Artificial Intelligence

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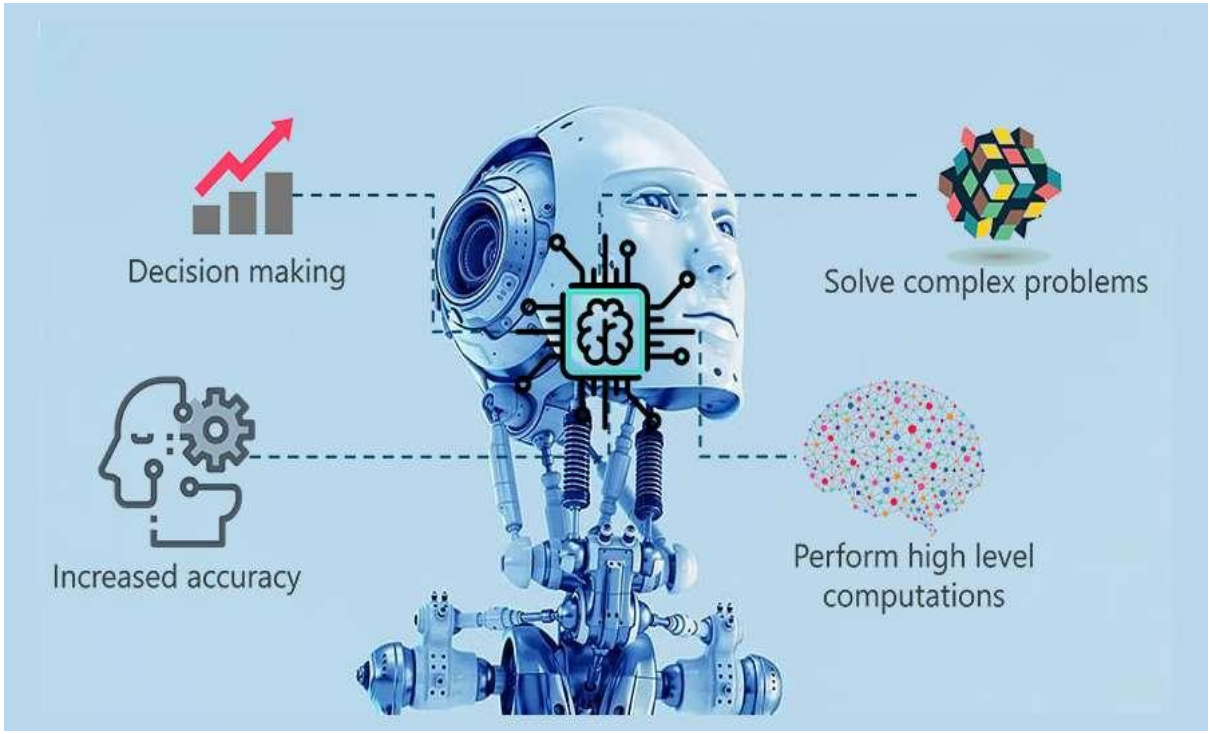
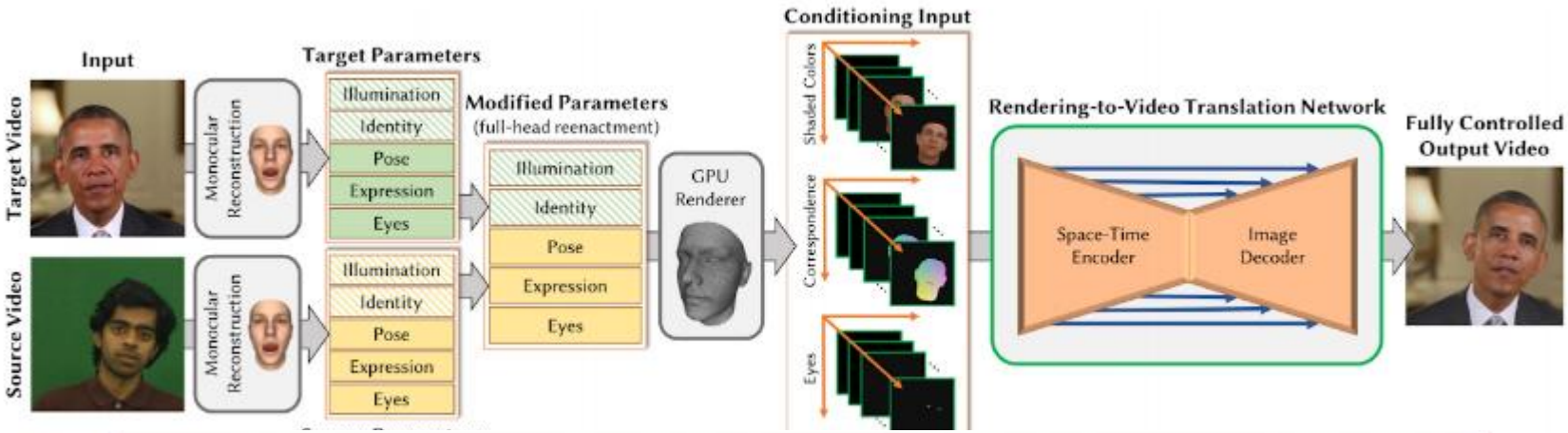
What is Artificial Intelligence

The theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.



