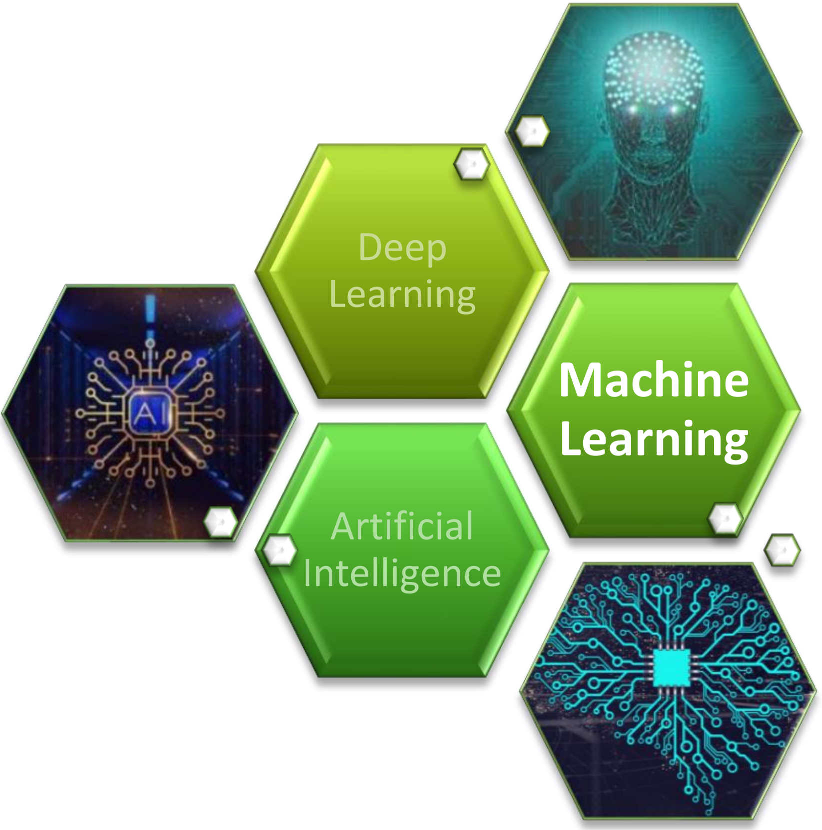
How AI is Transforming Our World: A Journey into the Future of Artificial Intelligence

Artificial Intelligence

An impactful science in Disruptive Innovations



Presented by:

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(Included in the list of Top 2% Influential Scientists published by Stanford University in the area of Artificial Intelligence)
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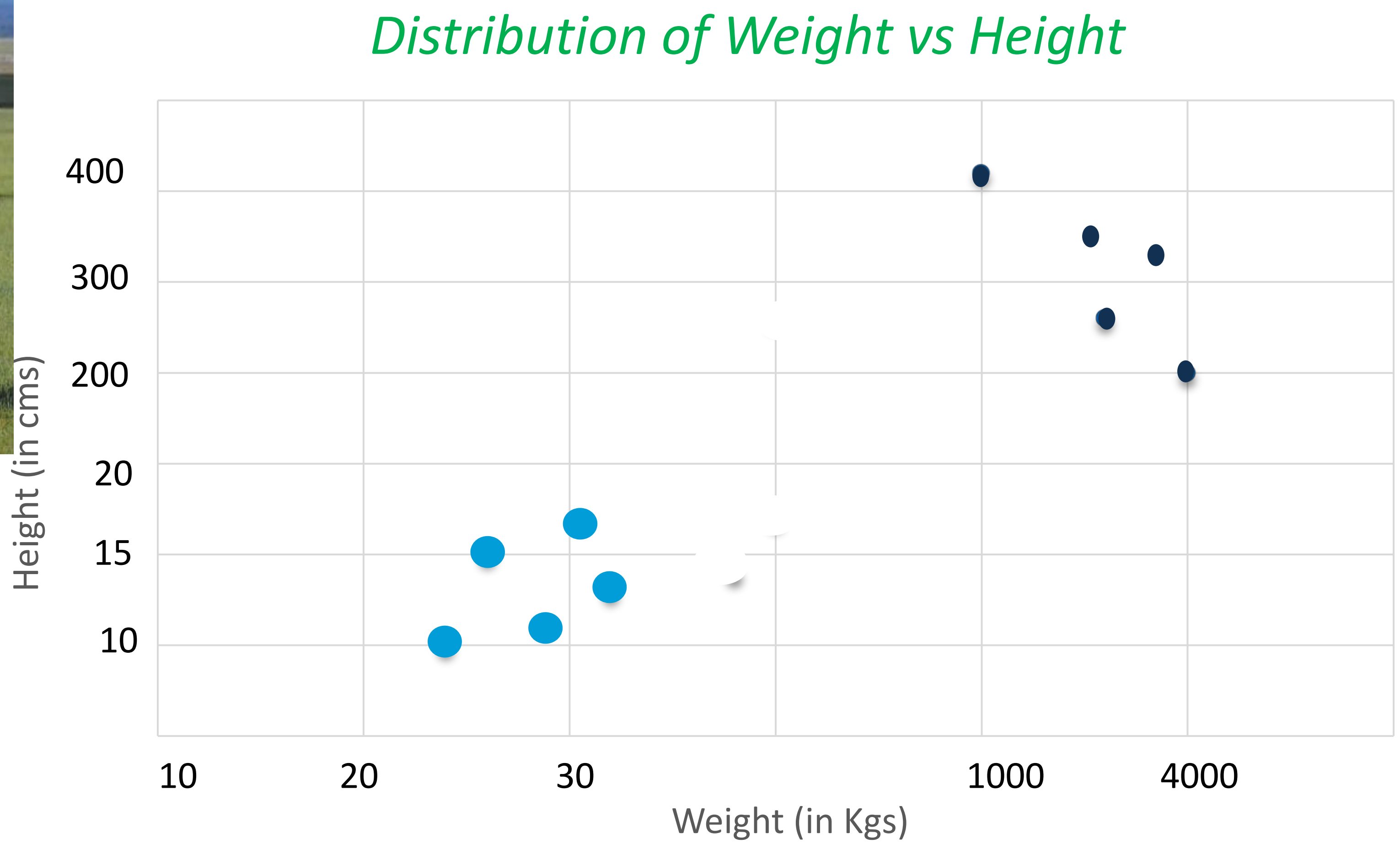
*Former **Dean**, PG Studies and Research, Dr. A.P.J.Abdul Kalam Technical University, Lucknow ((An UP State Government University).*

Make a Machine differentiate Elephants from Dogs?

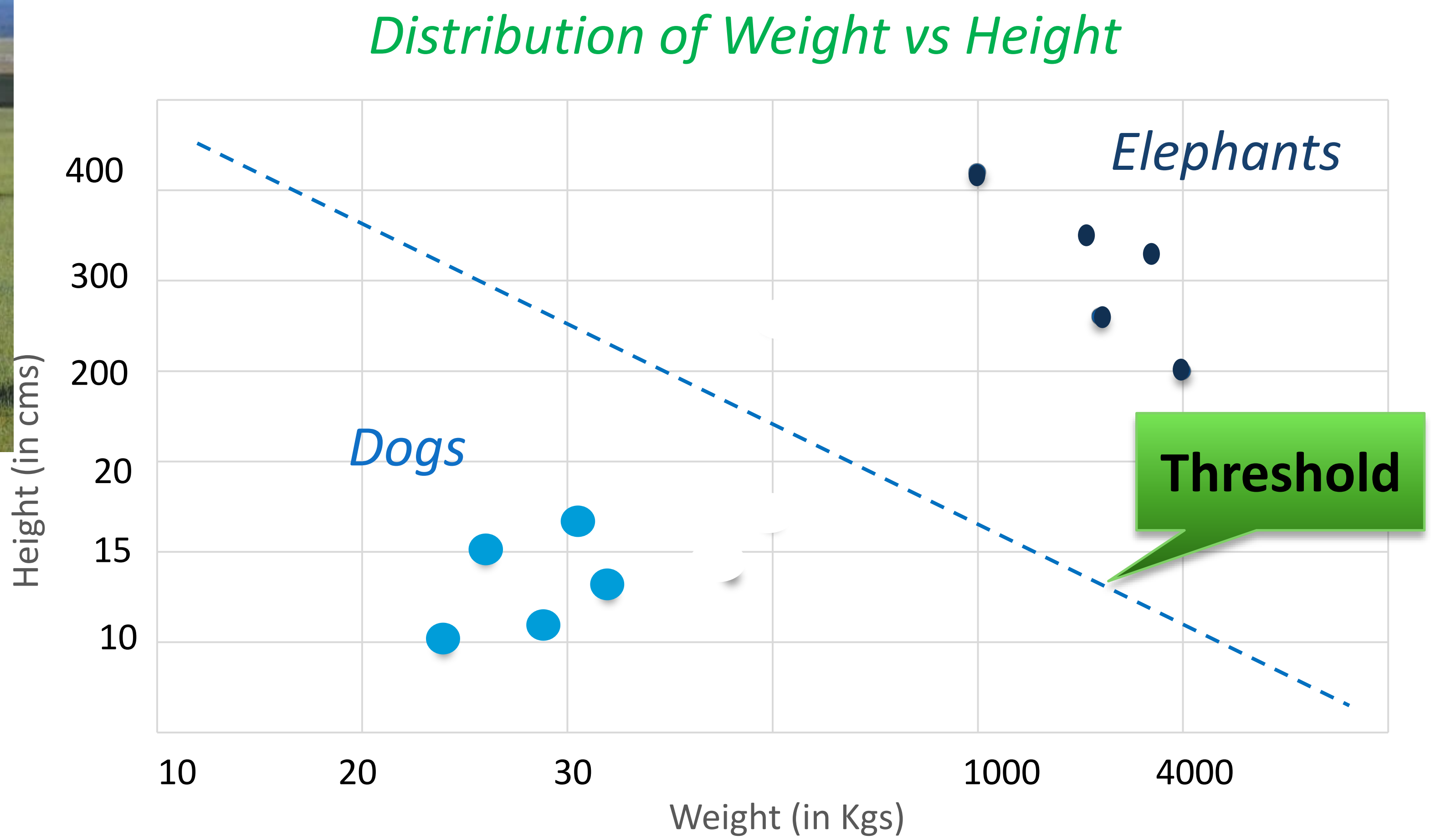
Machine

Elephant OR Dog?

Make a Machine differentiate Elephants from Dogs



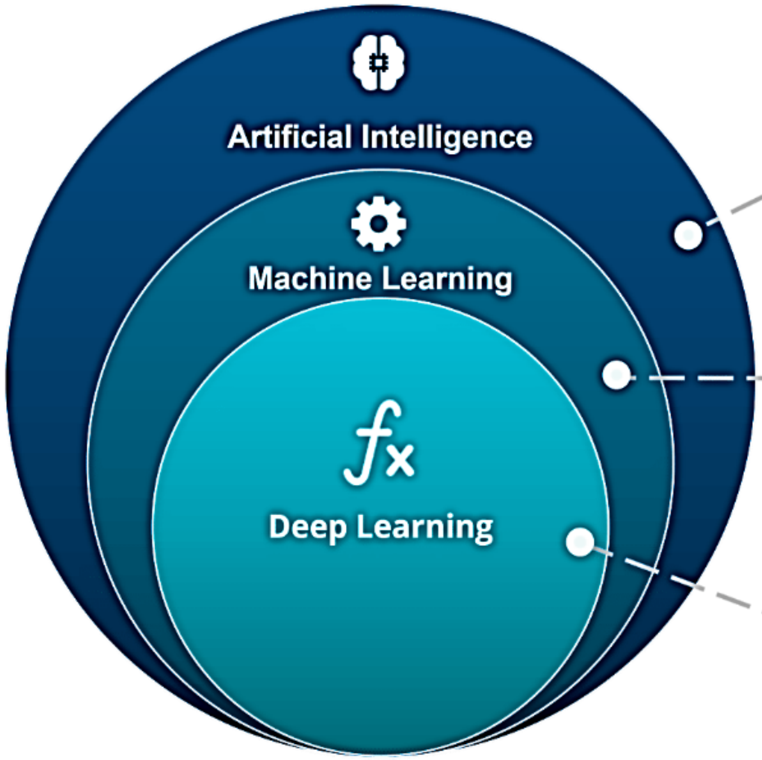
Make a Machine differentiate Elephants from Dogs: Simply Threshold



Differentiate 100 species of Moths with Simple Threshold?

Make Machine Intelligent !

AI is the science of making machines do things that would require intelligence if done by men



Timeline

ARTIFICIAL INTELLIGENCE
A technique which enables machines to mimic human behaviour

1950's
1960's
1970's

MACHINE LEARNING
Subset of AI technique which use statistical methods to enable machines to improve with experience

1980's
1990's
2000's

2010's

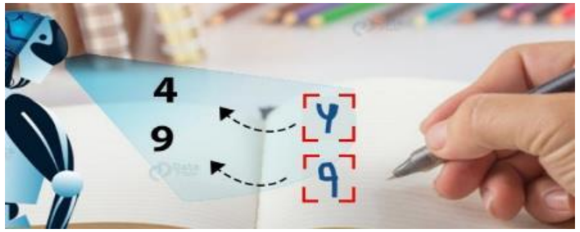
DEEP LEARNING
Subset of ML which make the computation of multi-layer neural network feasible

Few Examples of Machine Learning Application in Real World

Voice Assistant

NETFLIX

Recommendation System



Character Recognition

Facial Recognition/Detection

Driver Assistance System

Drug Discovery

Gaming (eg. AlphaGo)

2σ

Finance (Stock Prediction)

Medical Diagnosis

What is Machine Learning?

One of the Earliest definition of Machine Learning:

Arthur Samuel (1959):

"Field of study that gives computers the ability to learn without being explicitly programmed."

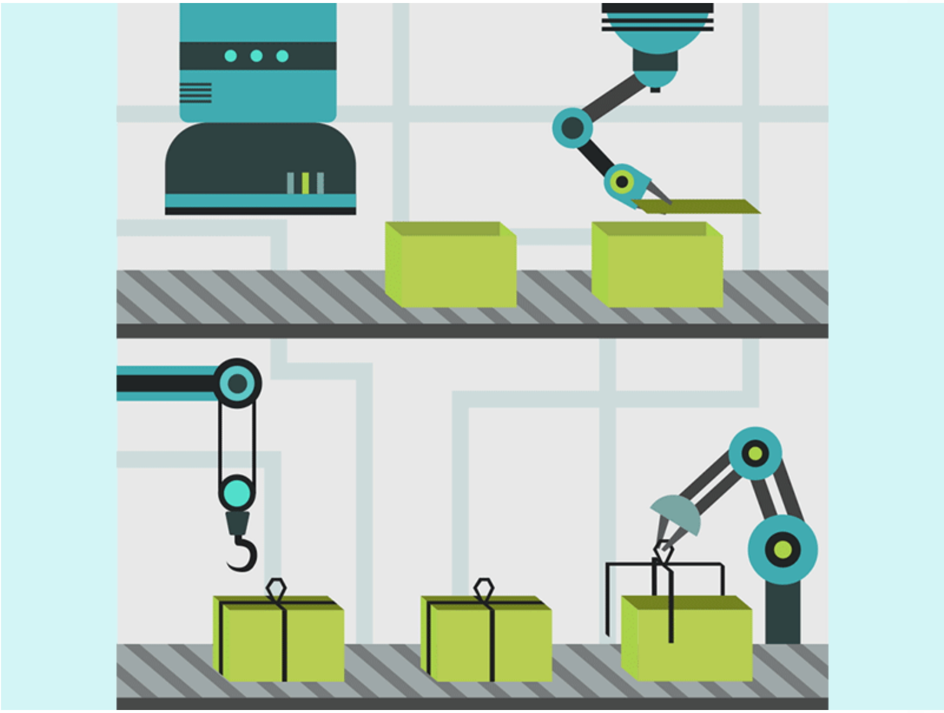
The Samuel Checkers-playing Program was among the world's first successful self-learning programs, and as such a very early demonstration of the fundamental concept of artificial intelligence.

