Unit 4 Generative AI

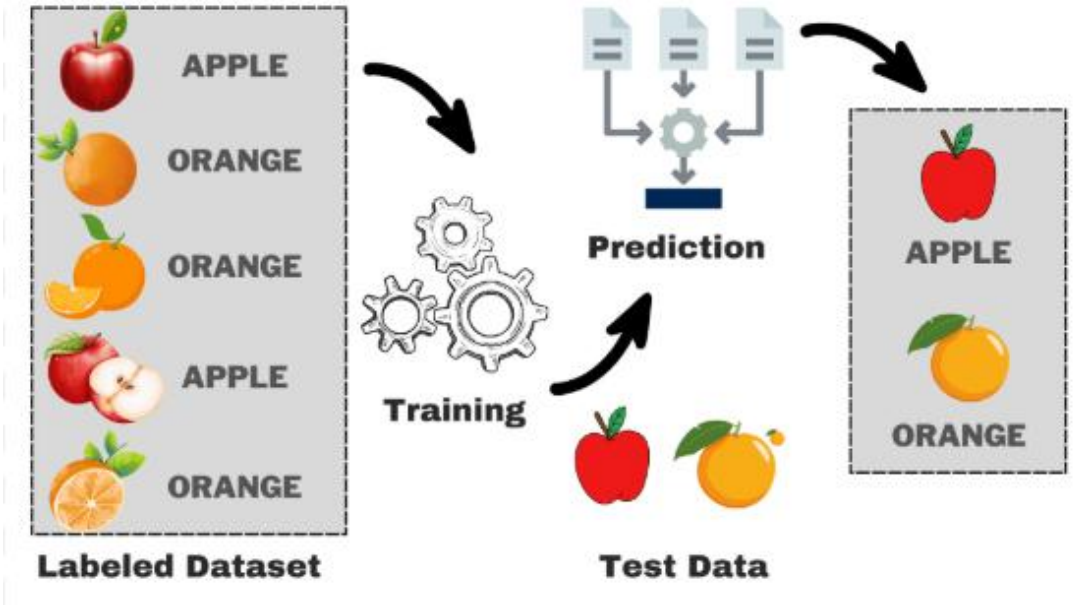
Class IX Artificial Intelligence

INDIAN SCHOOL AL WADI AL KABIR

Supervised Learning

- Supervised learning is a type of machine learning where the computer is taught using examples that include both input and output.

Training phase: Train the machine learning Model using the labelled dataset. The model looks at the features of the data and learns to associate these features with the corresponding data type.



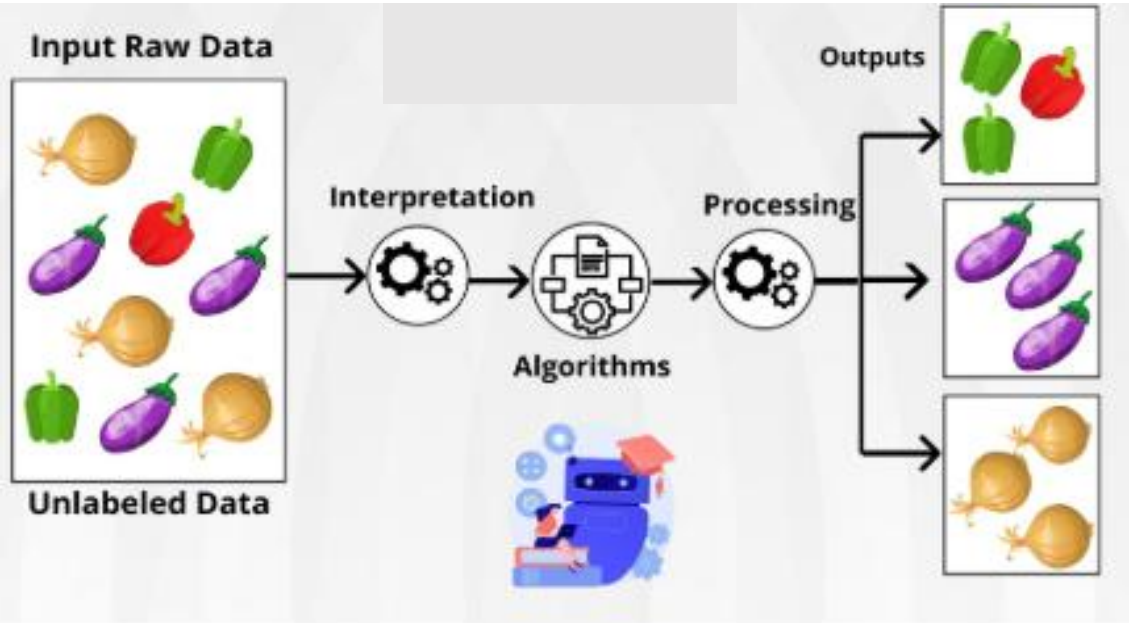
Testing Phase: Once the model is trained, test it with unlabeled data. The model uses the already learned information to predict the output, demonstrating how well it has learned the patterns in the data