Artificial intelligence **is a field, which combines computer science and robust datasets, to enable problem-solving**.

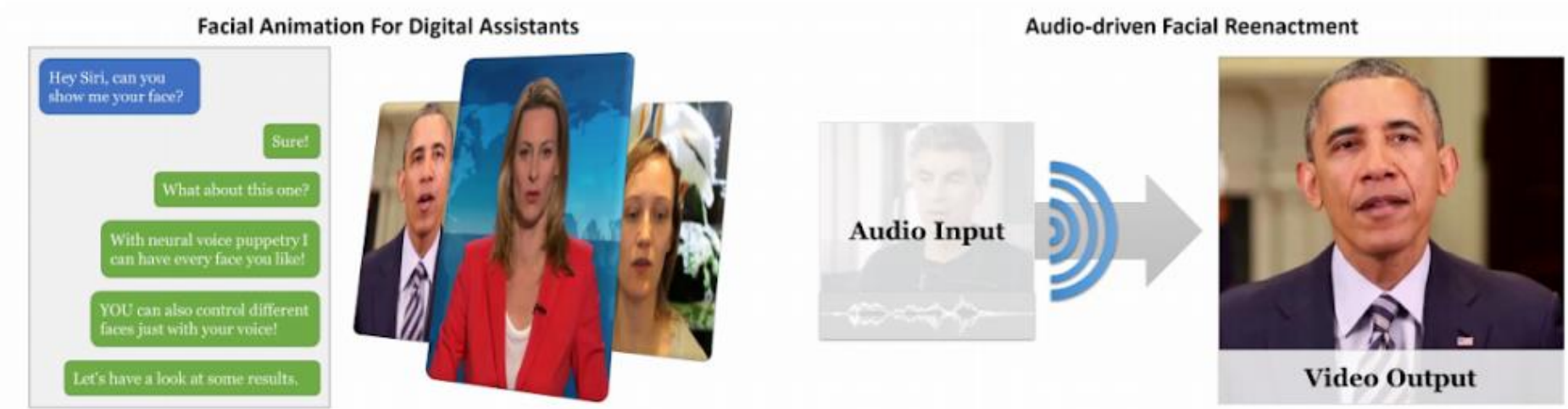
What is Artificial Intelligence



[2020 Guide to Synthetic Media | Paperspace Blog]

What is Artificial Intelligence

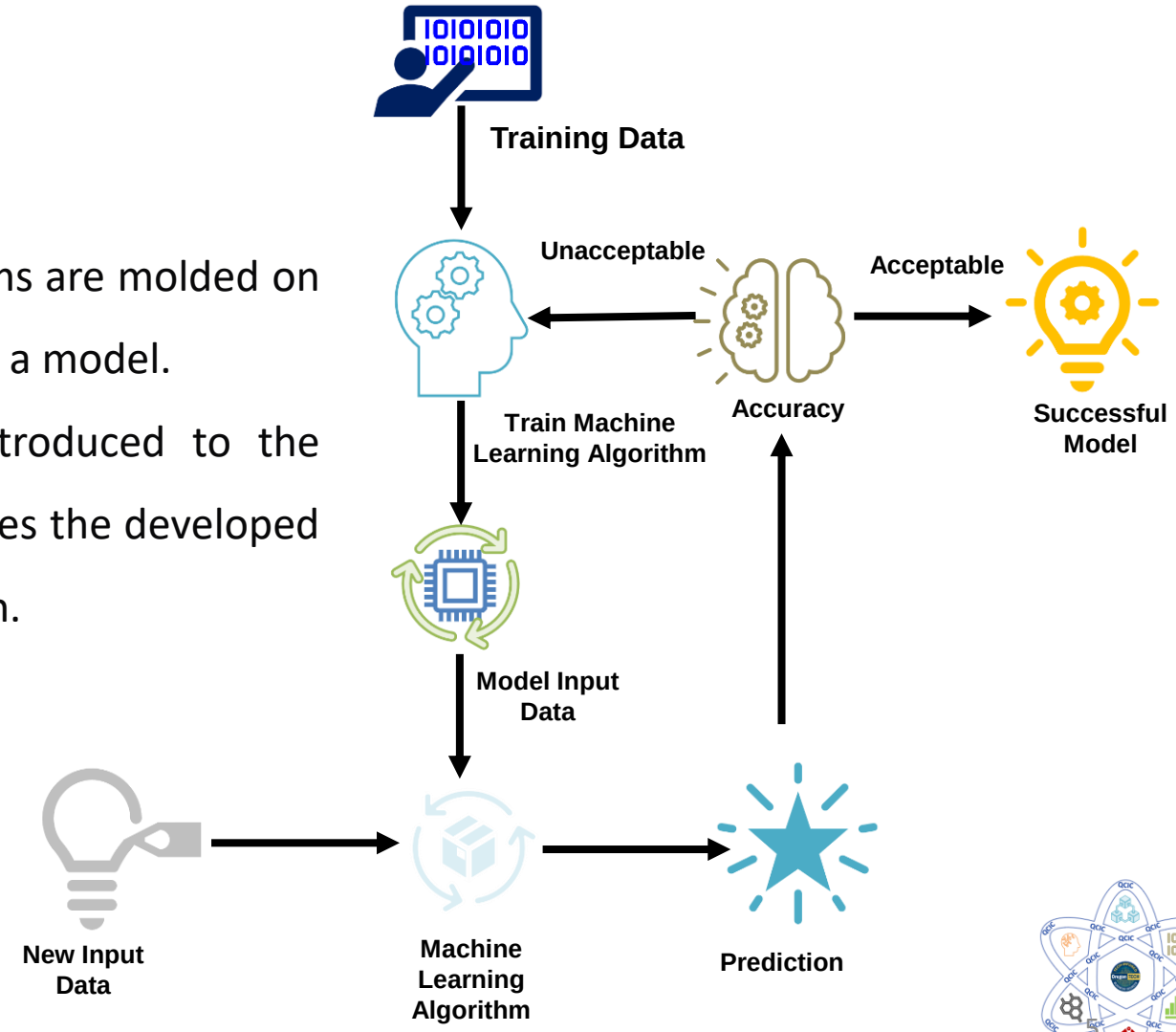
Neural Voice Puppetry: Audio-driven Facial Reenactment