***On February 24, 1956**, Arthur Samuel's Checkers program was developed for play on the IBM 701, In 1962, Self-proclaimed checkers master Robert Nealey played the game on an IBM 7094 computer. The computer won. It is still considered a milestone for artificial intelligence, as an example of the capabilities of an electronic computer.*

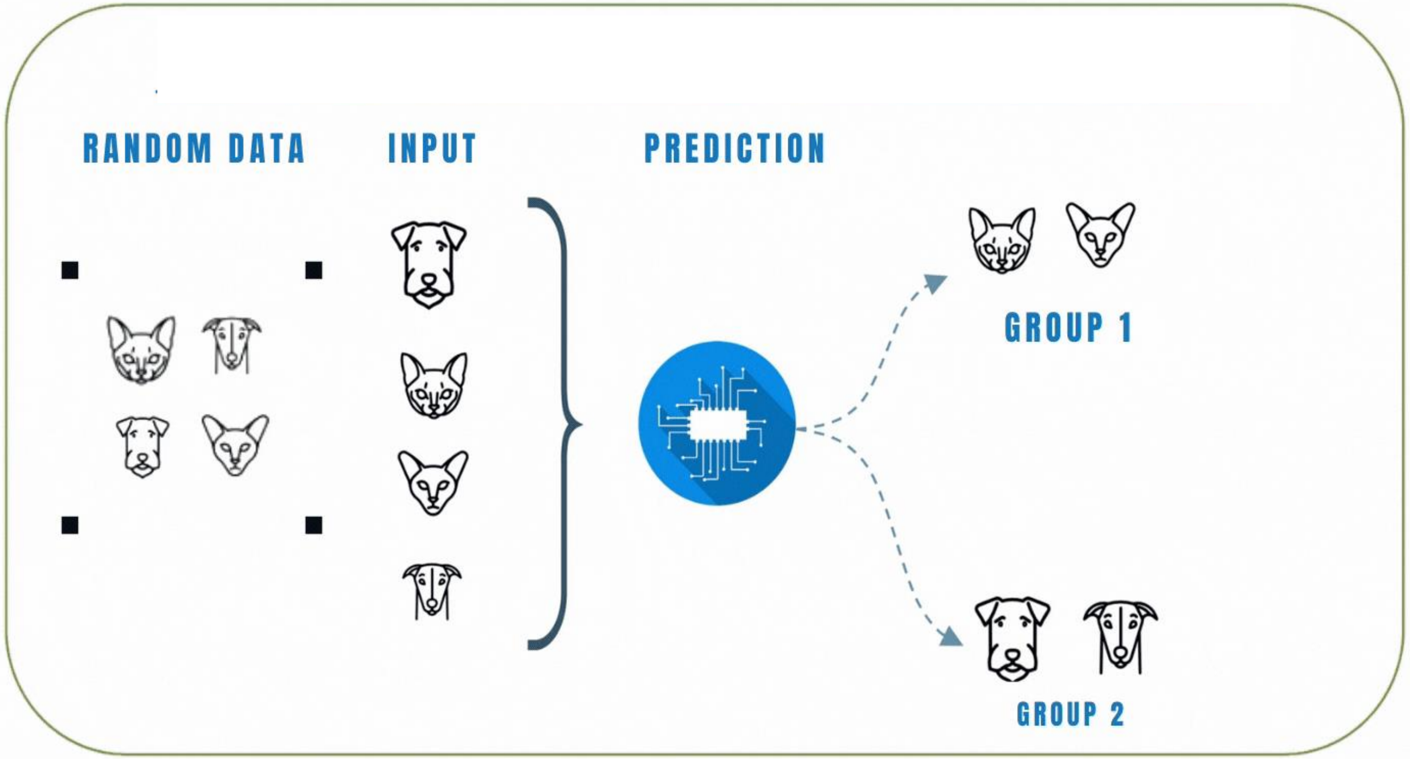
Courtesy: ibm.com

Machine Learning vs Process Automation

Process Automation



Machine Learning



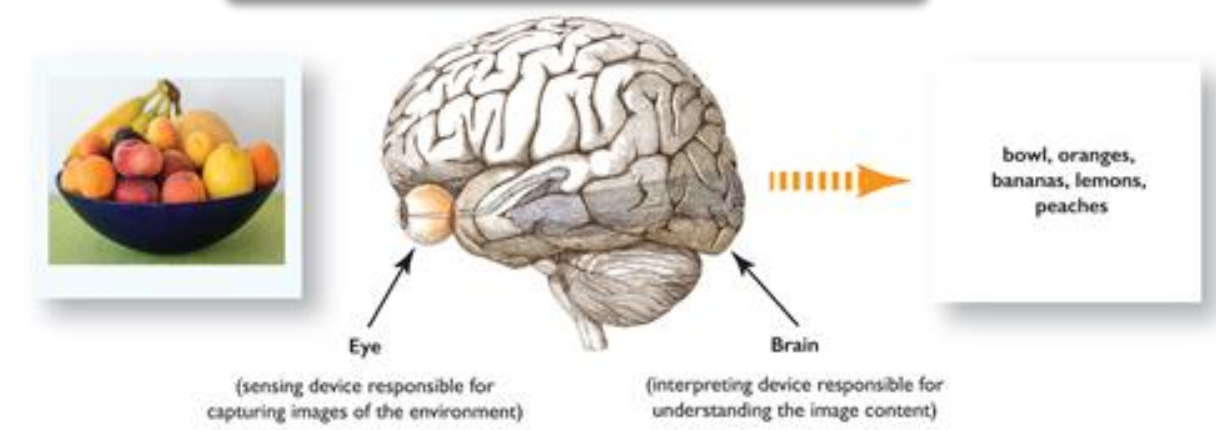
Follow orders, Pre-programmed Rules to run a process, Monotonous, Repetitive process

Mimic human-ability to think and do, Machine seeks patterns, adapts with experience

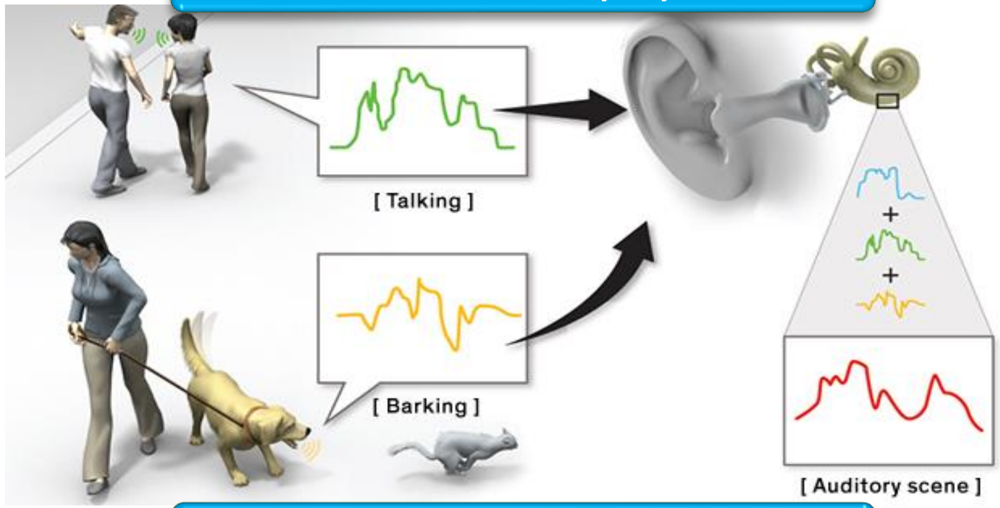
Human Perception vs. Machine Learning

Capture Data -> Process -> Interpret

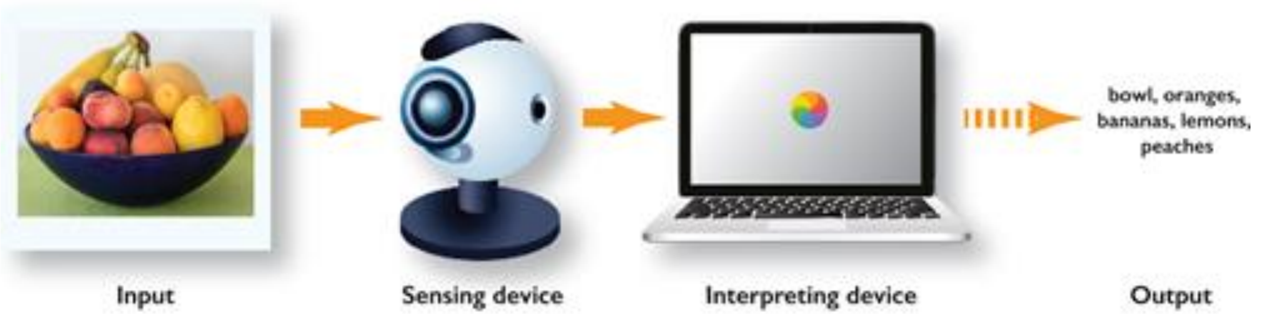
Human Vision System



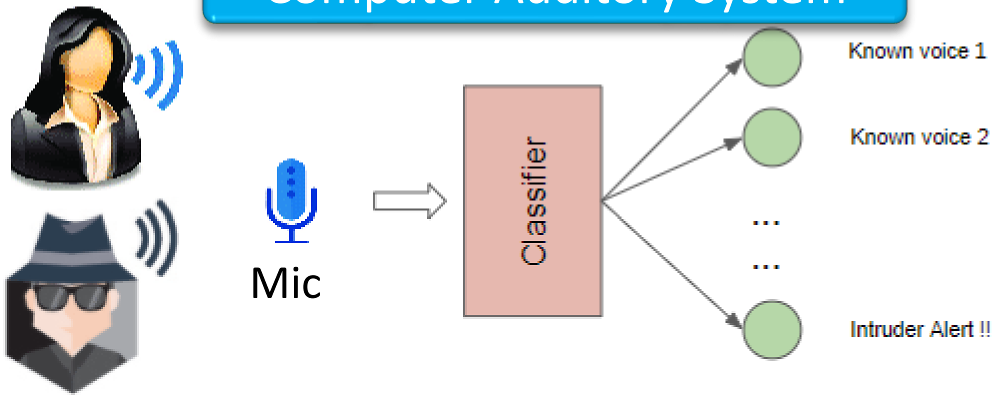
Human Auditory System



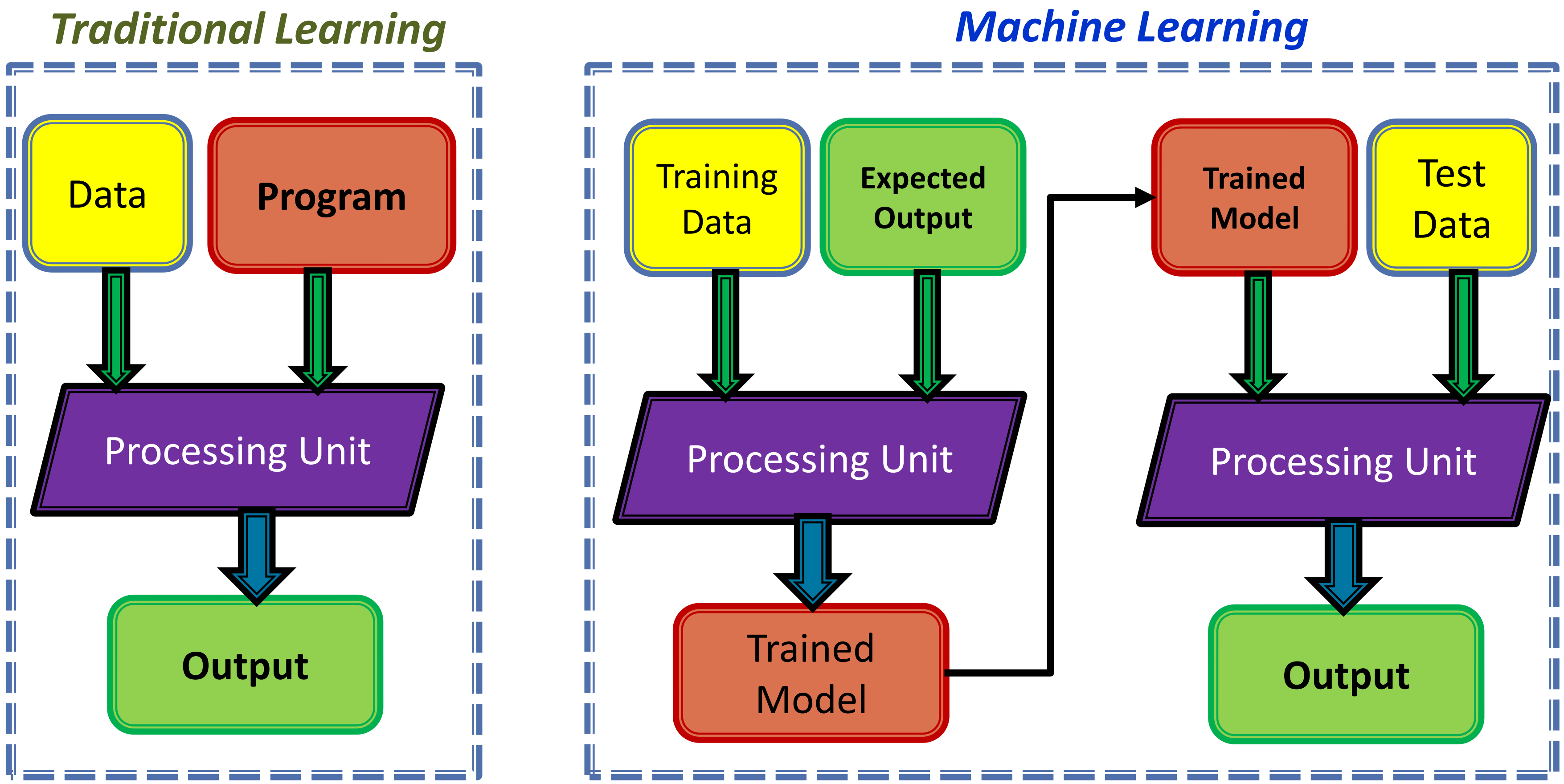
Computer Vision System



Computer Auditory System



Traditional Learning vs. Machine Learning



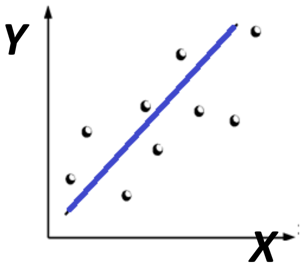
Example of Machine Learning: Score Prediction

Experience/Data

Labelled Data: Lectures attended vs. Score

	Lectures Attended	Score In Chemistry
Student 1	3	35
Student 2	7	45
Student 3	16	75
Student 4	14	60

Students in Class



X → Train ML Model ← ***Y***

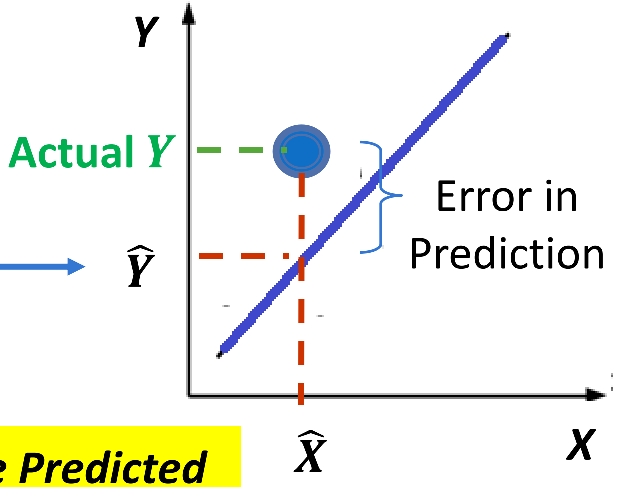
Task

Predict
Score in Chemistry

New Value of X → Trained ML Model → $\hat{Y}$

Performance

Error in Prediction



$\hat{Y}$ = Score Predicted by Model

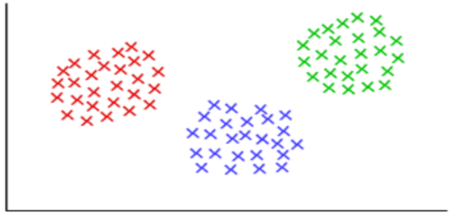
Types of Machine Learning

Machine Learning

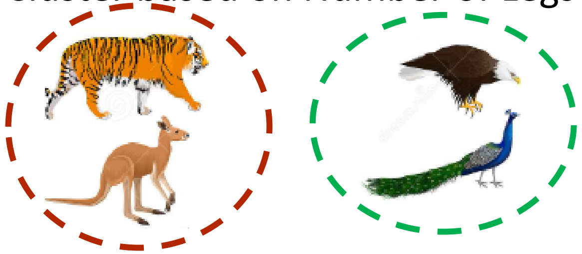
Supervised Learning
Task Driven
Predict Future Values
→ Classification (Categorical Labels)
→ Regression (Continuous Labels)


Predict Score in Chemistry

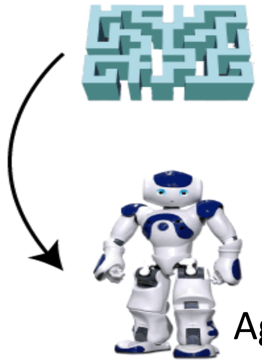
Unsupervised Learning
Data Driven
Clustering


(No defined Labels)

