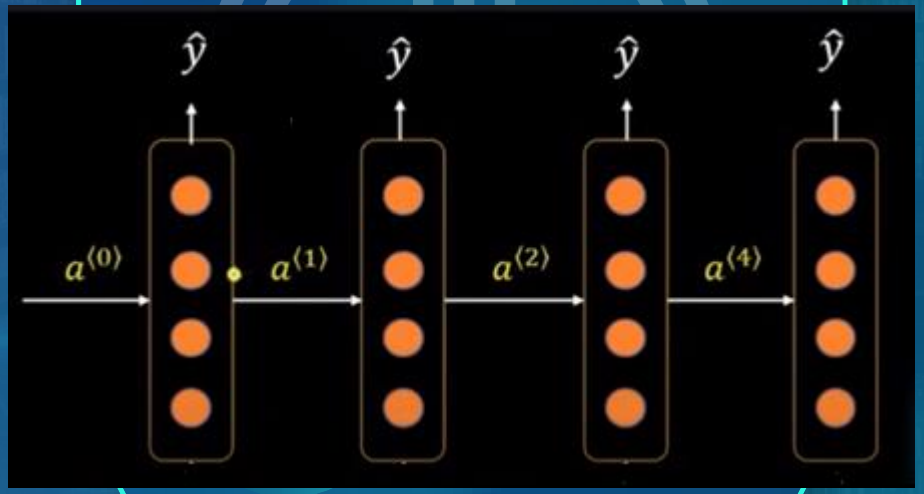
Neural Networks

Image recognition such as identifying either the image is cat or dog the feature is bit complex i.e. whiskers or the pointy ears that the cat has and this data which is an image data is just a bunch of pixel so it is unstructured data, so therefore the features of an image are complex features the cat's face could be in a different angle so that makes an image detection much complex and we can't use statistical ml for this therefore neural networks were invented and that gave birth to deep learning.

Evolution of Generative AI

Recurrent Neural Networks

RNN is this kind of network lets say you want to translate a sentence “Shahid loves baby aika” from English to Urdu what you do is to feed the first word to your neural network so we will feed Shahid to a neural network and it will give me this translation that A1 is nothing but the translation of Shahid in urdu after that you feed the second word and the translation of previous word to the same network so these are not four different networks but actually you provide translation of previous word to the same network this is just a time excess it's the same network where you feed the translation of the previous word or previous sentence so this creates kind of a loop within the neural network and it is called recurrent neural network, used for solving problems like language translation.



Evolution of Generative AI

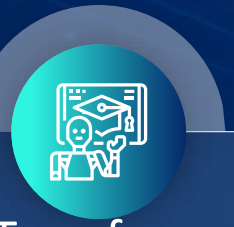
Spatial Neural Networks called Transformer

A spatial neural network is an AI model with a superpower: understanding the arrangement of things. Imagine a brain specifically wired for seeing the world in positions and distances. This network excels at tasks like:

- 3D Perception: Recognizing objects in images and videos, even if they're hidden or from unusual angles.
- Scene Understanding: Grasping the layout of a room, the flow of traffic, or the movement of objects in a video.
- Robot Navigation: Helping robots move safely and efficiently by understanding their surroundings.

By processing spatial data, these networks unlock a new level of intelligence for AI in our 3D world. It's like giving AI a sixth sense for space.

Evolution of Generative AI



Transformer Explained

Transformer excels at understanding relationships in text and data. It analyzes each word, considering its meaning and how it connects to others, like focusing on specific points in a conversation. Transformer by Google is BERT and OpenAI is GPT [Generative Pre-trained Transformer] With this "self-attention," it excels at:

- **Machine translation:** Capturing the nuances of languages by understanding how words interact.
- **Text summarization:** Grasping the key points of long passages by considering word relationships.
- **Chatbots and AI assistants:** Having meaningful conversations by understanding context and following the flow of ideas.

By focusing on connections, Transformer AI unlocks new levels of communication and understanding between machines and humans.

Evolution of Generative AI

Large Language Model - LLM

Large: I'm trained on massive amounts of text data, allowing me to process information and respond in a comprehensive way.
Language: My specialty is understanding and generating human language. I can translate, write different kinds of creative content, and answer your questions in an informative way.
Model: I'm a complex algorithm that uses statistical patterns to make sense of language. This lets me learn and adapt to new information and situations.
Like Gemini is a giant library of text and code, with the ability to understand and respond to your requests in a way that simulates conversation.

AI In Medicine

Diagnosing diseases with image analysis

AI can be trained on vast amounts of medical images like X-rays, CT scans, and mammograms. These AI systems can then analyze new patient images, highlighting potential abnormalities and aiding doctors in diagnosing diseases like cancer or lung infections.

Personalized medicine with patient data analysis

AI can analyze a patient's medical history, genetic data, and lifestyle information. This allows doctors to predict a patient's risk of certain diseases and tailor treatment plans accordingly. For example, AI might suggest medications or therapies with a higher chance of success based on the patient's unique profile.

AI In Manufacturing

Predictive maintenance:

Imagine a factory with hundreds of machines constantly running. Downtime due to unexpected breakdowns can be costly.

AI can be used to analyze sensor data from these machines, tracking things like vibration, temperature, and energy use. By identifying subtle changes in these patterns, AI can predict when a machine is about to fail.

This allows for proactive maintenance, preventing breakdowns and saving the manufacturer time and money.

Jazak’Allah