2020 Guide to Synthetic Media | Paperspace Blog

How Synthetic Video/Audio Works

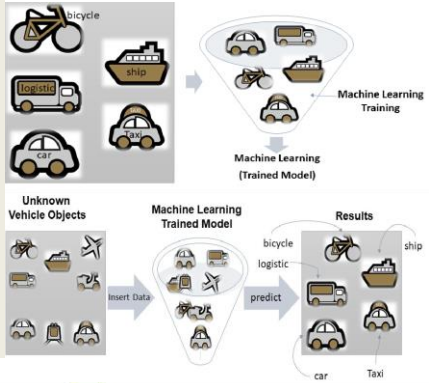
- Machine learning algorithms are molded on a training dataset to create a model.
- As new input data is introduced to the trained ML algorithm, it uses the developed model to make a prediction.



AI Overivew

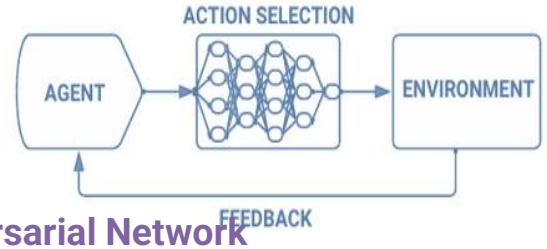
- Artificial Intelligence (AI) is a multidisciplinary field of science and technology focused on ***creating systems capable of performing tasks that typically require human intelligence***.

- Machine Learning
  - Supervised
  - Unsupervised
  - Semi Supervised



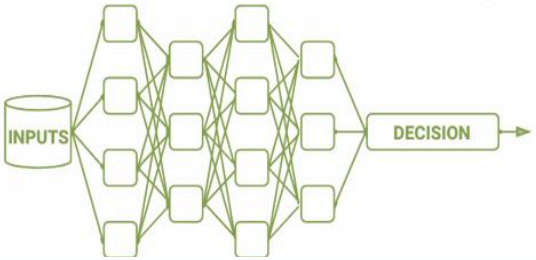
Reinforcement Learning

... from reinforcement learning systems where AI agents learn how to interact with their environments ...



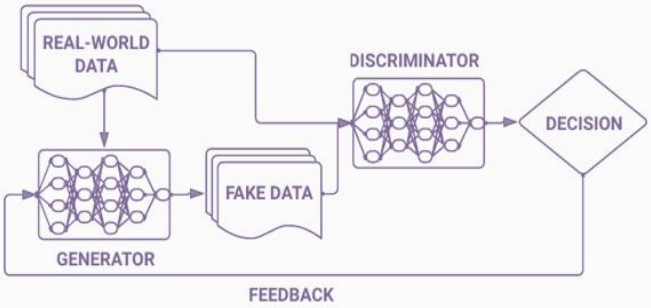
Deep Learning

Deep learning is a general AI architecture modelled off of neural networks. It can be adapted for many tasks ...