Cluster based on Number of Legs



Reinforcement Learning
Learning from the mistakes

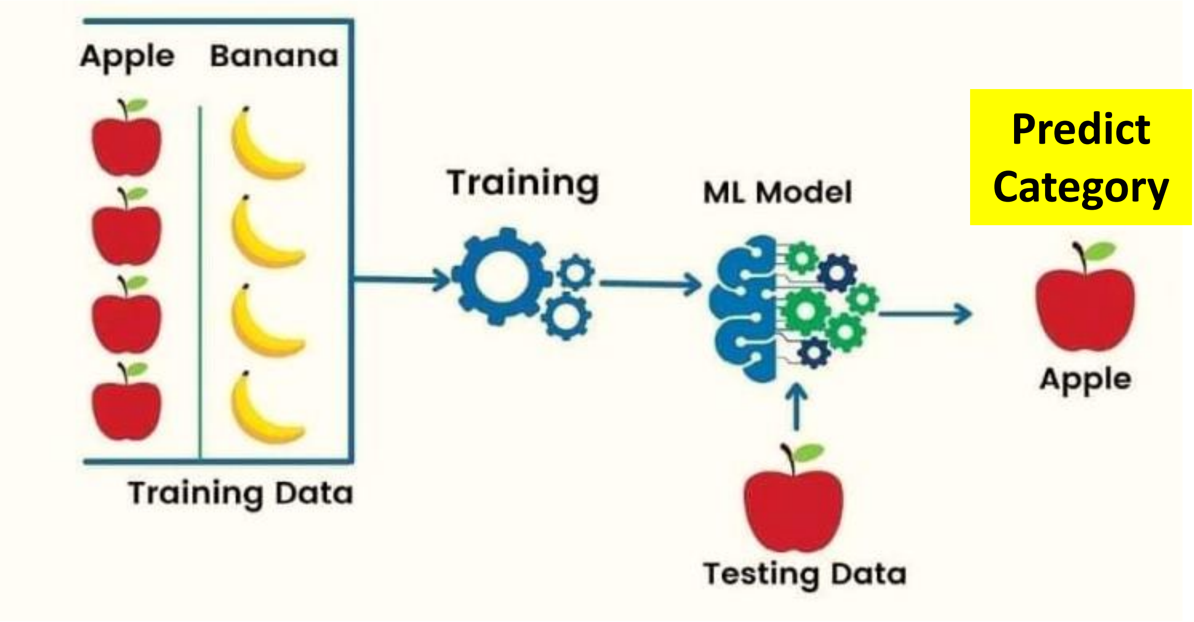


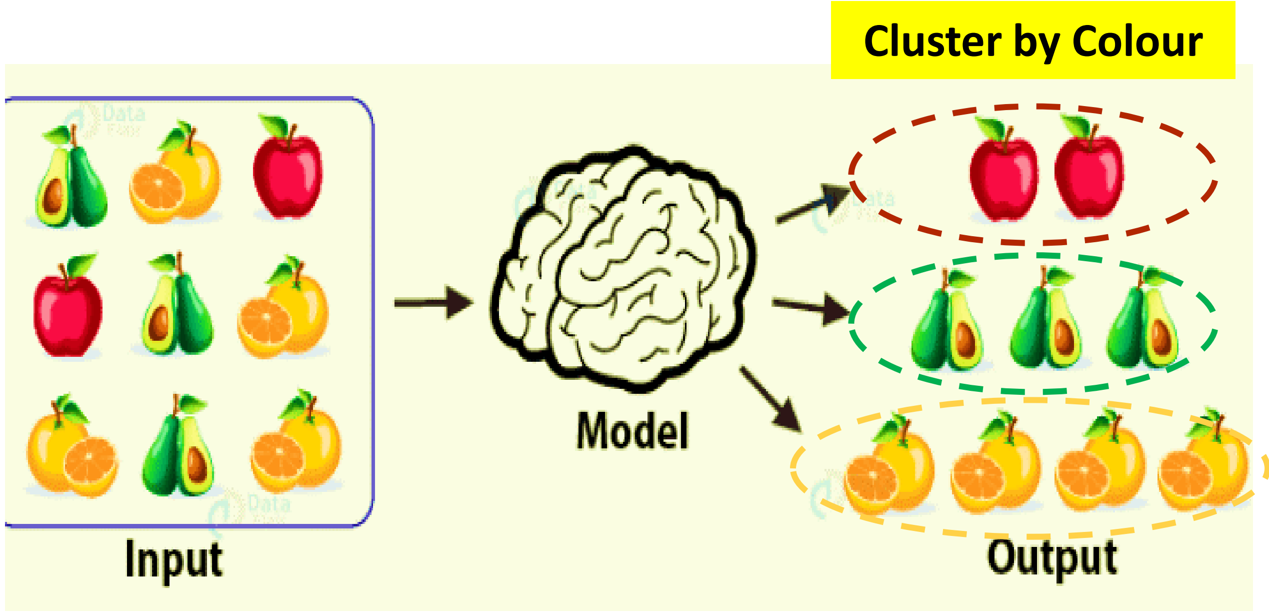
Supervised Learning

- Training Data is Labelled
- Task driven
- Classification/Regression

Unsupervised Learning

- Training Data is Not Labelled
- Data driven
- Clustering, Dimensionality Reduction



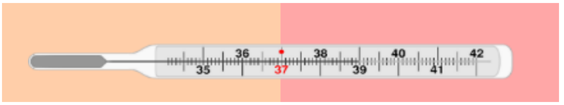


Example of Classification vs. Regression

Parameters	Classification	Regression
Output type	Discrete	Continuous
Trying to find	A boundary	Best Fit Line
Evaluation	Accuracy	Sum of squared errors

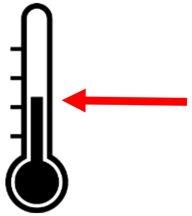
Examples

Will it be cold or Hot tomorrow?



Cold Hot

What is the temperature going to be tomorrow?



$42^{o}C$

(Prediction)

Example of Classification vs. Regression

Students in Class

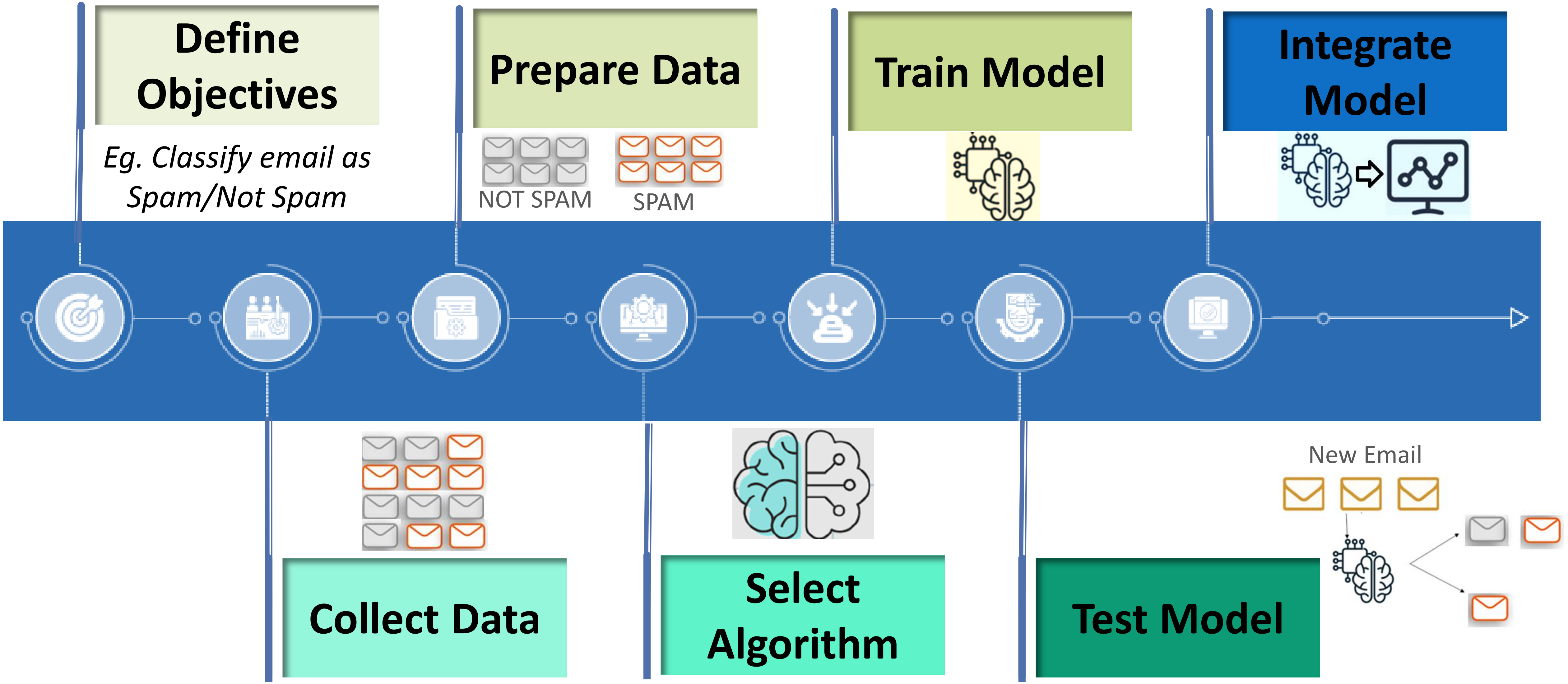
Classification → **Pass or Fail?**

Student Prediction

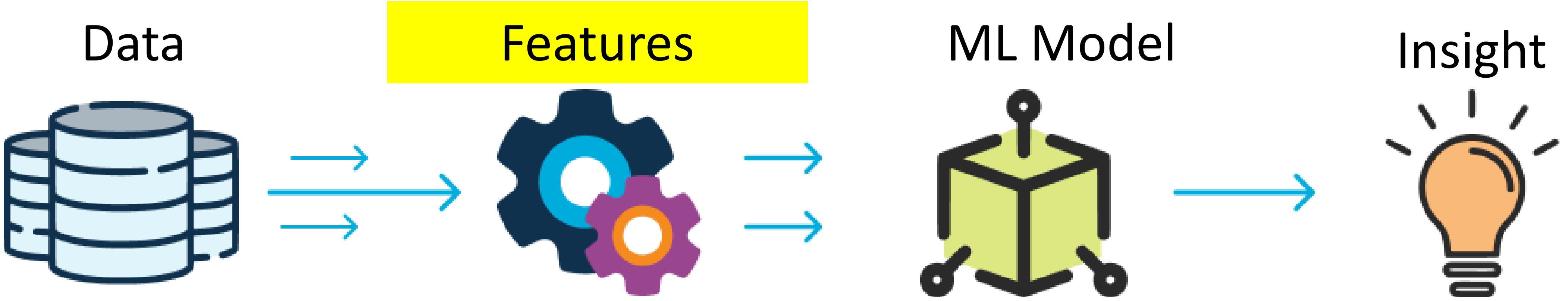
Regression → **Percentage?**

Student's marks Prediction

How does Machine Learning Work?



How to give Data to the Model ?



- **Data**: collection of examples/ observations/ instances/ samples
- **Features**: Descriptor of the object. Feature is derived from the data and it represents the data. Features are properties/ attributes/ parameters that describe the data

cs231n.stanford.edu/reports/2016/pdfs/010_Report.pdf

Feature Representation

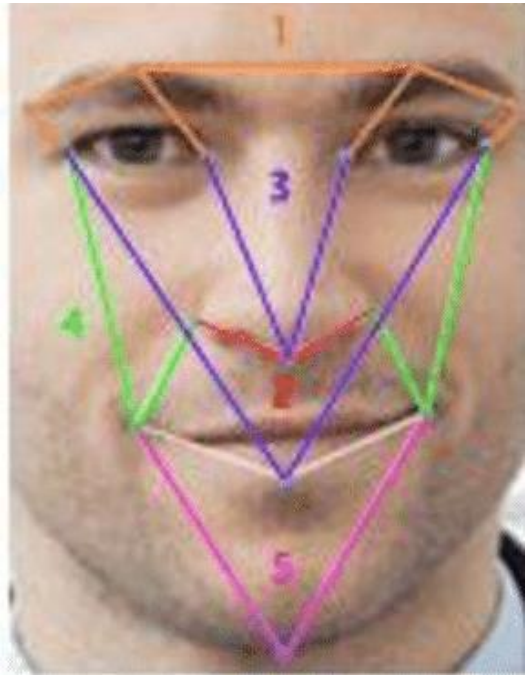
- Feature Vector: $\boldsymbol{x}_i = [x_{i1} \quad x_{i2} \quad \cdots \quad x_{iM}]$ is a $1 \times M$ vector of features for i^{th} observation, M=Dimensionality of data (Number of features)
- Feature Matrix: $X = \begin{bmatrix} x_{11} & x_{12} & \dots x_{1M} \\ \vdots & & \\ x_{N1} & x_{N2} & x_{NM} \end{bmatrix}$

N=Size of data (Number of Observations)

- Target Label $Y = \begin{bmatrix} y_1 \\ \vdots \\ y_N \end{bmatrix}$ Eg. $Y = \begin{bmatrix} \text{John} \\ \vdots \\ \text{Jane} \end{bmatrix}$

Features

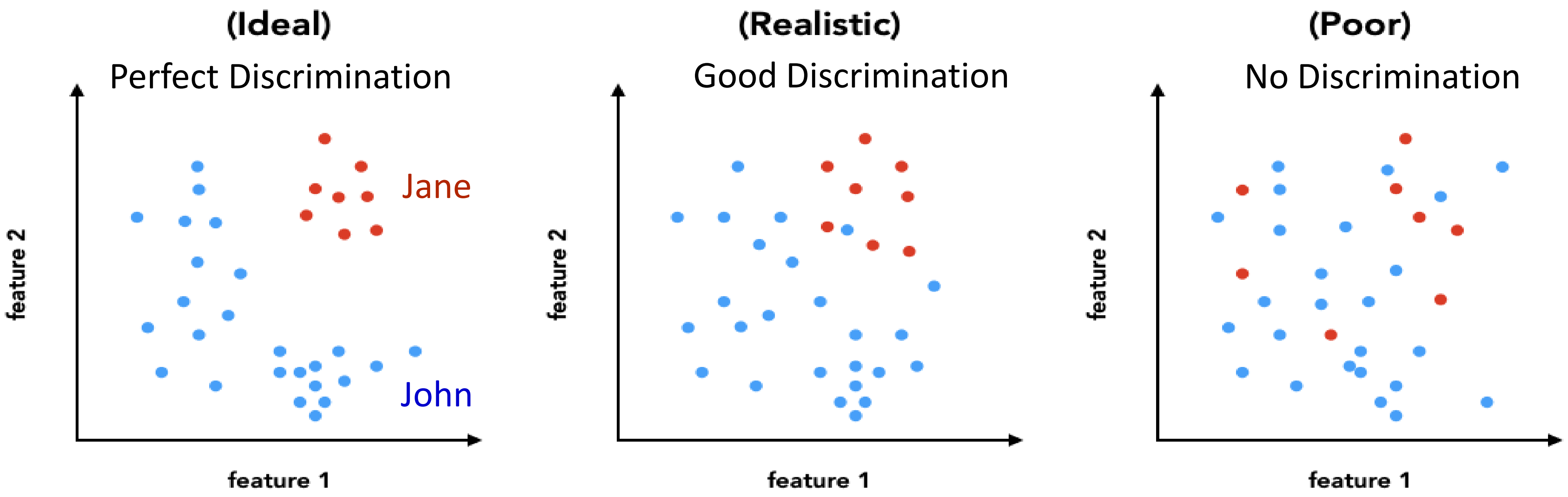
1. Distance between eyes
2. Width of nose
3. Depth of eye sockets
4. Shape of cheekbones
5. Length of jaw-line