Unsupervised Learning

- Un supervised learning is a type of machine learning where the computer is given data without any labels or answers. It has to figure out the patterns and relationships in the data all by itself.
- Input (Raw data):
- Data: Machine does not know the data.
- Process: The algorithm processes these

images and tries to group them based

on physical similarities it detects

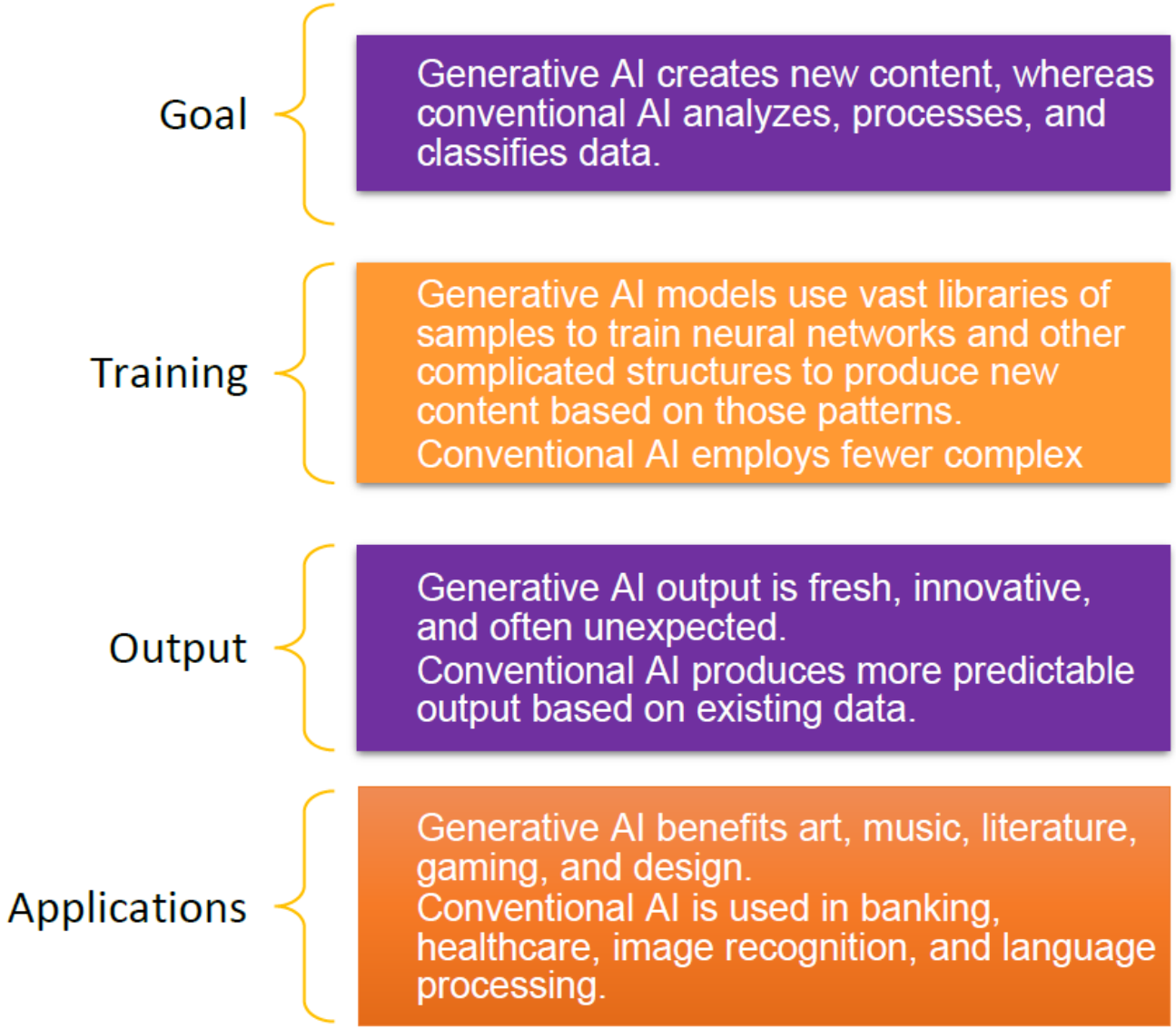