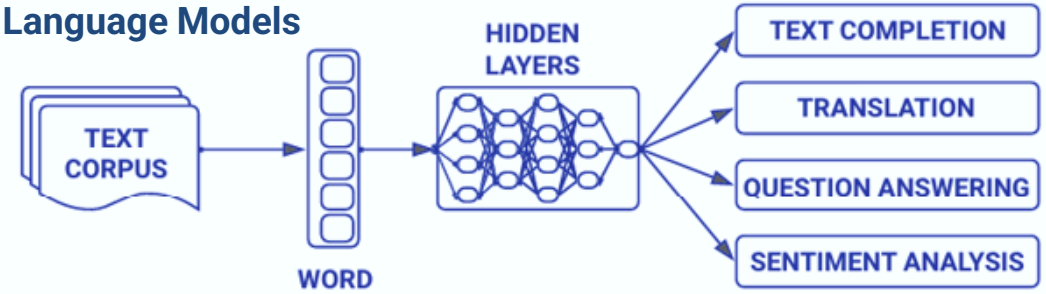
Generative Adversarial Network

... to GANs, where a generator learns how to produce outputs that can fool a discriminator ...



Large Language Models

... to massive natural language models that can perform a wide range of language-related tasks.



Trustworthy AI

Generative AI Challenges

Lake of Openness: Data came from, data auditing, Sort of processing step, testing

Fairness

Issues: Stereotyping, Biased data, etc.

Transparency

Trust

Quality, Accuracy, Reliability , Robustness

AI Hallucination

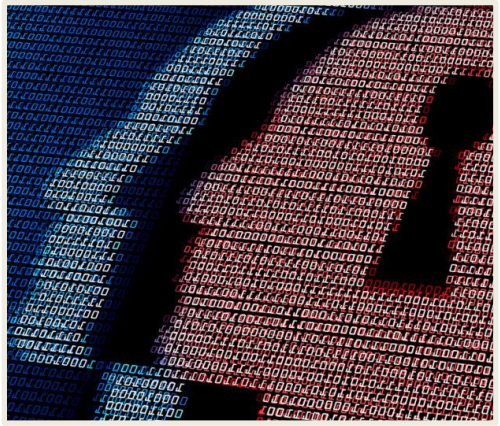
AI Bullying

AI Copyright

Privacy

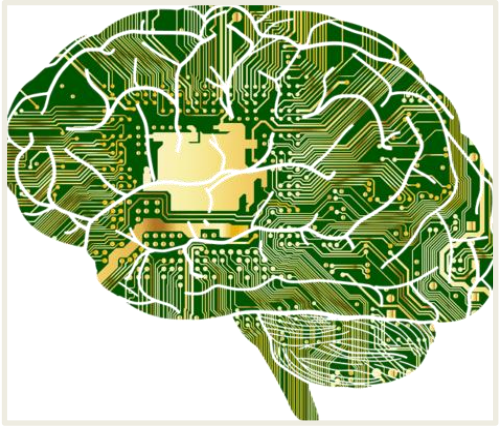
Trustworthy AI

AI Governance



- A cross-functional working group oversees and advances the program.
- We leverage our existing ISO-certified data privacy and security risk management processes.

Foundation AI



- Foundation models are general-purpose technologies that can support a diverse range of use cases.
- Building foundation models is often highly resource-intensive, with the most expensive models costing hundreds of millions of dollars to pay for the underlying data and compute

Data

- An AI model trained on data that looks real but won't leak personal information ·
- The latest AI safety method is a throwback to our maritime past.

Starts at the beginning (data come from, processing, testing, Deployment

Generative Adversarial Networks GAN

- Discriminator : The **discriminator** learns to distinguish the generator's fake data from real data. The discriminator penalizes the generator for producing implausible results.

- Generator : The **generator** learns to generate plausible data. The generated instances become negative training examples for the discriminator.

- When training begins, the generator produces obviously fake data, and the discriminator quickly learns to tell that it's fake:

- As training progresses, the generator gets closer to producing output that can fool the discriminator:

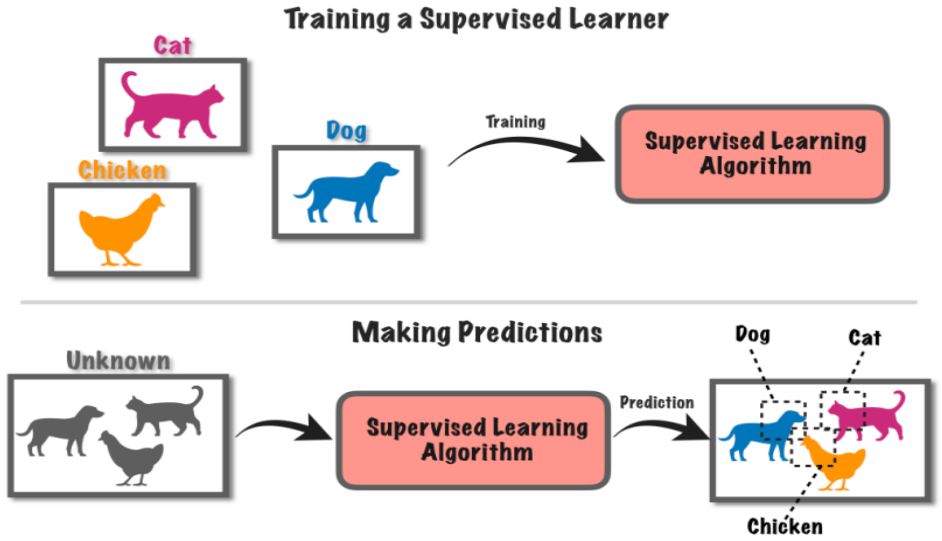
- Finally, if generator training goes well, the discriminator gets worse at telling the difference between real and fake. It starts to classify fake data as real, and its accuracy decreases.