Feature Representation

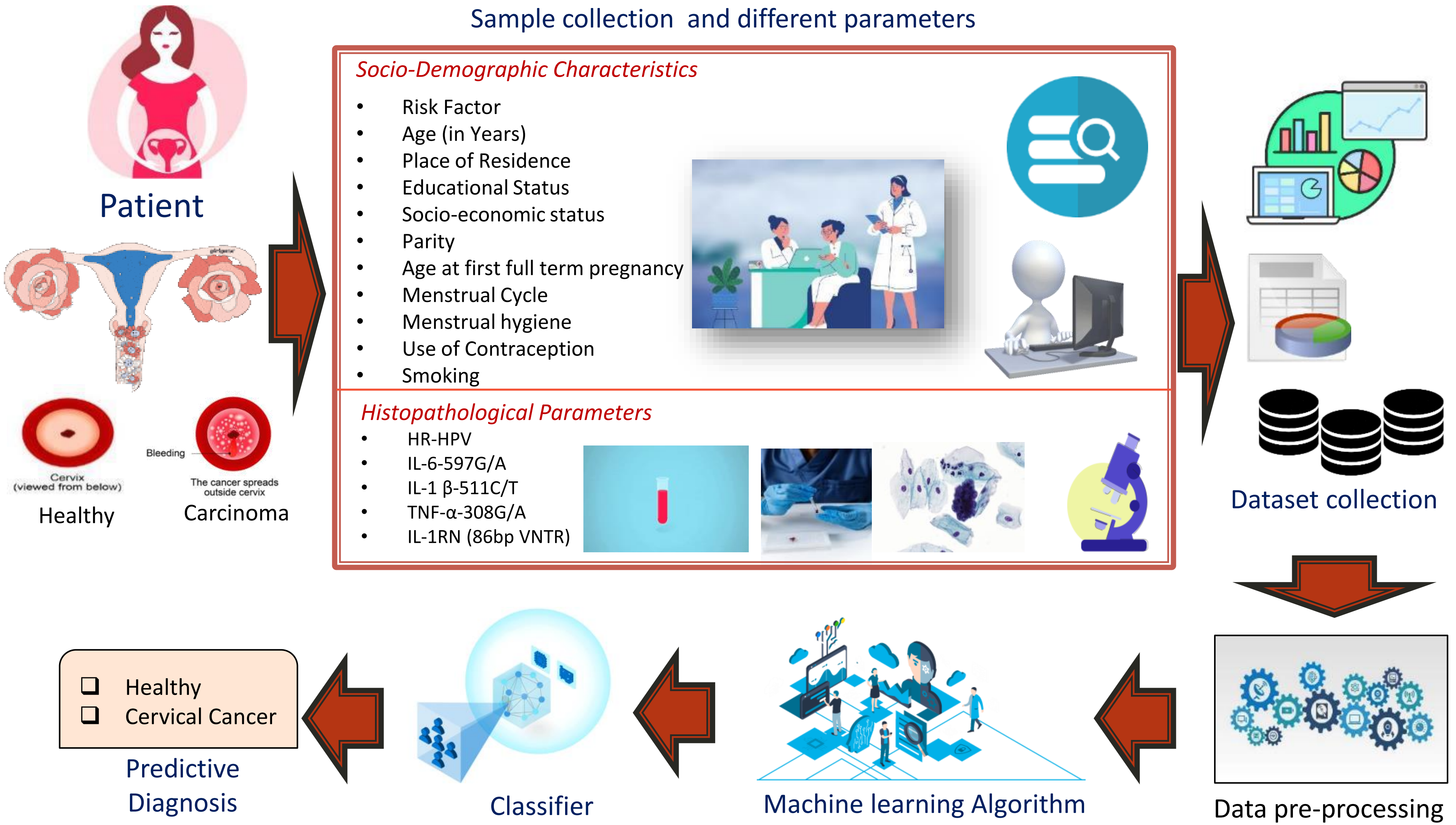
- **Feature Space**: Each observation is a point in M −dimensional feature space

Eg: 2D feature space



Cytokine Gene Variants and Socio-Demographic Characteristics as Predictors of Cervical Cancer: A Machine Learning Approach

- Cervical cancer is a kind of **malignant tumour** that occurs in the lowermost part of the uterus, known as the **cervix**, and can be treated if diagnosed in the early stages.
- In India, cervical cancer is the **second most common malignancy** among women.
- The **world** has a population of **3.8 billion women**, with India having 469.1 million (aged ≥15 years) women who are at a high risk of cervical cancer
- **Cytokine gene variants** and **socio-demographic characteristics** have been reported as biomarkers for determining the cervical cancer risk in the Indian population.


Sample collection and different parameters
Patient
Socio-Demographic Characteristics
Risk Factor
Age (in Years)
Place of Residence
Educational Status
Socio-economic status
Parity
Age at first full term pregnancy
Menstrual Cycle
Menstrual hygiene
Use of Contraception
Smoking
Histopathological Parameters
HR-HPV
IL-6-597G/A
IL-1 β-511C/T
TNF-α-308G/A
IL-1RN (86bp VNTR)
Cervix (viewed from below)
Bleeding
The cancer spreads outside cervix
Healthy
Carcinoma
Dataset collection
Data pre-processing
Machine learning Algorithm
Classifier
Healthy
Cervical Cancer
Predictive Diagnosis

DEEP LEARNING

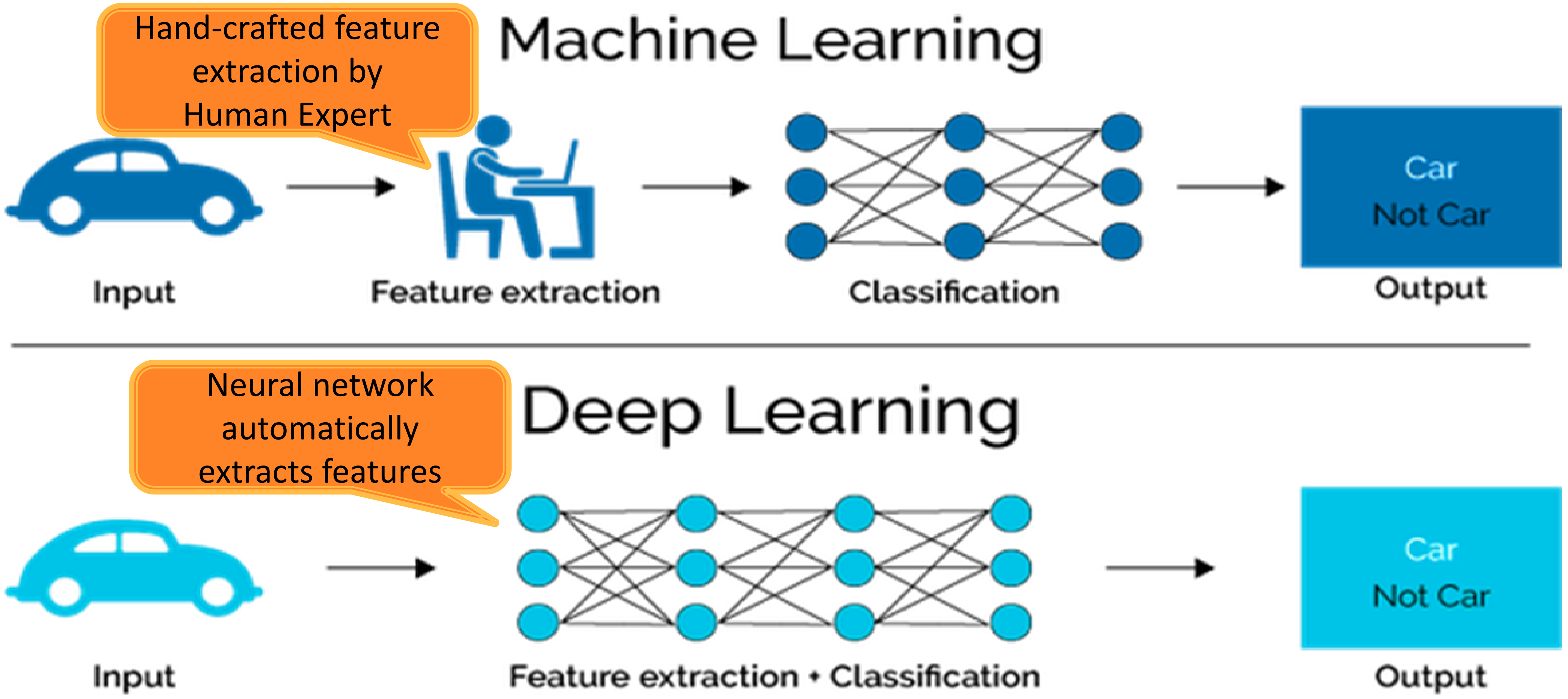
Father of 'AI'

"Once your computer is pretending to be a neural net, you get it to be able to do a particular task by just showing it a whole lot of examples."

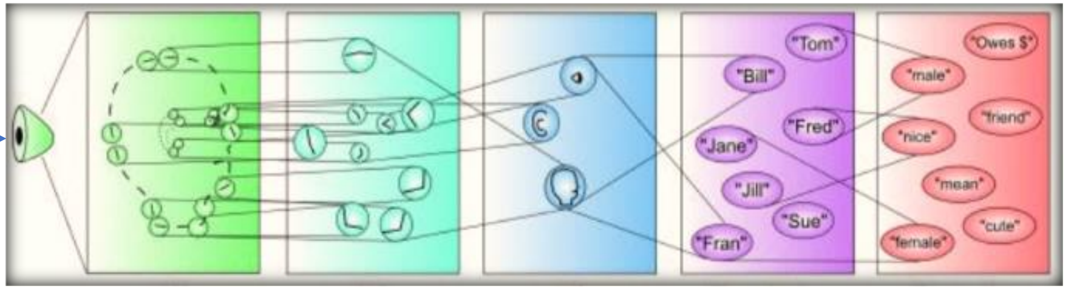
By Geoffrey Hinton
(EX. Google (Google Brain)
Prof. at University of Toronto)

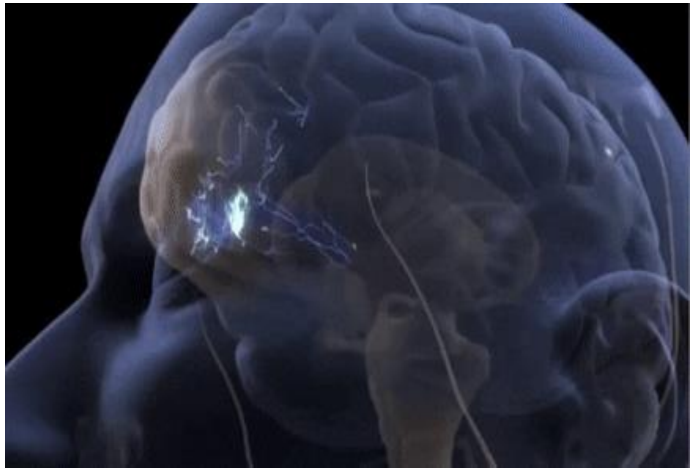
Geoffrey Hinton designs machine learning algorithms. His aim is to discover a learning procedure that is efficient at finding complex structure in large, high-dimensional datasets and to show that this is how the brain learns to see.

ML vs. DL

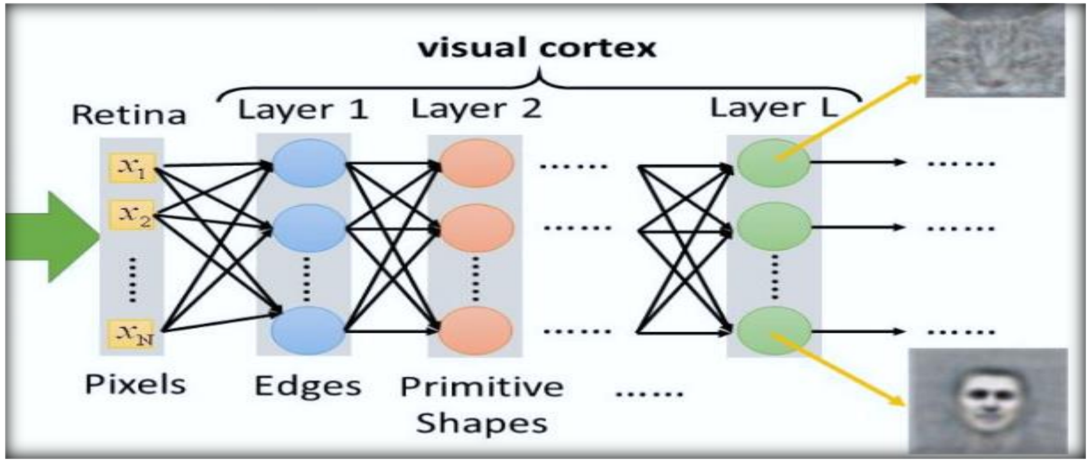

Hand-crafted feature extraction by Human Expert
Machine Learning
Car
Not Car
Input
Feature extraction
Classification
Output
Neural network automatically extracts features
Deep Learning
Car
Not Car
Input
Feature extraction + Classification
Output

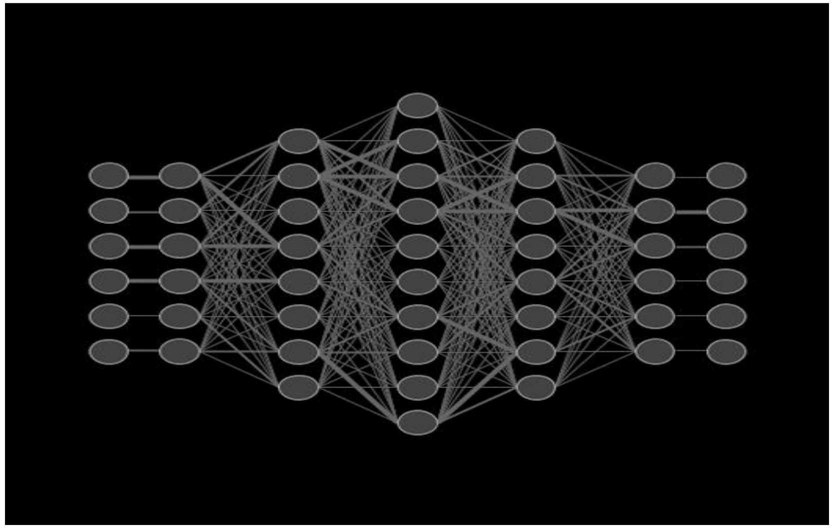
Visual Cortex and Deep Neural Network (DNN)



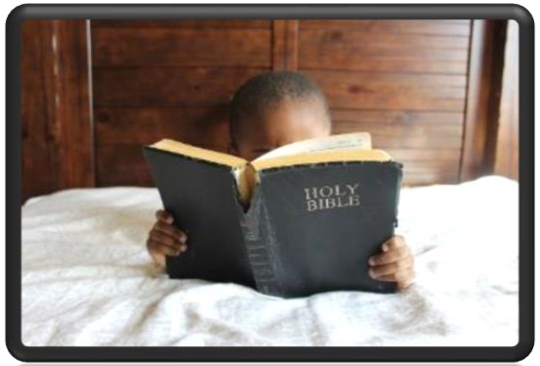


Images, Text, Sound etc.