Output: The algorithm organizes the images into clusters . Each cluster is expected to contain images of similar objects.

In unsupervised or self-supervised learning, the machine learning model takes unlabeled datasets and figures out patterns and inherent structures within them ,without human intervention.

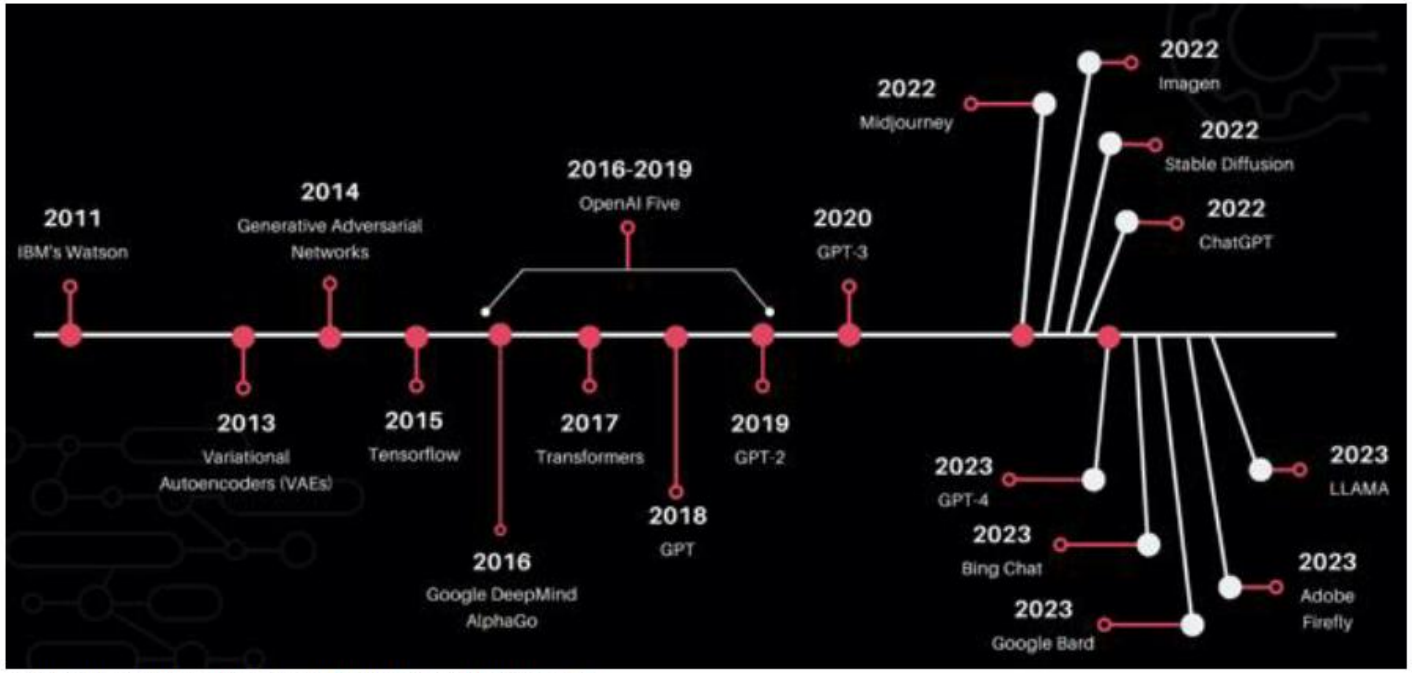
Generative AI vs Conventional AI

- In contrast to other forms of AI, Generative AI is specially made to produce new and unique content rather than merely processing or categorizing already-existing data.