Source : developers.google.com

Type of Machine Learning - 2

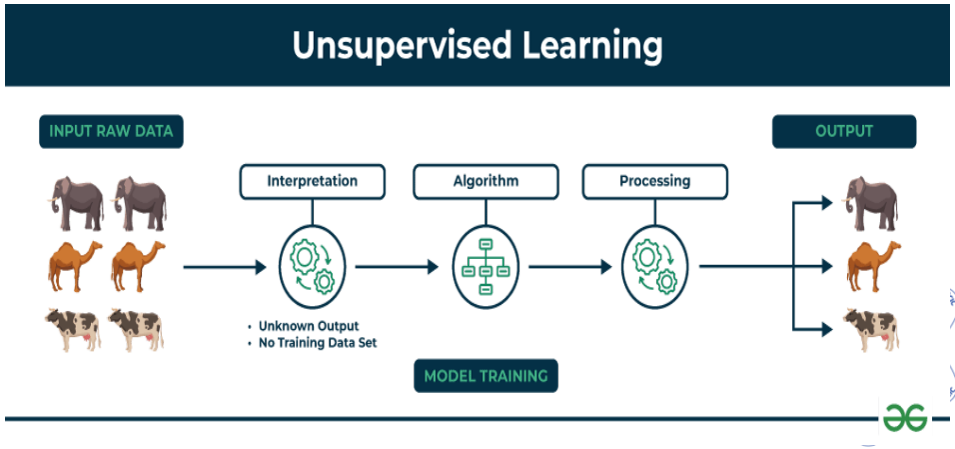
Supervised

Training with labeled data includes desired outputs



Unsupervised

Training unlabeled data does not include desired outputs



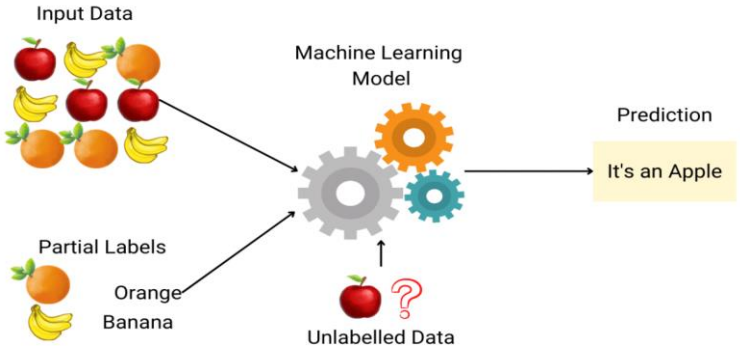
Labeled Data: Cat, Dog, Chicken

Unlabeled Data: Group of Animals

Type of Machine Learning -2

Semi supervised

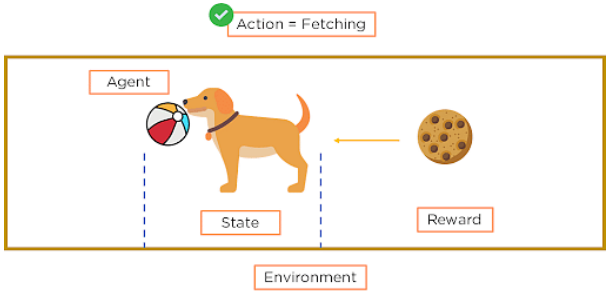
Training partial labeled data includes a few desired outputs



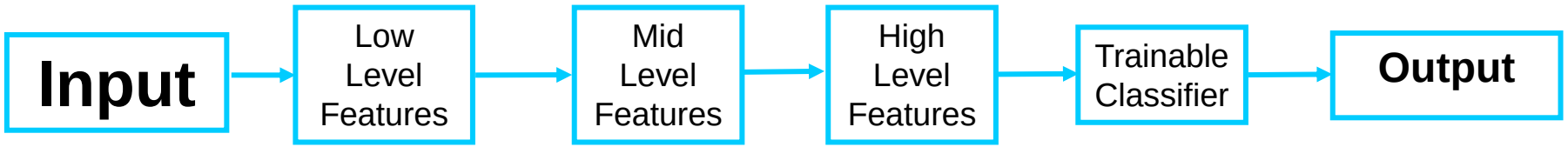
Partial Labeled: Train the system with partial labeled data, not complete Machine will find the fruit from the group of fruits.