Manual Feature Extraction: Issues



Occlusion

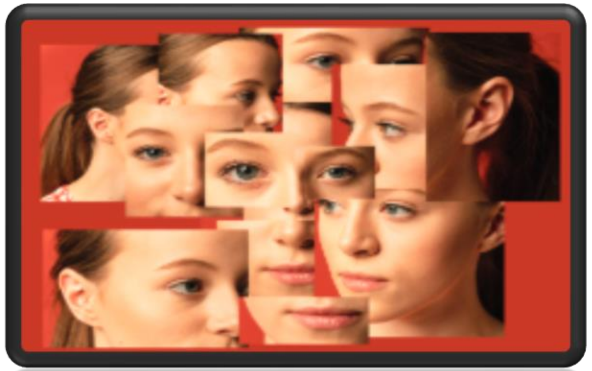
Cluttered Background

Intra-class Diversity

Object Deformation

Scale Variation

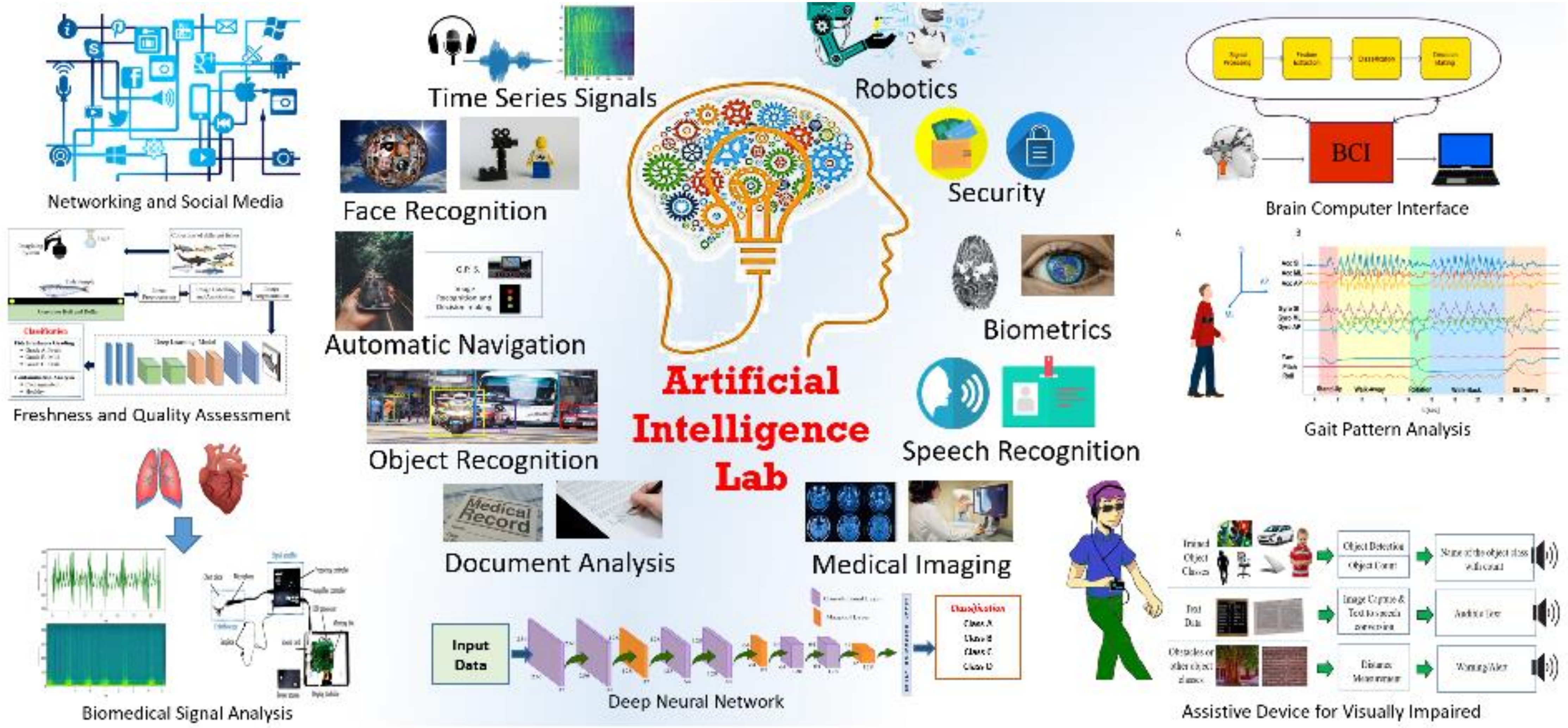
Illumination Variation



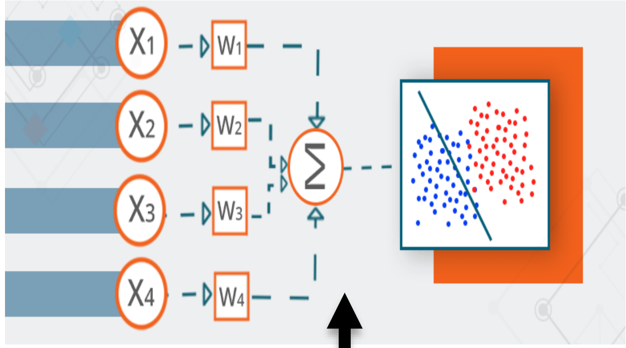
Change in Viewing Angles

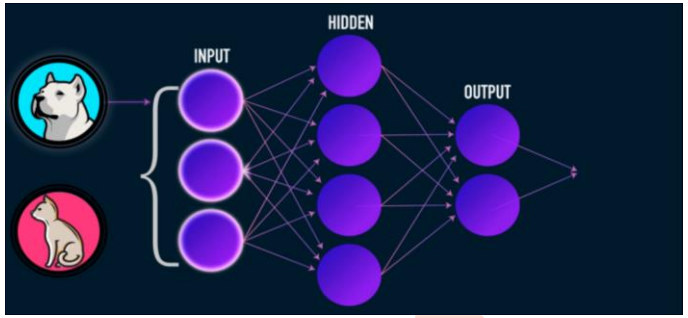
Image Deformity

Applications of Deep learning



Deep Learning: Historical Overview





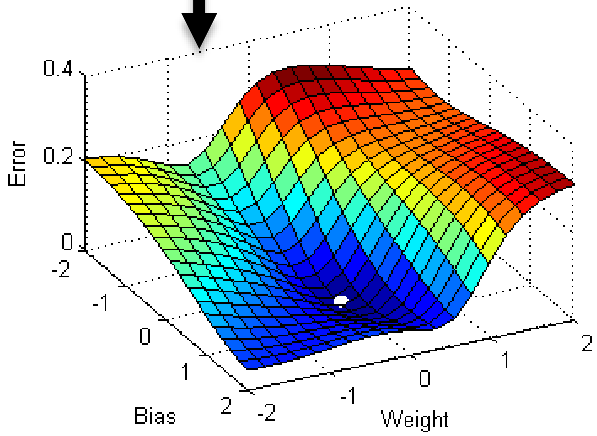
1952
Stochastic Gradient Descent

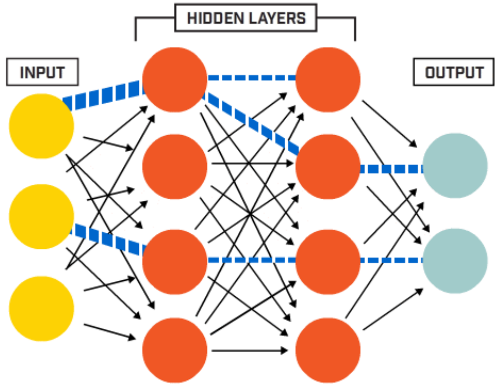
1958
Perceptron: Learning weights

1974
Backpropagation

1986
Backpropagation : Multi layer Perceptron

1998
Convolutional Neural Network





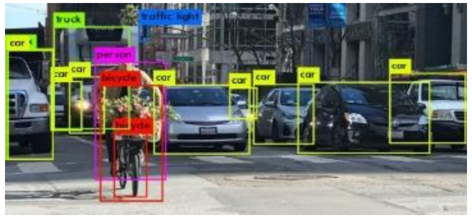
Why using Deep Learning Now?

Neural Network date back to 1950s, so why the resurgence?

1. **Big Data**
   - Larger Datasets
   - Easier Collection and storage

IMAGENET

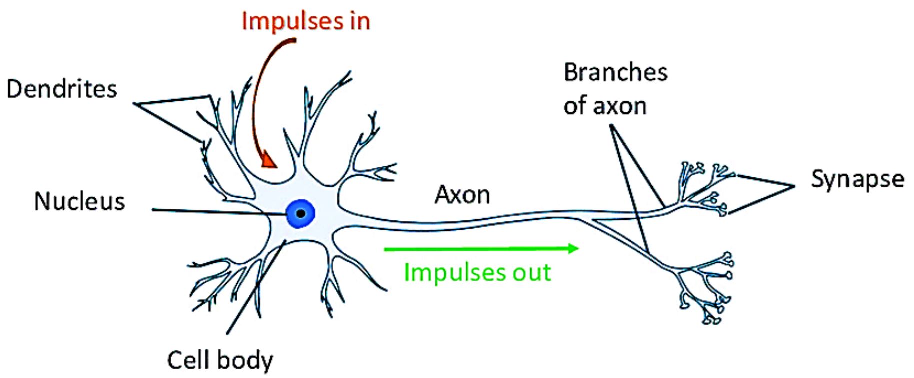
2. **Hardware**
   - Graphics Processing Units (GPUs)
   - Massively Parallelizable

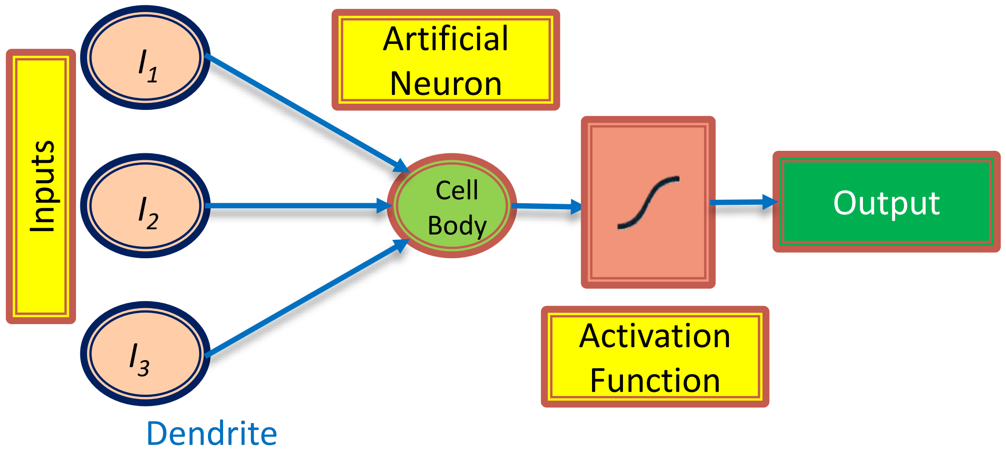


3. **Software**
   - Improved Techniques
   - New Models
   - Toolboxes

TensorFlow

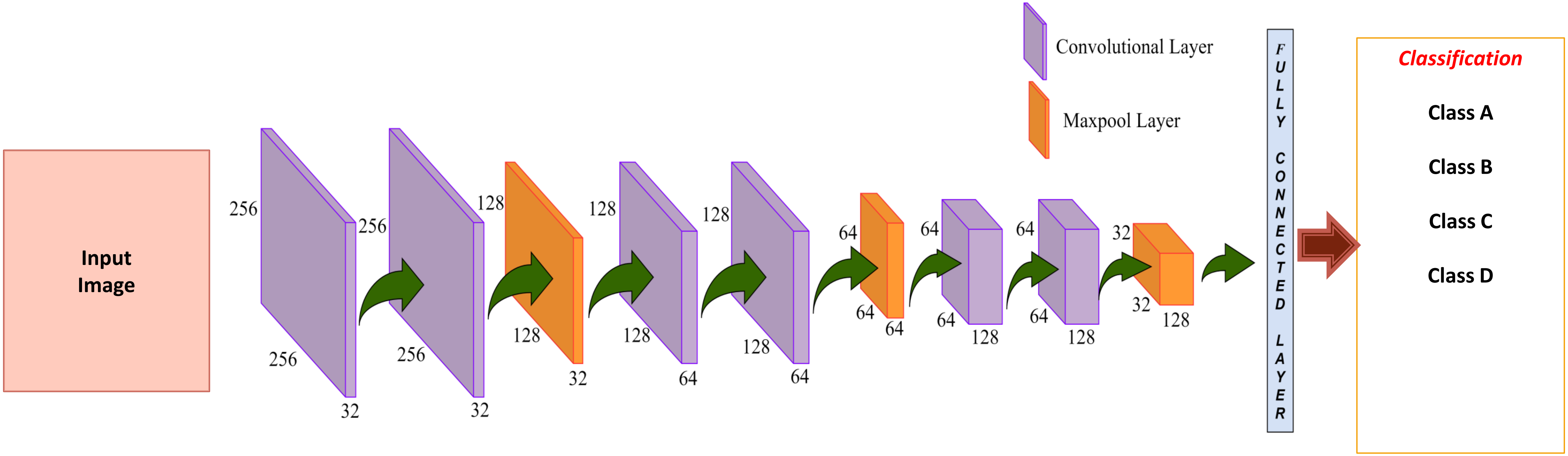
Biological Neural Network & Artificial Neural Network





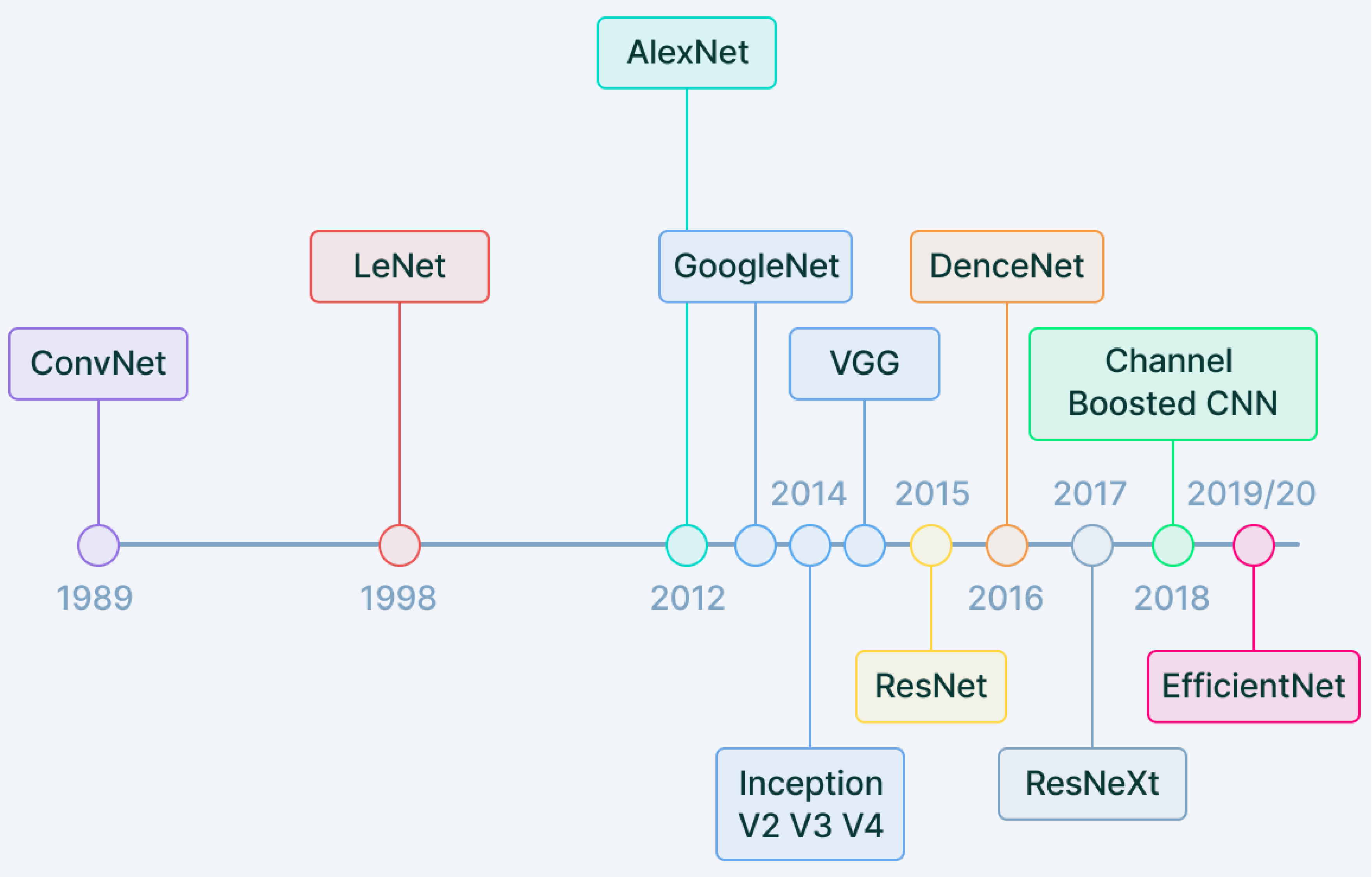
Biological Neural Network	Artificial Neural Network
Stimulus	Input
Receptor	Input Layer
Neural Network	Processing Layer
Neuron	Processing Element
Dendrite	Addition Function
Synapse	Weight
Cell Body	Transfer/ Activation Function
Axon	Artificial Neural Output

Convolutional Neural Networks

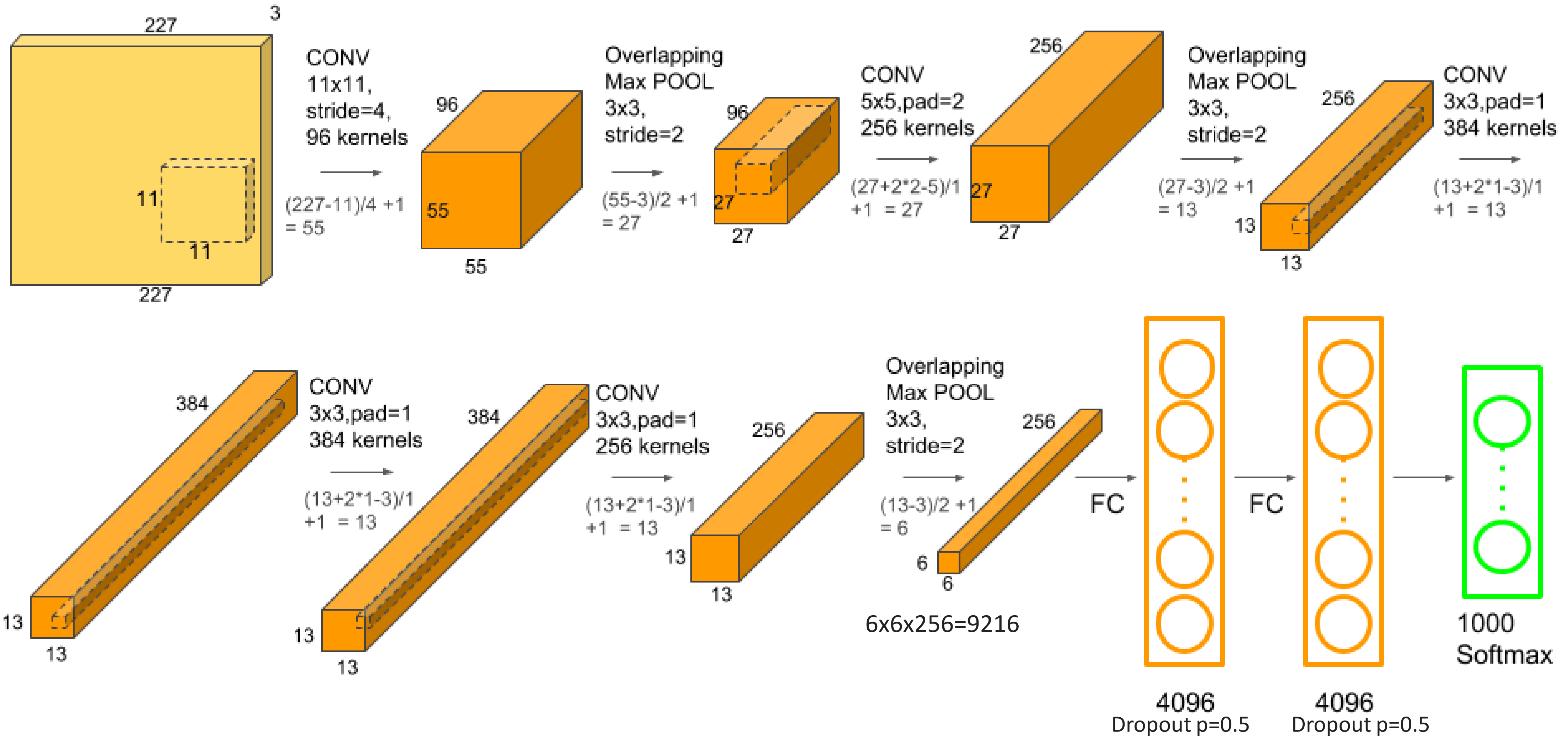


- Convolutional layer and Pooling help to extract high level features of input
- Fully connected layer used extracted high level features for classification of input image in different classes
- Output also include the class probability of the image