Generative AI

- Generative artificial intelligence (AI) refers to the algorithms that generate new data that resembles human-generated content, such as audio, code, images, text, simulations, and videos.
- This technology is trained with existing data and content, creating the potential for applications such as natural language processing, computer vision, the metaverse, and speech synthesis



Source: https://www.desdevpro.com/blog/talk-rise-of-generative-ai

- https://www.youtube.com/watch?v=26fJ_ADteHo

Types of Generative AI

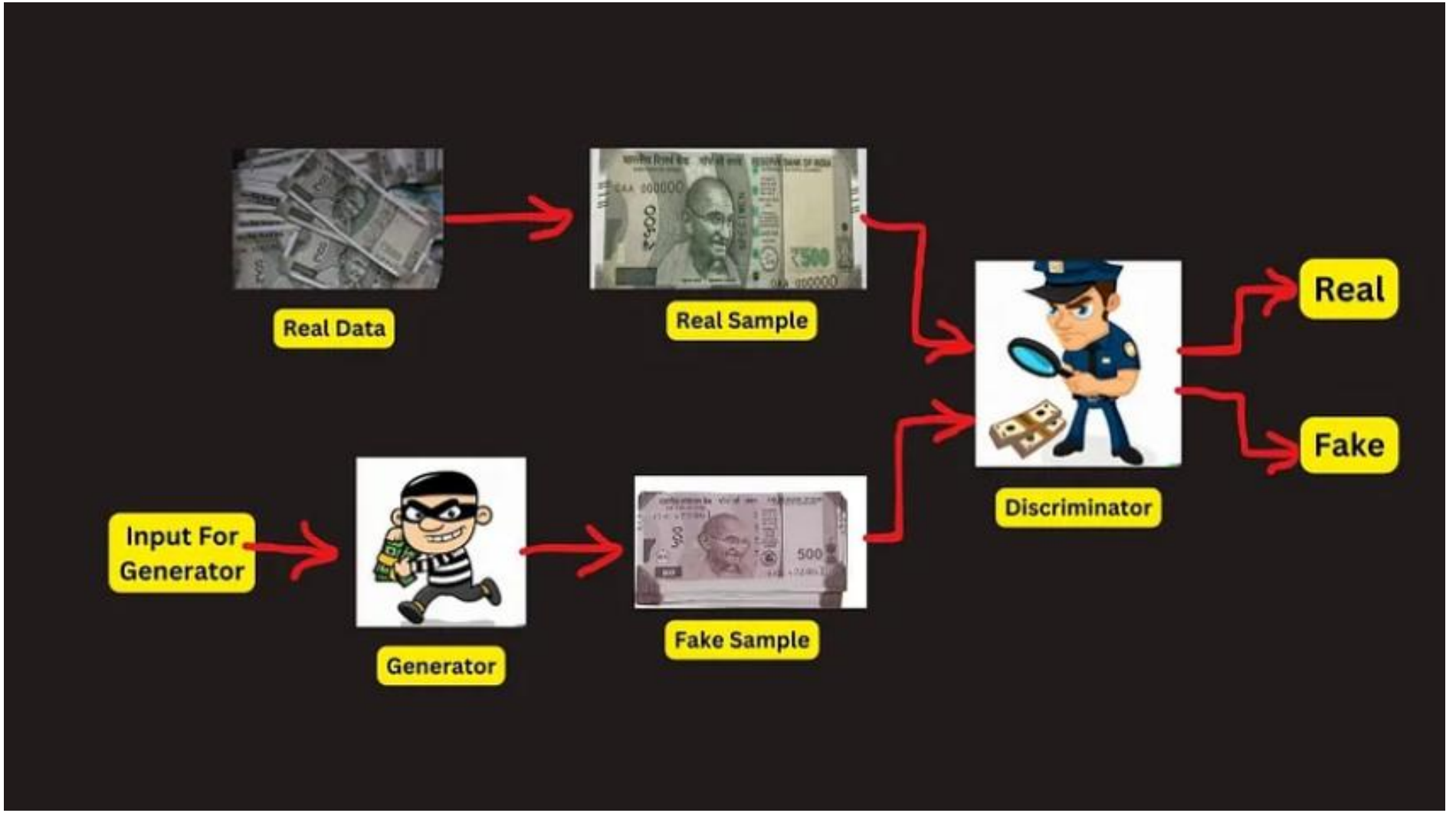
Generative AI comes in a variety of forms, each with unique advantages and uses. Some of the most typical varieties are listed below