Reinforcement

Rewards from sequence of actions



Deep Learning



- **Image**

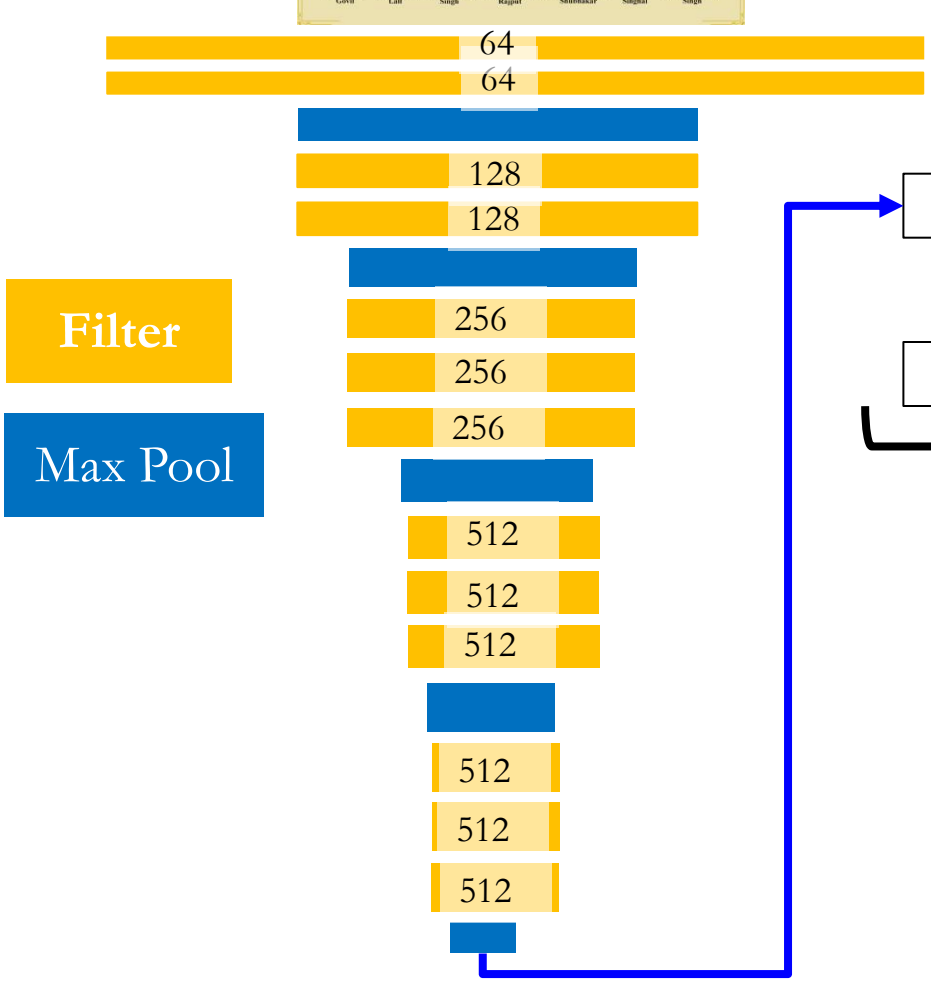
  Pixel → Edge → Texture → Motif → Part → Object