Popular CNN Architectures

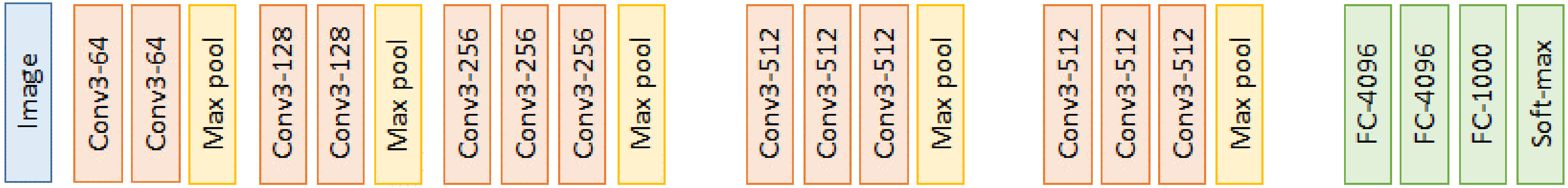


AlexNet

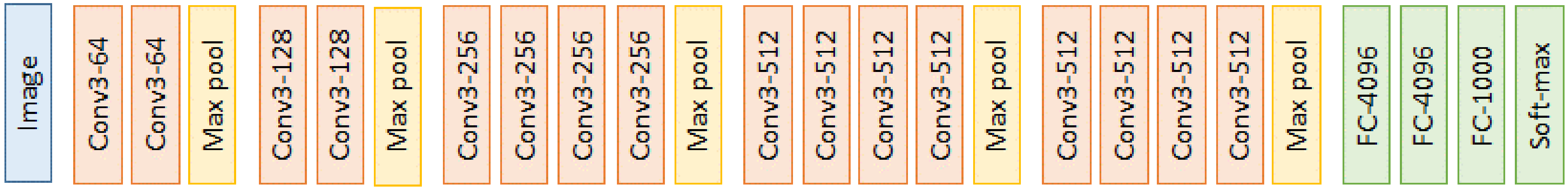


- Input: 227x227x3
- Conv 11x11, 5x5, three 3x3
- 3 MaxPool
- ReLu for hidden units
- Softmax for output

VGGNet



VGG-16

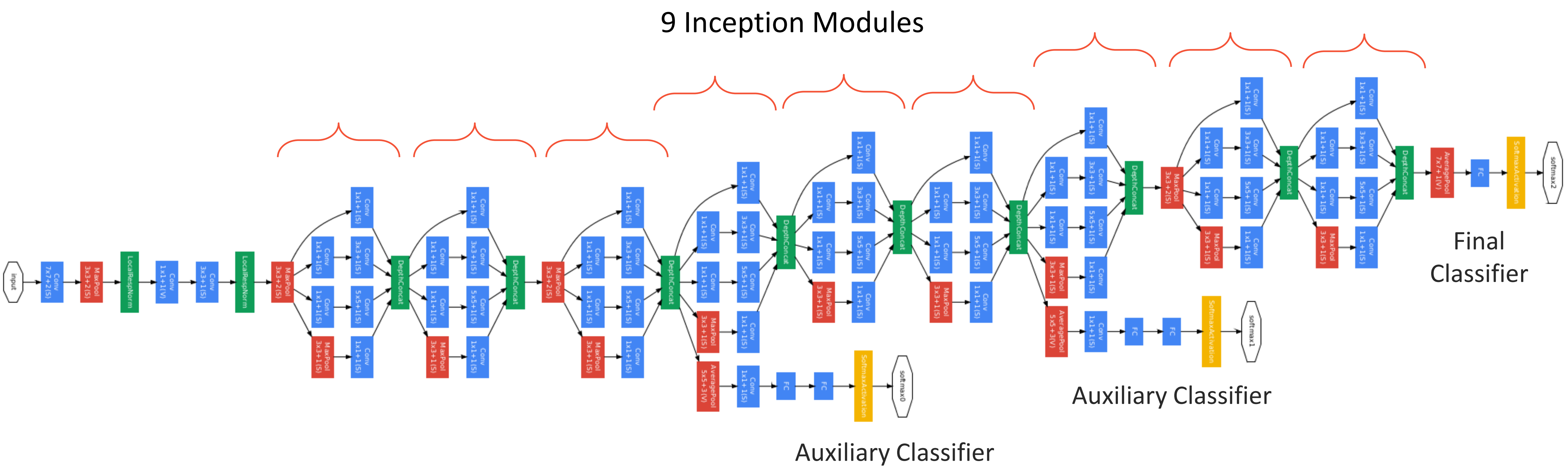


VGG-19

Conv= 3x3 filter, s=1, same
Max pool= 2x2, s=2 (5 Max pooling layers)

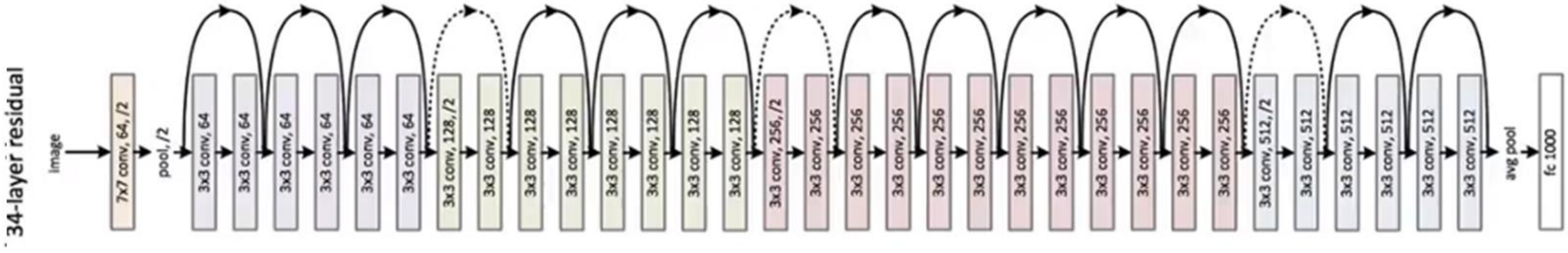
ReLU activation in all hidden units
Softmax activation in output units

GoogLeNet (Inception v1)

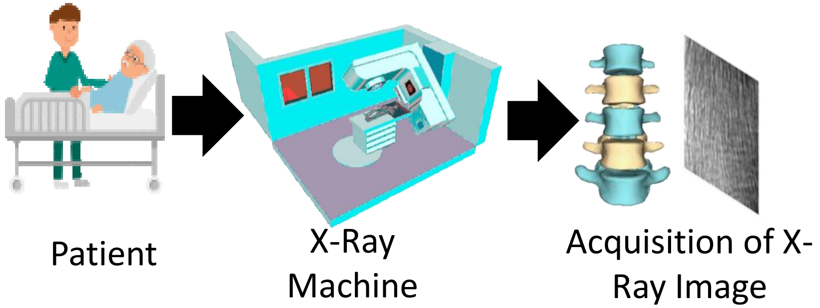


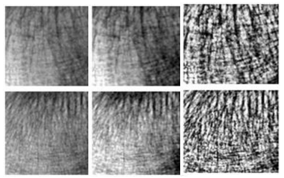
Plain

ResNet



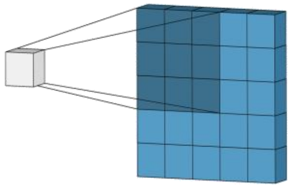
AI-based Classification of the Trabecular Bone Structure of Osteoporotic Patients using Machine Vision



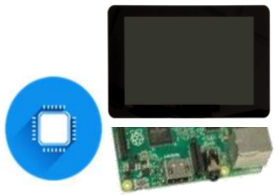


Pre-processing of X-ray Images

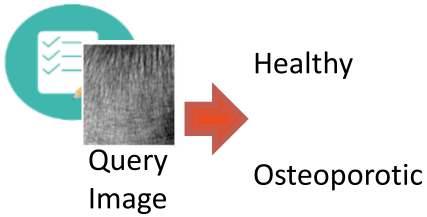
Analysis of features and training of Images



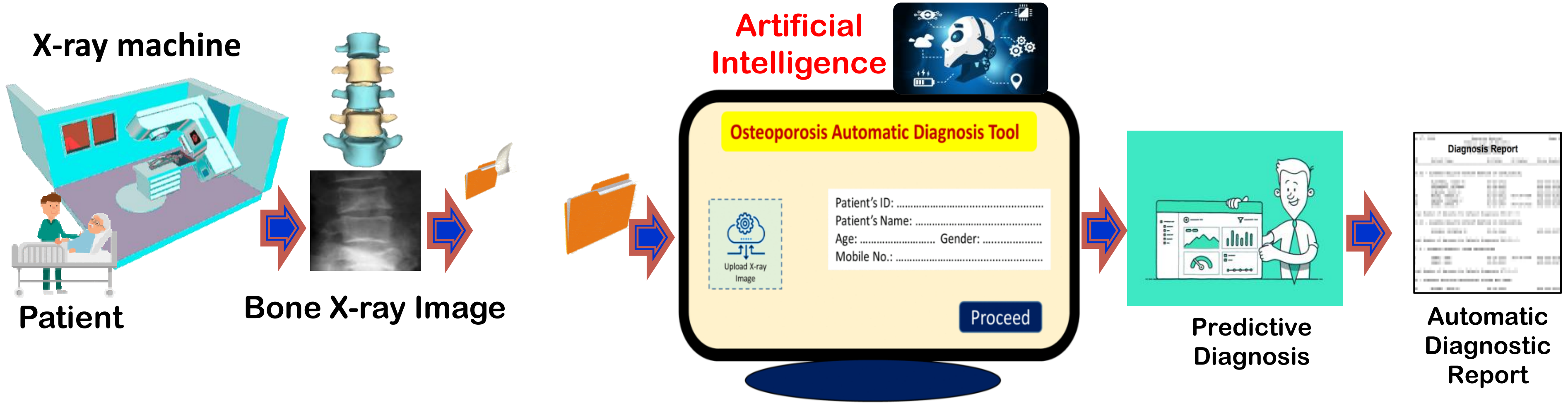
Training and Evaluation of trained model



Deployment of Model using Computing Device



Testing of Images



Need of the Innovation

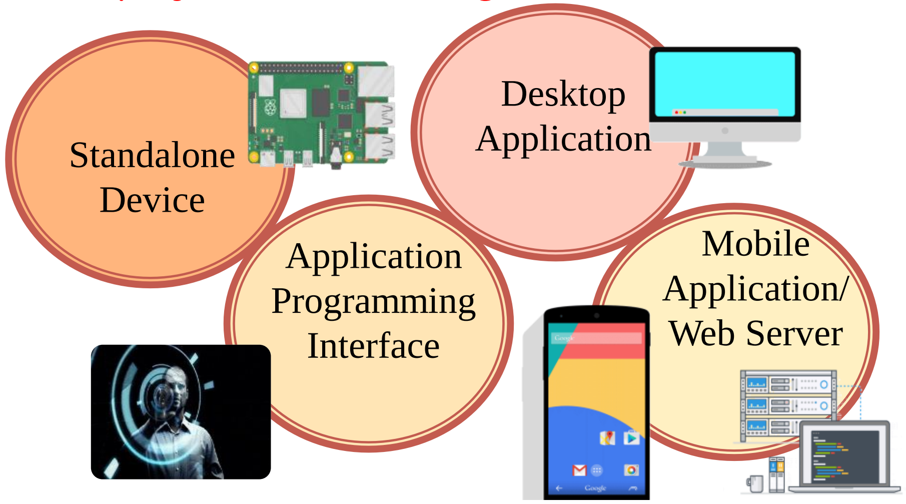
- X-Rays Machines are more commonly available & cheaper.
- Biomarkers from comprehensive computing and processing of the X-rays for identification of Osteoporosis can act as a massive screening diagnostic tool, specially in small towns.

What is needed: Digital X ray Machine and any computing device

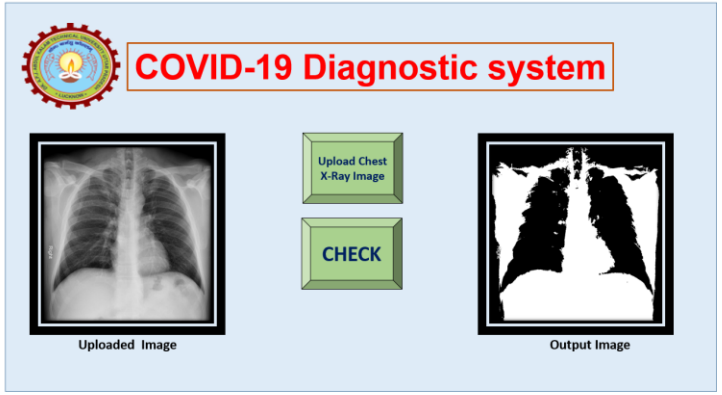
Potential Use :

- Primary Health care centres for rapid screening.
- Mobile – Van based screening in hot spot areas.
- As Web-server/Mobile diagnostic application

Deployment of the diagnostic framework



Artificial Intelligence based COVID-19 Pre-screening using X-Ray Chest Images



User Friendly GUI – Upload the X-Ray and single click to generate the report

Uttar Pradesh University of Medical Sciences, Saifai, Etawah

King George's Medical University

Government Medical College, Kota, Rajasthan

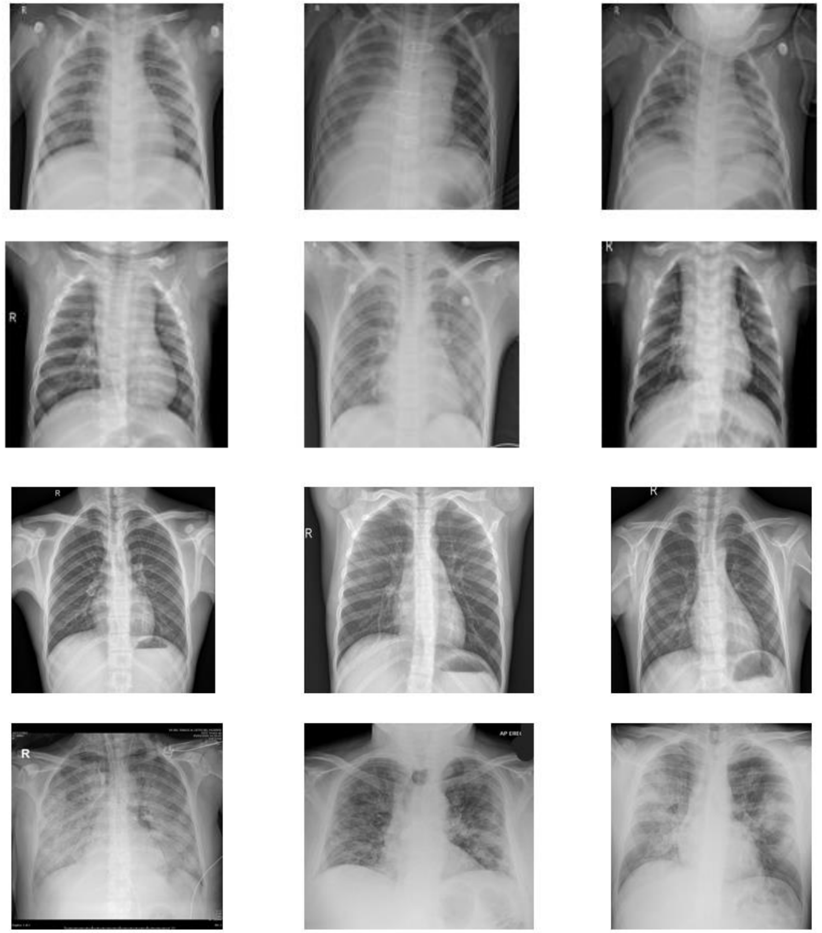
Launch of the AI Based App for COVID Detection by Honorable CM, Uttar Pradesh on 26th May 2020.