1. GANs (Generative Adversarial Networks): GANs are neural networks that collaborate to produce fresh data

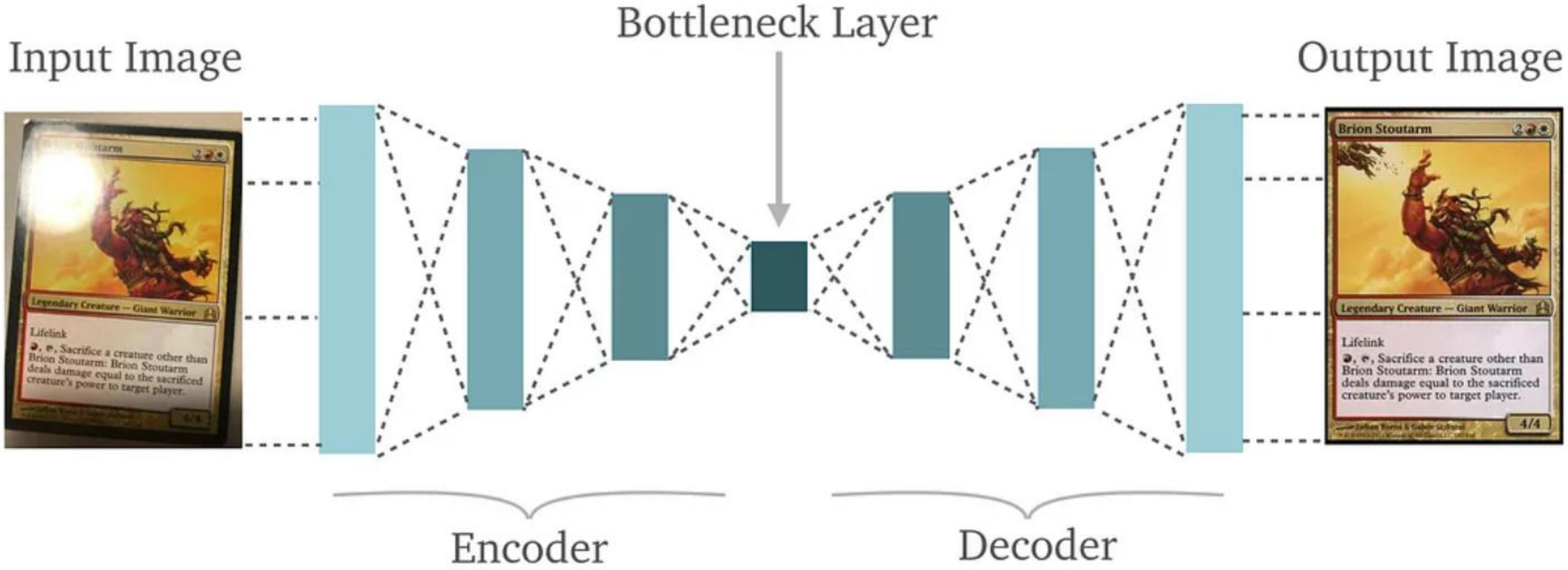
- Made up of two neural networks: Generator Network & Discriminator Network
- The generator network produces the data, while the discriminator network analyses the data and provides feedback.
- Until the generator can generate data that is identical to real data, the two networks collaborate in a feedback loop.
- Examples-creating portraits of non-existing people, convert images from day to night, generate images based on textual description, generate realistic video, 3D object creation, improve video and image quality etc.

2.Auto Encoder: These are Neural networks that have been trained to learn a compressed representation of data

- They function by compressing data first, then decompressing that compressed data to restore it to its original form.
- Auto encoders can be applied to denoising or picture compression applications.
- Examples- artistic image creation, drug discovery. They generate highly realistic samples.