- **Text**

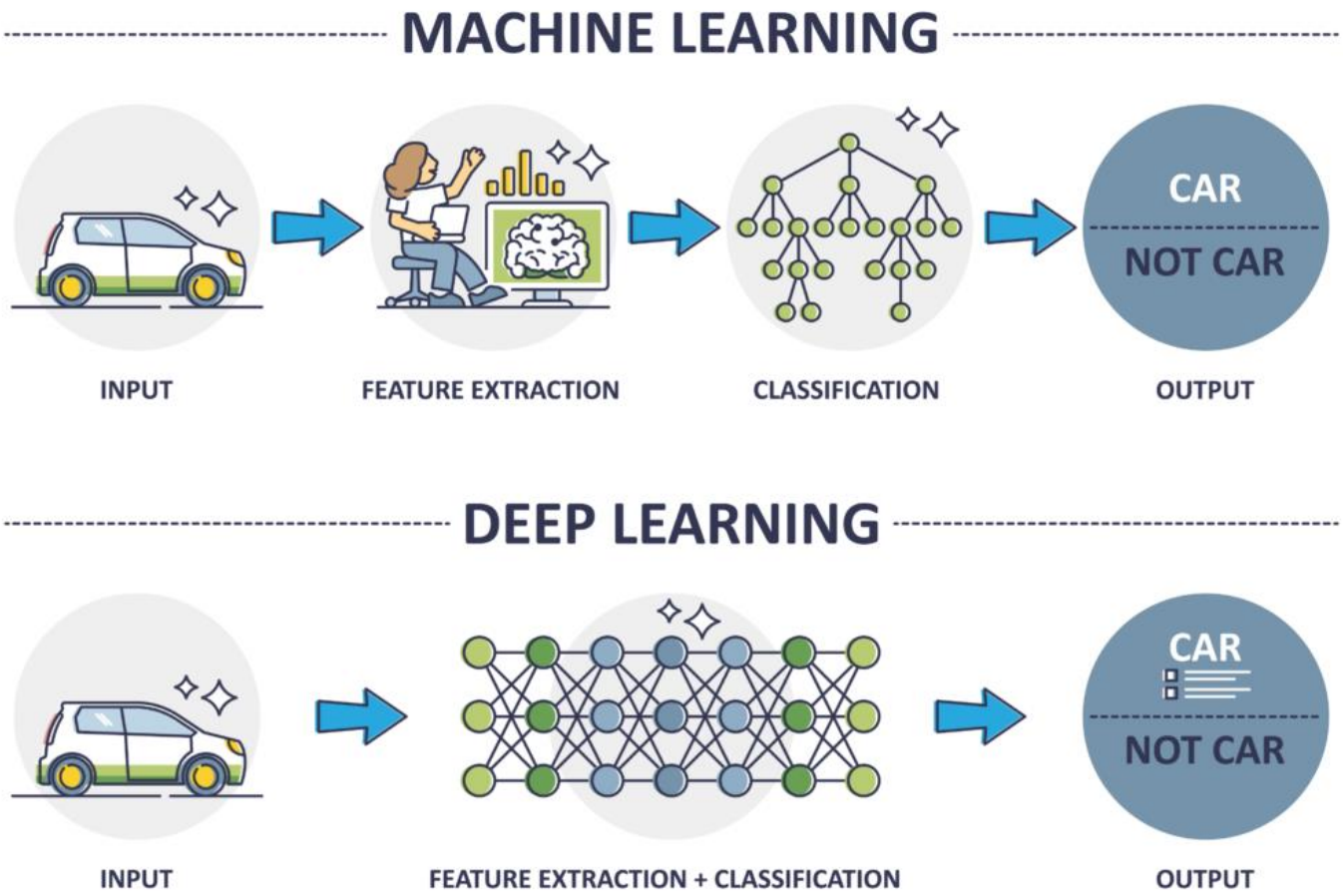
  Character → Word → Word-group → Clause → Sentence → Story