Bacterial Pneumonia

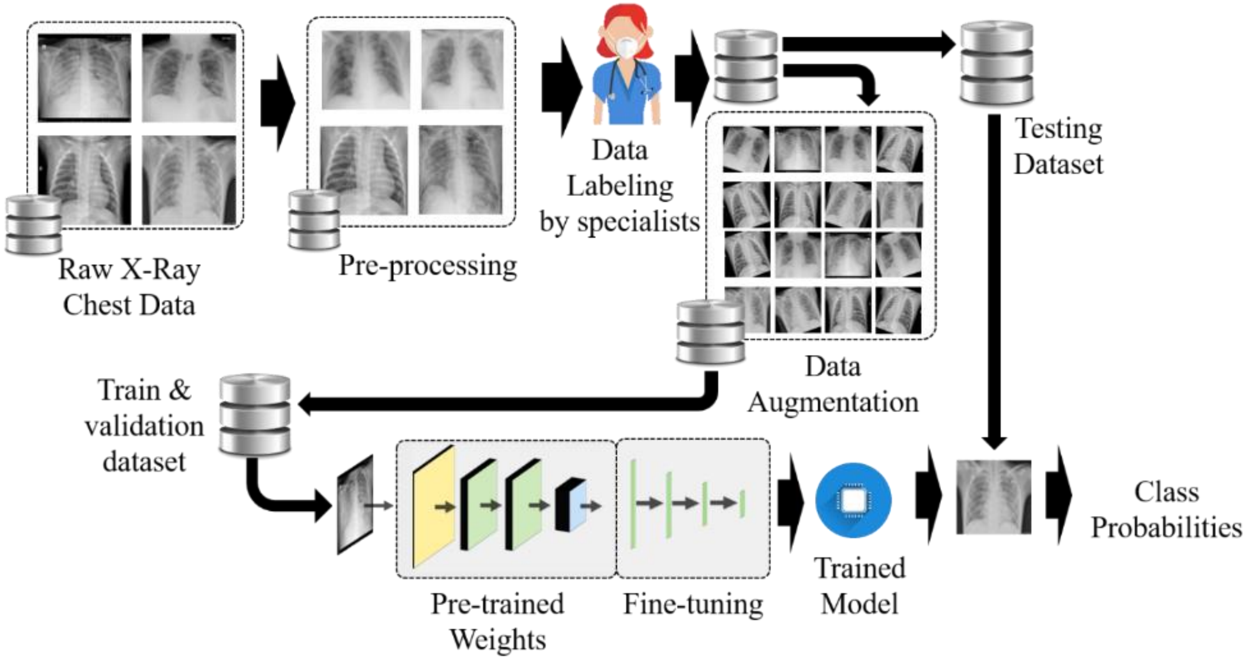
Viral Pneumonia

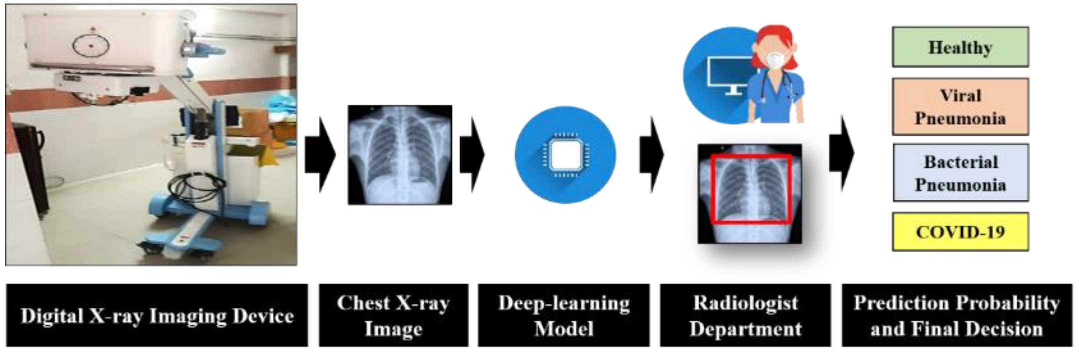
Healthy

COVID-19

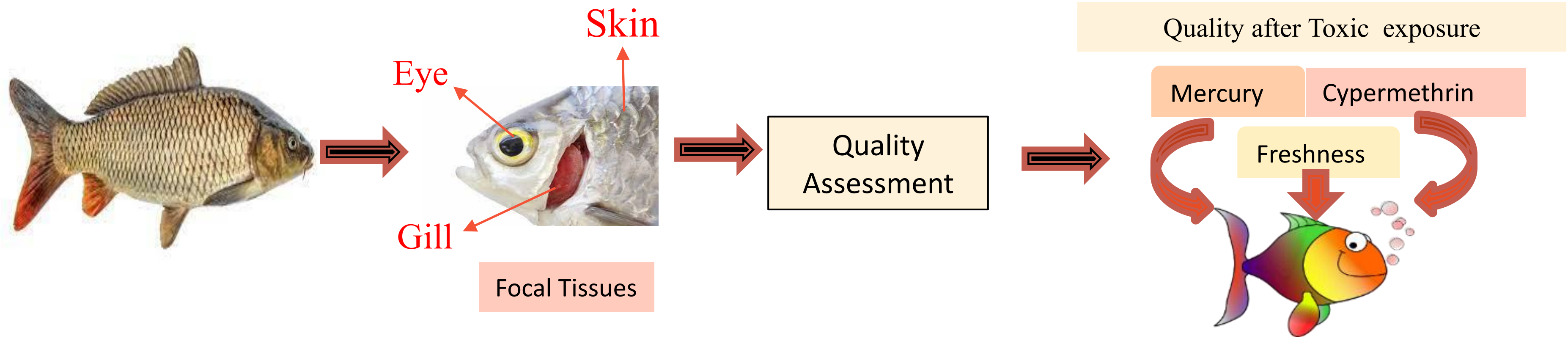


- Collection of Images
- Segregation of unwanted images
- Image Augmentation
- Image Annotation
- Image dataset with annotation
- Division of dataset in Training and Validation set
- Training
- Trained Machine Learning Model





Fish Freshness and Quality Assessment like exposure to Pesticides / Heavy metals using Computer Vision and Artificial Intelligence



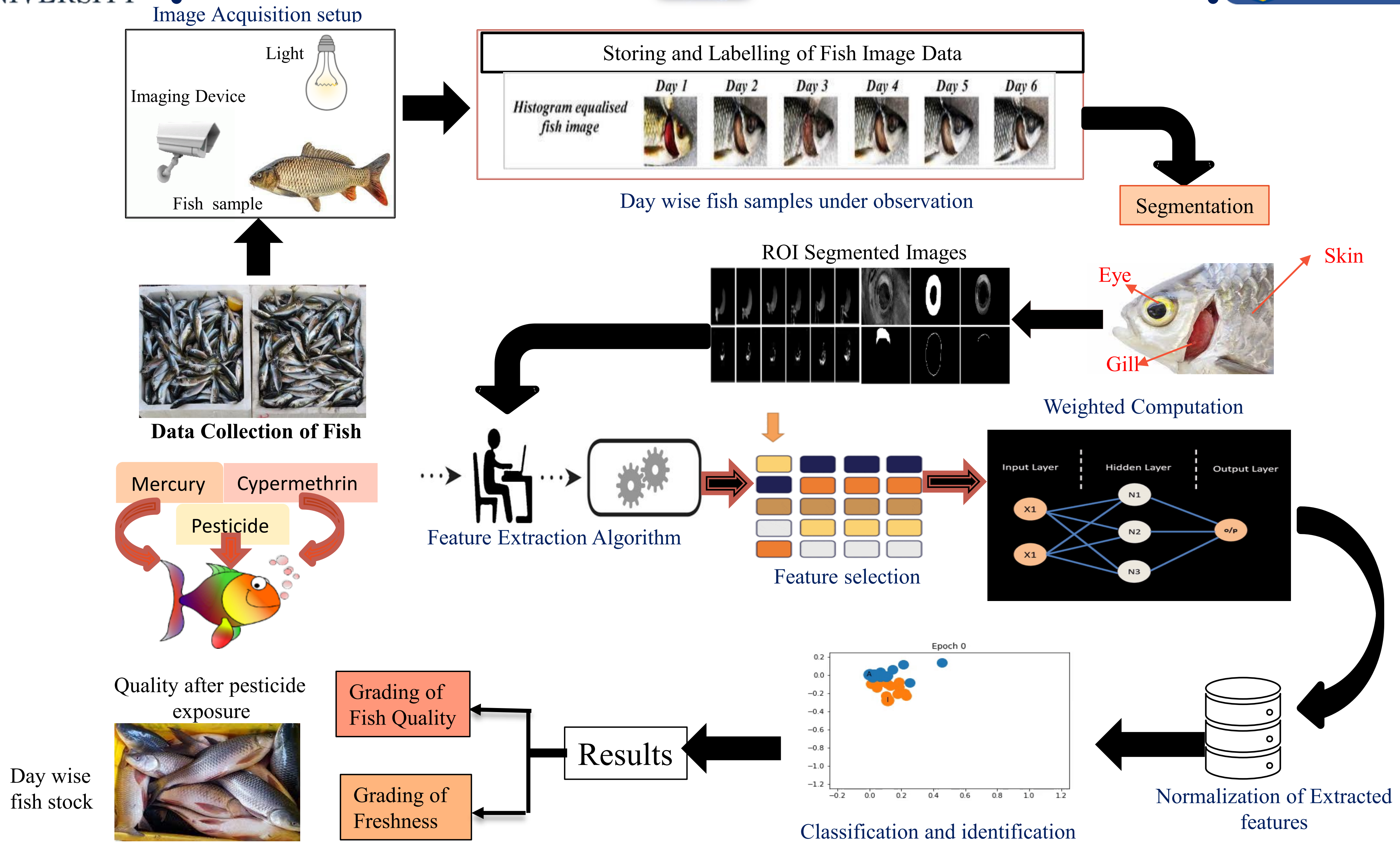
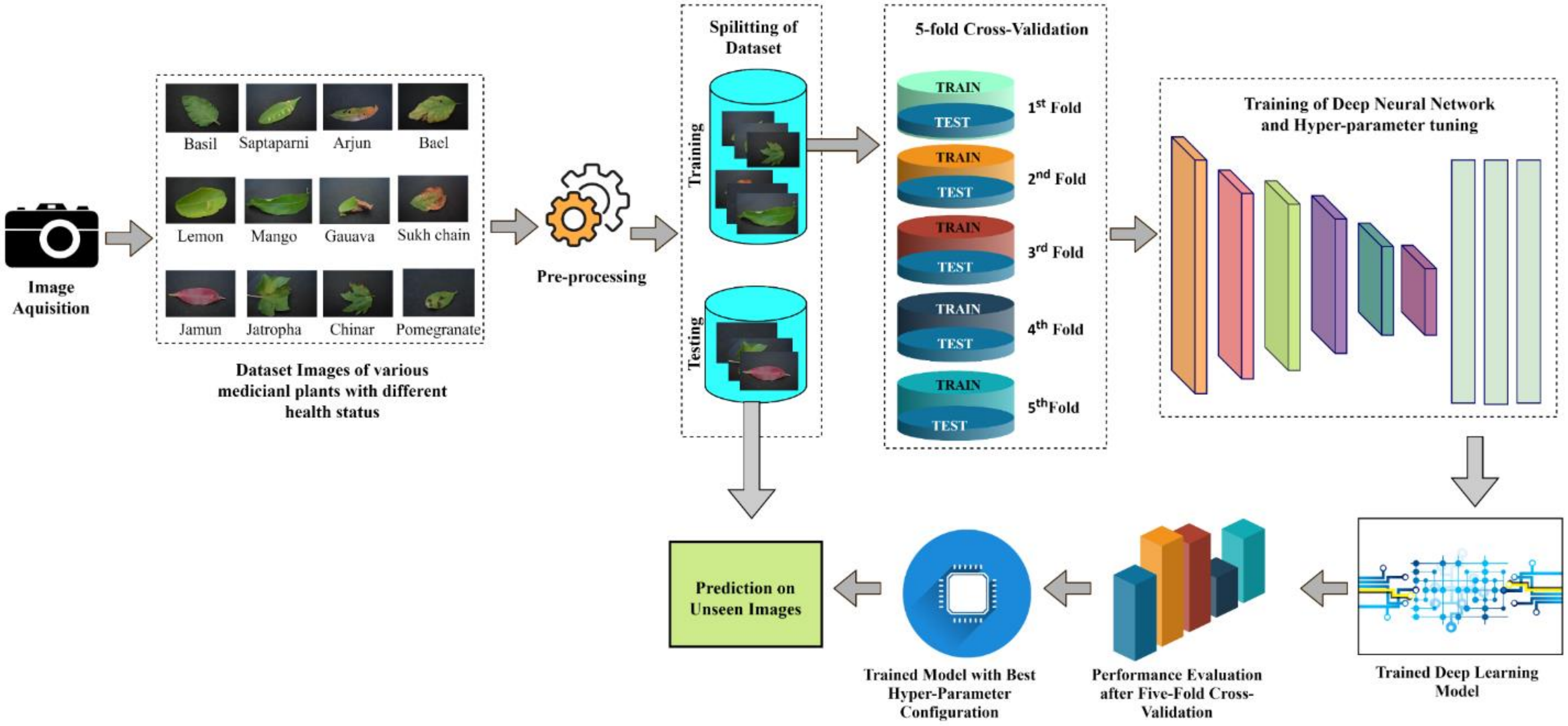


Image Acquisition setup
Light
Imaging Device
Fish sample
Storing and Labelling of Fish Image Data
Histogram equalised fish image
Day 1
Day 2
Day 3
Day 4
Day 5
Day 6
Day wise fish samples under observation
Segmentation
ROI Segmented Images
Eye
Skin
Gill
Data Collection of Fish
Weighted Computation
Input Layer
Hidden Layer
Output Layer
X1
X1
N1
N2
N3
o/p
Mercury
Cypermethrin
Pesticide
Feature Extraction Algorithm
Feature selection
Epoch 0
Quality after pesticide exposure
Grading of Fish Quality
Results
Grading of Freshness
Day wise fish stock
Classification and identification
Normalization of Extracted features

Deep Neural Network for Multi-class Classification of Medicinal Plant Leaves



The proposed methodology for identification and classification of medicinal plant disease

Generative AI

Which Face is Real?