Real Data
Real Sample
Real
Fake
Discriminator
Input For Generator
Generator
Fake Sample

GAN



AUTO ENCODER

Types of Generative AI

3. VAEs. (Variational Autoencoder): In order to produce fresh data, VAEs learn the distribution of the data and then sample from it.

- Examples- Generation of new images similar to given training set, Image reconstruction, generating drafts for writer, generating new sounds and music composition etc.

4. RNNs(Recurrent Neural Network): are a special class of neural networks that excel at handling sequential data, like music or text.

- They function by feeding past inputs and applying that knowledge to anticipate future inputs.
- Example- Generating novel text in the style of a specific author or genre, predicting next character or word in a sequence, sentiment analysis etc.

Benefits of using Generative AI

Creativity: Generative AI can assist creatives in pushing the boundaries in making creative processes more efficient and personalized. This can be particularly valuable in fields such as art, design, and music.

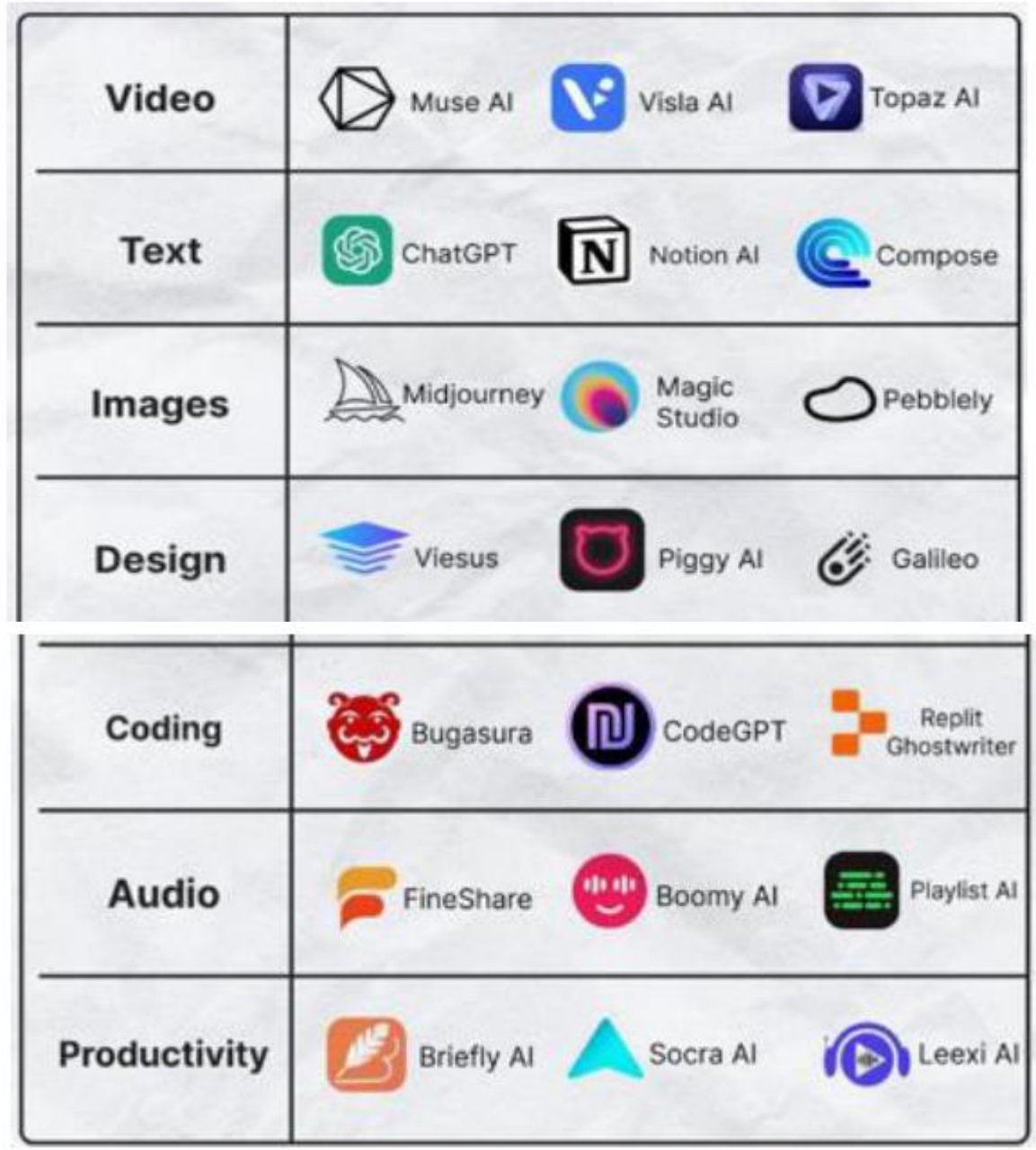
Efficiency: Generative AI can automate content creation processes, which can save time and reduce costs compared to traditional manual processes.