Deep Learning Process

Feature Extraction Architecture



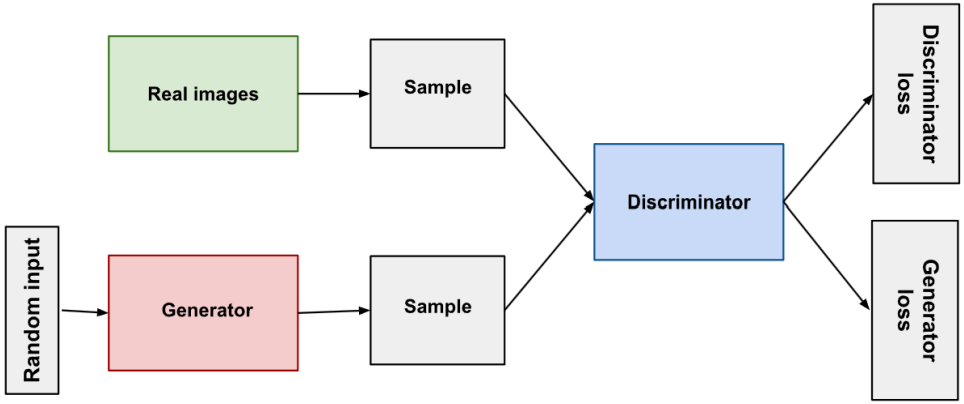
Machine Learning Vs. Deep Learning

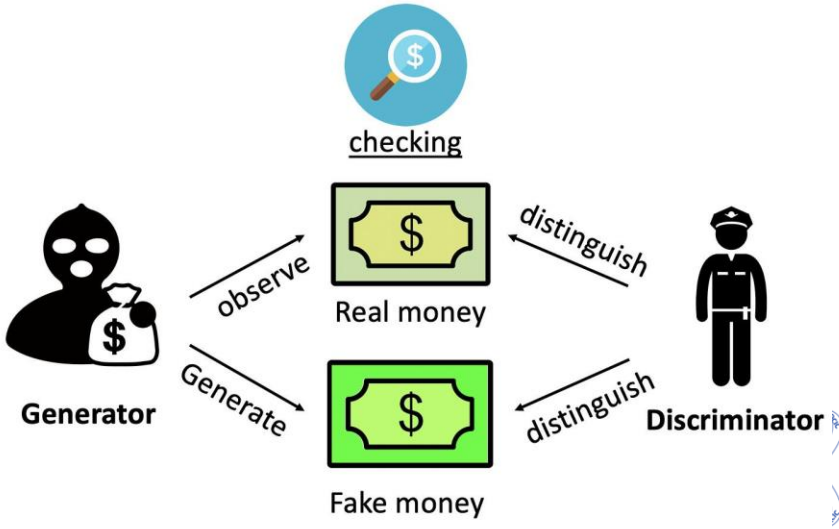


https://www.ait.de/en/deep-learning/

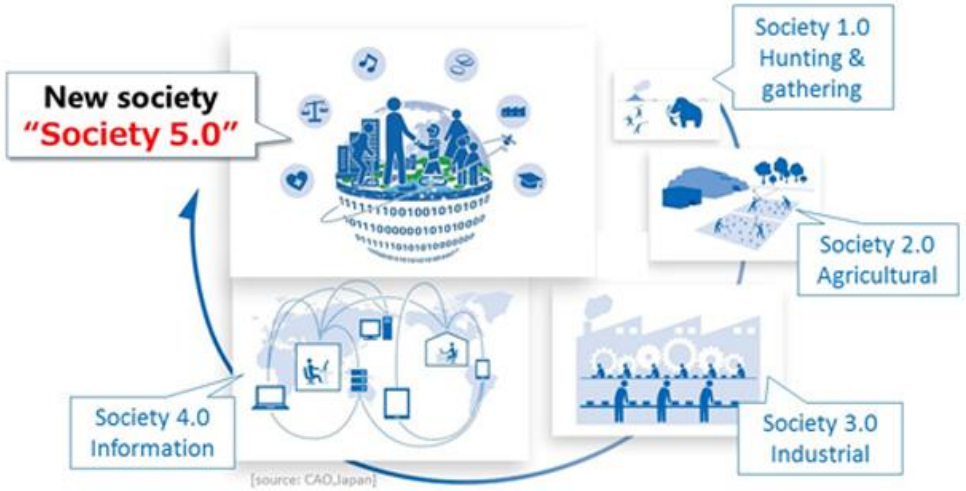
Generative Models

- Type of Machine learning models that can generate something new (image/text) after learning from a set of existing (image/text) data.
- **Generative Adversarial Networks (GAN)** : used for generating images/texts
- GAN has two important components :
  - Generator
  - Discriminator



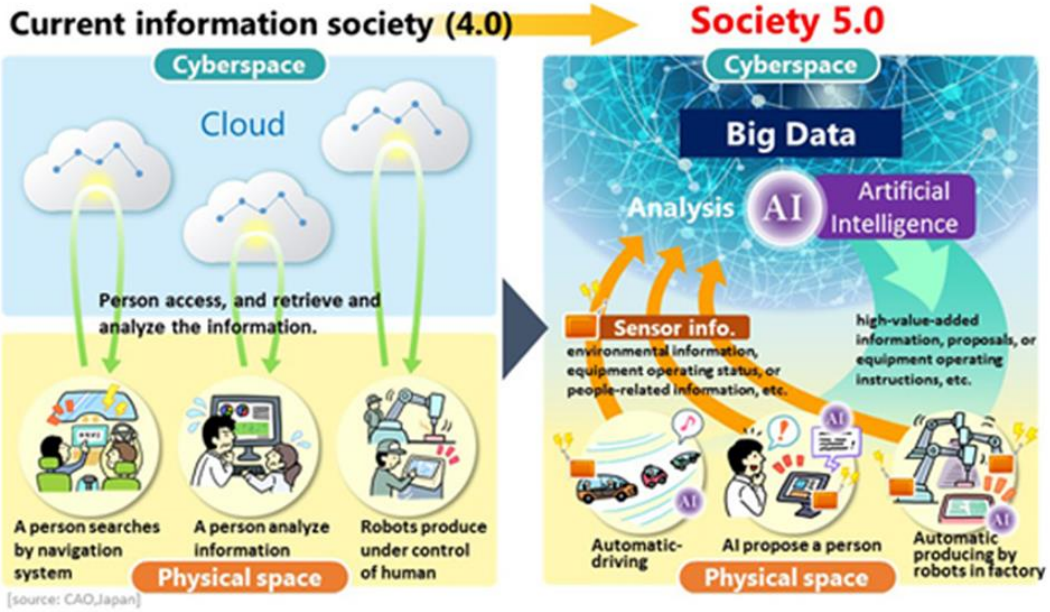


Artificial Intelligence Society



- Society 5.0 was proposed in the 5th Science and Technology Basic Plan as a future society that Japan should aspire to.
- It follows the hunting society (Society 1.0), agricultural society (Society 2.0), industrial society (Society 3.0), and information society (Society 4.0).

- In Society 5.0, however, people, things, and systems are all connected in cyberspace and optimal results obtained by AI exceeding the capabilities of humans are fed back to physical space.
- This process brings new value to industry and society in ways not previously possible.



https://www8.cao.go.jp/cstp/english/society5_0/index.html

THANK YOU