Personalization: Generative AI can be used to create personalized content for individual users based on their preferences and behaviors, such as customized product recommendations or personalized news articles.

Exploration: Generative AI can be used to explore new design spaces or optimize complex systems, such as designing new drugs or improving industrial processes.

Accessibility: Generative AI can democratize access to content creation tools, making it easier for people with limited resources or technical expertise to produce high-quality content.

Scalability: Generative AI can be used to generate large volumes of content quickly and efficiently, making it a scalable solution for businesses and organizations that need to produce large amounts of content.


Video
Muse AI
Visla AI
Topaz AI
Text
ChatGPT
Notion AI
Compose
Images
Midjourney
Magic Studio
Pebblely
Design
Viesus
Piggy AI
Galileo
Coding
Bugasura
CodeGPT
Replit Ghostwriter
Audio
FineShare
Boomy AI
Playlist AI
Productivity
Briefly AI
Socra AI
Leexi AI

- **Examples of Generative AI**
- Generative AI has many applications, from art and music to language and natural language processing. Here are some examples of how generative AI is being used in various fields:
- **Art:** Generative AI is being used to create unique works of art.
- For example, The Next Rembrandt project used data analysis and 3D printing to create a new painting in the style of Rembrandt

- Generative AI is being used to create new music, either by composing original pieces or by remixing existing ones.
- For example, AIVA is an AI composer that can create original pieces of music in various genres.

- **Language:** Generative AI is being used to generate new language, such as chatbots that can hold conversations with users or natural language generation systems that can produce written content.

Limitations of Using Generative AI

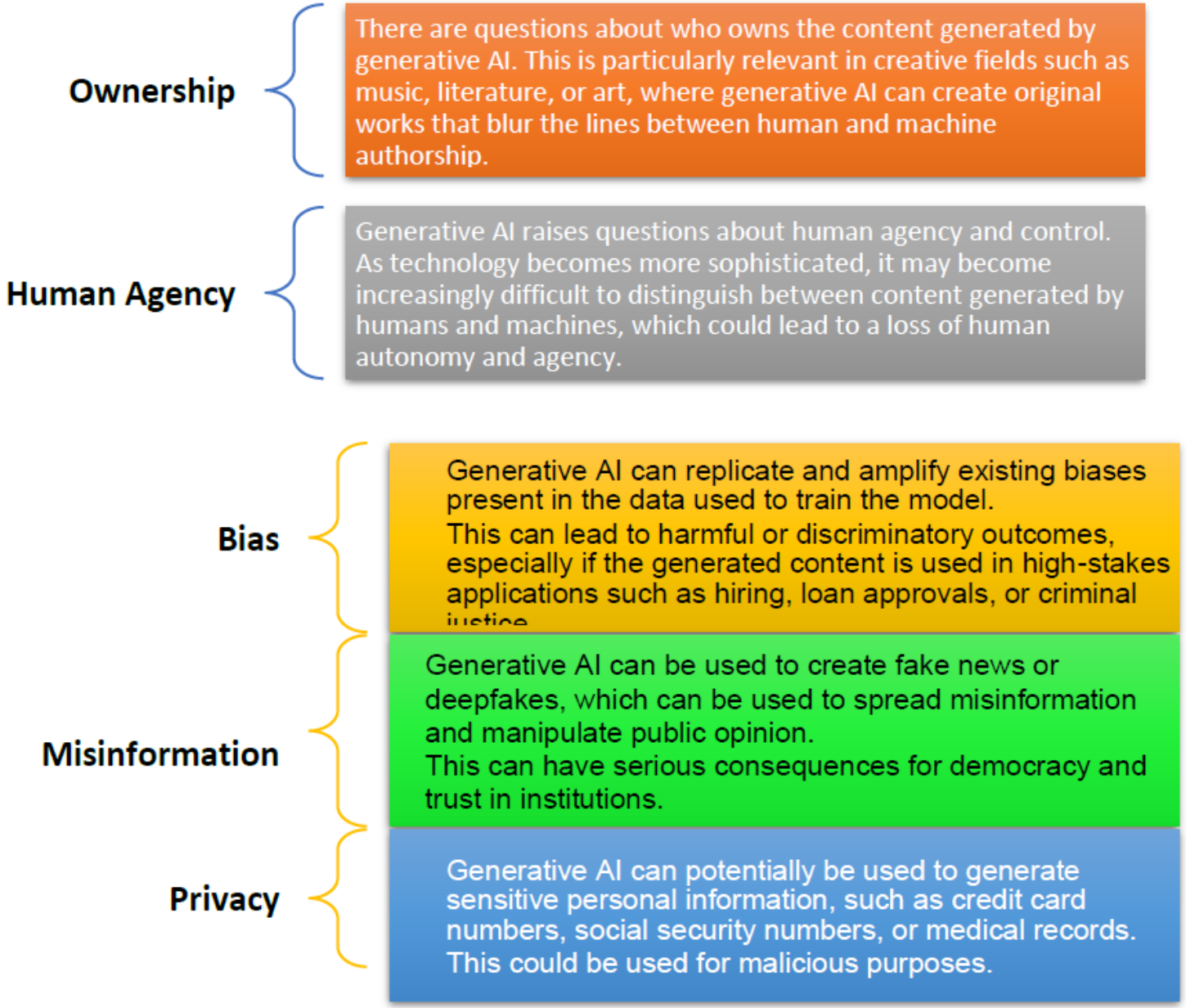
1. Data Bias : If generative AI is trained on biased or incomplete data, the output may be similarly biased or flawed. This can lead to inaccurate or problematic results in certain applications, such as in facial recognition or natural language processing.

2. Uncertainty :Generative AI can produce unexpected and often unpredictable results, which can be both a benefit and a drawback.

3. Computational Demands: Generative AI requires significant computational resources to train and generate its output, which can be expensive and time-consuming.

Ethical considerations of using Generative AI

While Generative AI offers many benefits, there are also several ethical considerations that should be considered when using this technology, which are given below



The Potential Negative Impact on Society

Generative AI can be used to create fake news or deep fakes that can spread misinformation and manipulate public opinion.
Lead to job displacement for humans who previously performed these tasks.
Generative AI has the potential to generate sensitive personal information, such as social security numbers or medical records, which could be used for malicious purposes.

Responsible Use of Generative AI

- Ensuring that the training data used are diverse and representative.
- The outputs are scrutinized for bias and misinformation.
- Prioritizing user privacy and consent,
- Having clear guidelines around ownership and attribution of generative content.
- Engaging in public discussions around the social and ethical implications of this technology to ensure that it is developed and used in ways that are beneficial to society.

In short, responsible use of Generative AI is essential for ensuring that this technology is developed and used in ways that benefit society!
By emphasizing ethics, creating trust, limiting negative repercussions, defining legislation, and encouraging innovation, we may maximize Generative AI’s potential to improve society!

- **Hands-on Activity**
- **Generate Images with Text Prompt**
- Go to artbreeder.com
- Select Create from menu bar and click on New Image under Prompter category.
- Give cool text prompt and see how AI generates a picture from those prompts.
- **Runway ML**: Runway ML is a platform for creating, training, and deploying
- -friendly interface for building and training various types of generative models, including GANs, VAEs, and image classifiers.
- (Watch video: Video source: https://www.youtube.com/watch?v=trXPfpV5iRQ)
- Explore AI Magic Tools Of Runway ML
- Go to https://runwayml.com/
- Explore the AI Magic Tools
- Take any tool of your choice and generate new content with it.

- **Hands-on Activity**
- **Chit-Chat with ChatGPT & Gemini**
- Sign up & Login into both ChatGPT and Gemini.
- Chat with the ChatGPT and ask it to write a paragraph on Generative AI? - ChatGPT
- Similarly, Chat with Bard and ask it to write a paragraph on Generative AI? - Gemini
- Compare the results