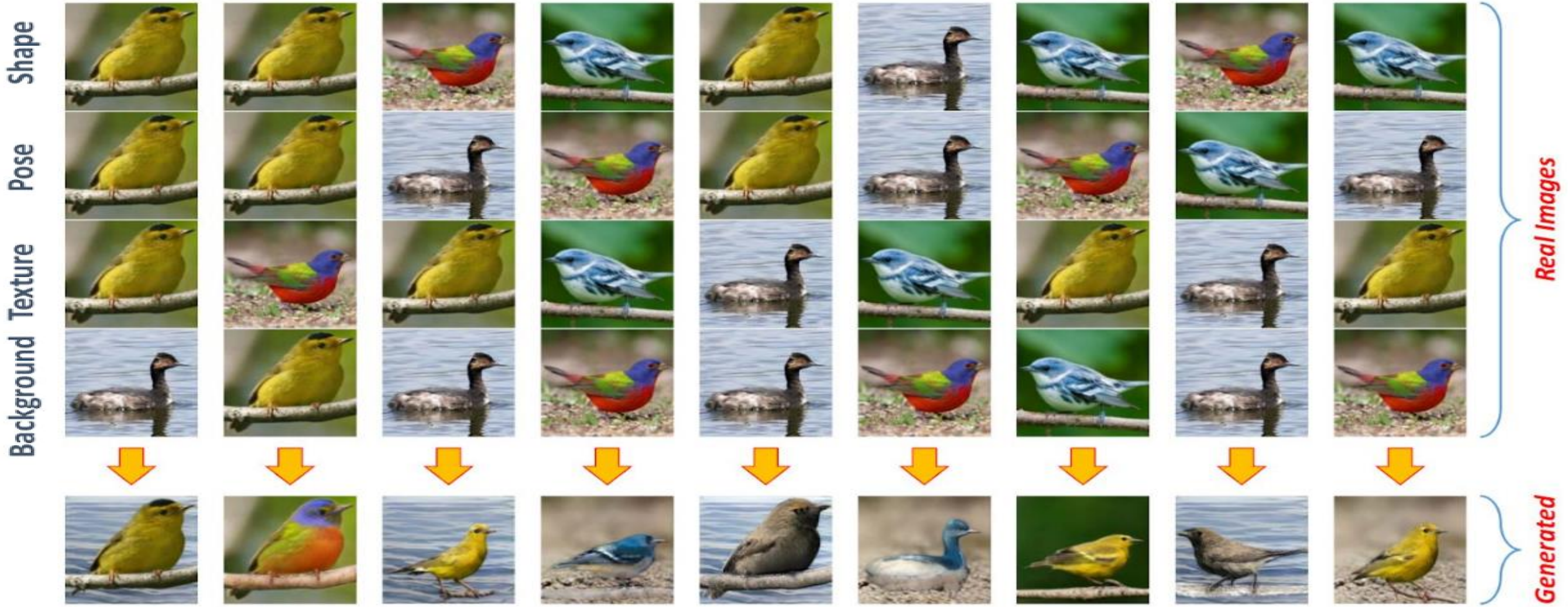
A

B

C

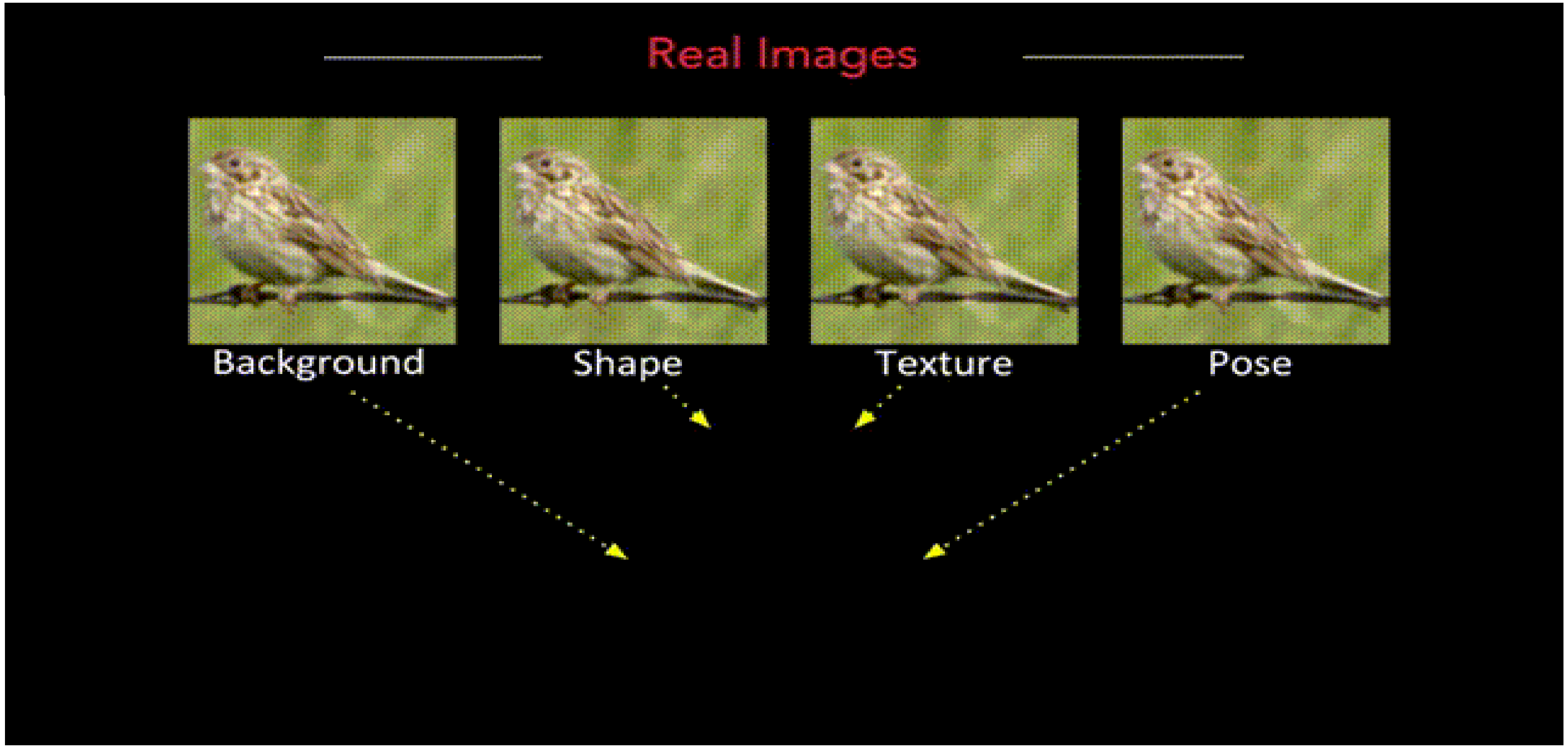
Ref: http://introtodeeplearning.com/slides/6S191_MIT_DeepLearning_L4.pdf

Extracting All Factors From Different Real Images to Synthesize a New Image



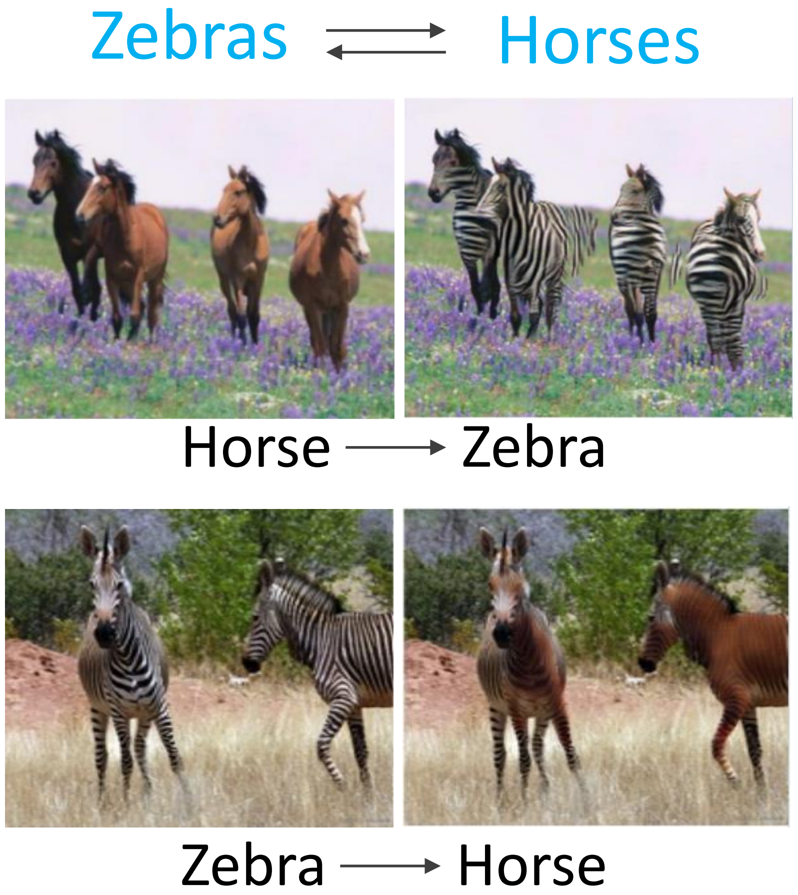
Ref: https://github.com/Yuheng-Li/MixNMatch

Extracting All Factors From Different Real Images to Synthesize a New Image

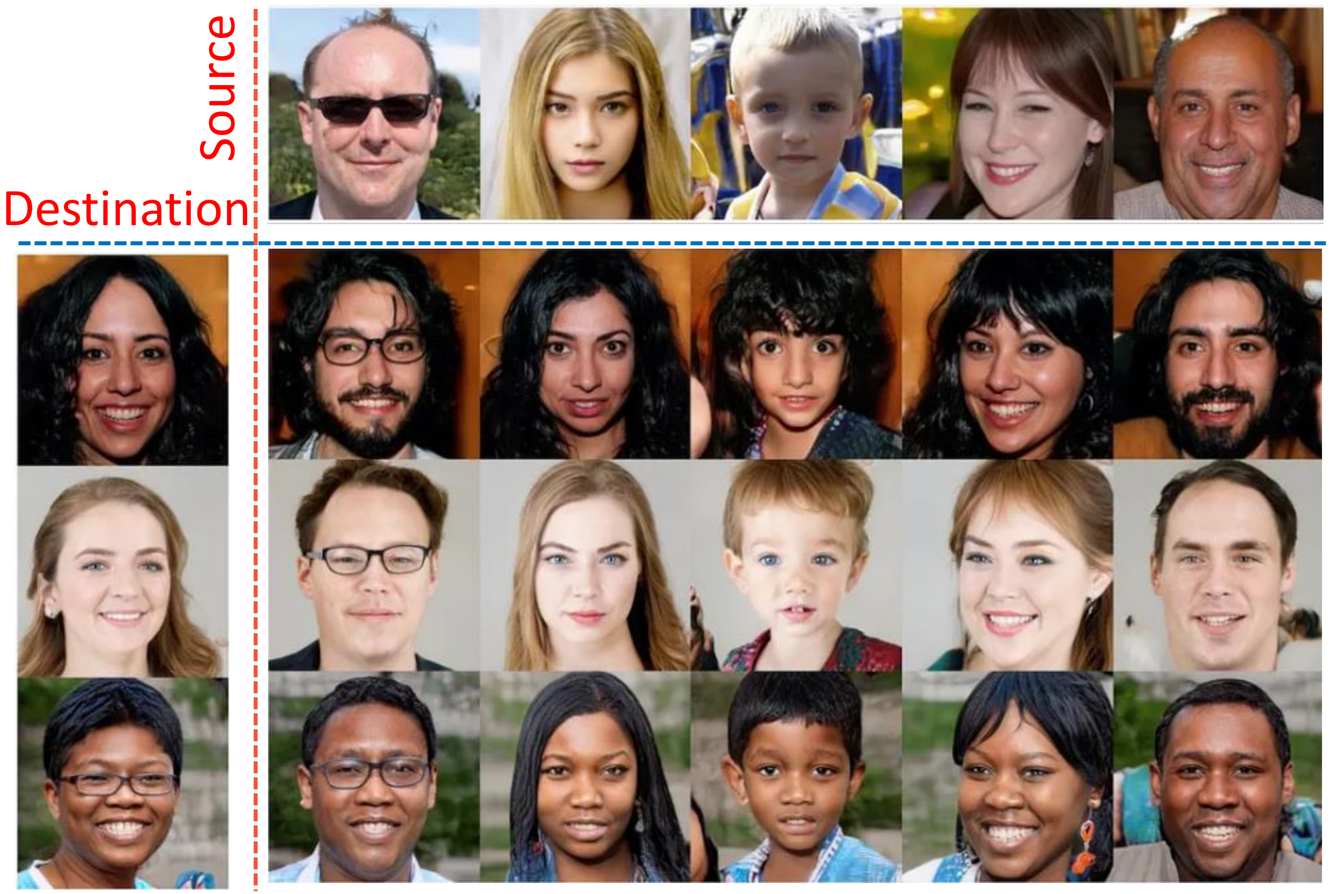


Ref: https://github.com/Yuheng-Li/MixNMatch

Why Generative Models?



Cross-domain Image Translation



Generating Realistic Face Images

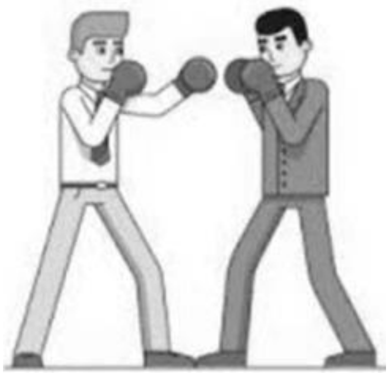
Ref. https://github.com/junyanz/CycleGAN

What are Generative Adversarial Networks?

Generative

Generates data
(Creates fake data)

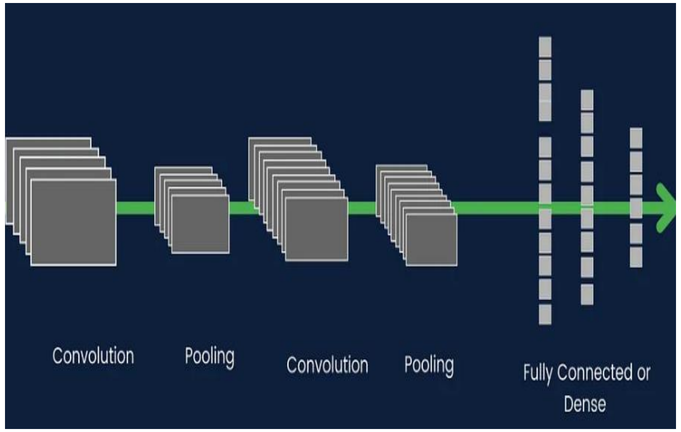
Adversarial



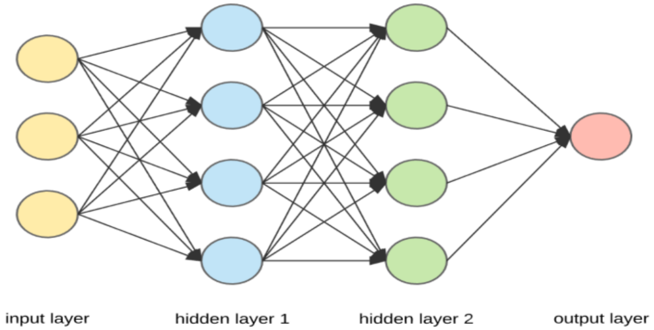
Generator and Discriminator, each competing to win.

Generator trying to fake, and Discriminator trying not be fooled.

Networks



Deep Convolutional Network

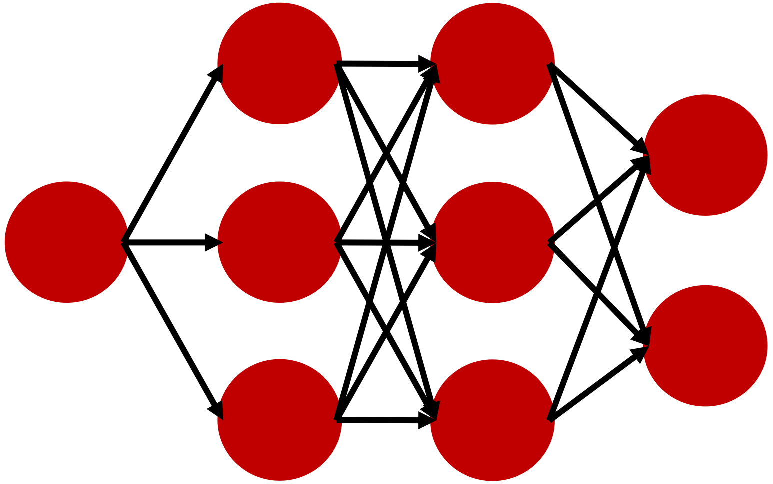


Fully connected (Dense only)

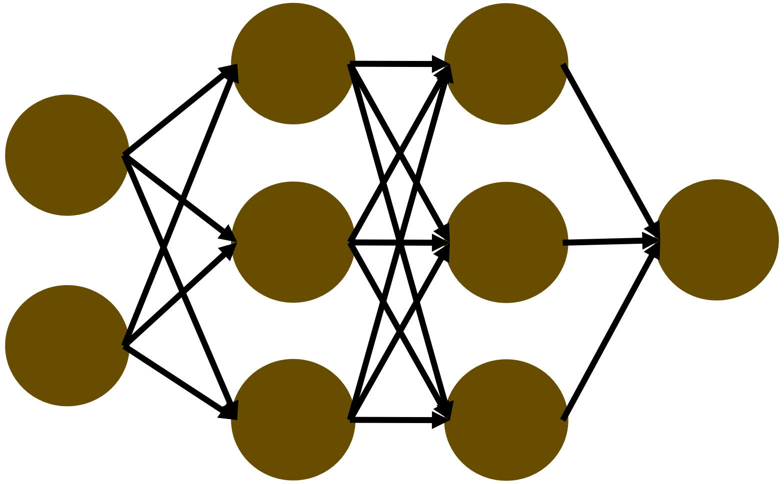
Ref. https://www.youtube.com/watch?v=xBX2VlDgd4I&list=PLZsOBAyNTZwboR4_xj-n3K6XBTweC4YVD

What are Generative Adversarial Networks?

Generative Adversarial Network is a two-player game



Generator



Discriminator

Try to fool the Discriminator by generating the real-looking samples.

Try to distinguish between real and fake samples.

Example of GAN Working Procedure?

Generative Adversarial Network is a two-player game

Ref. https://www.google.com/search?q=painter+and+detective+cartoon+images.

Example of GAN Working Procedure?

Generative Adversarial Network is a two-player game

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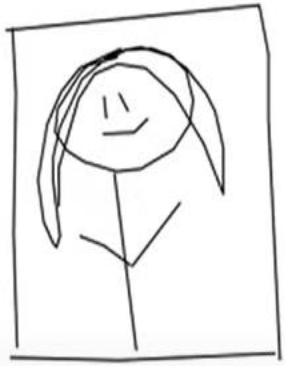

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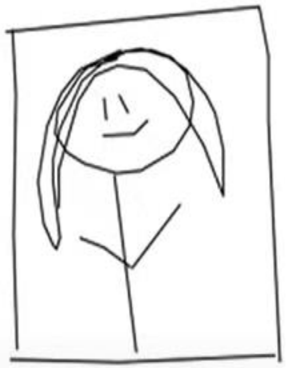
Generative Adversarial Network is a two-player game



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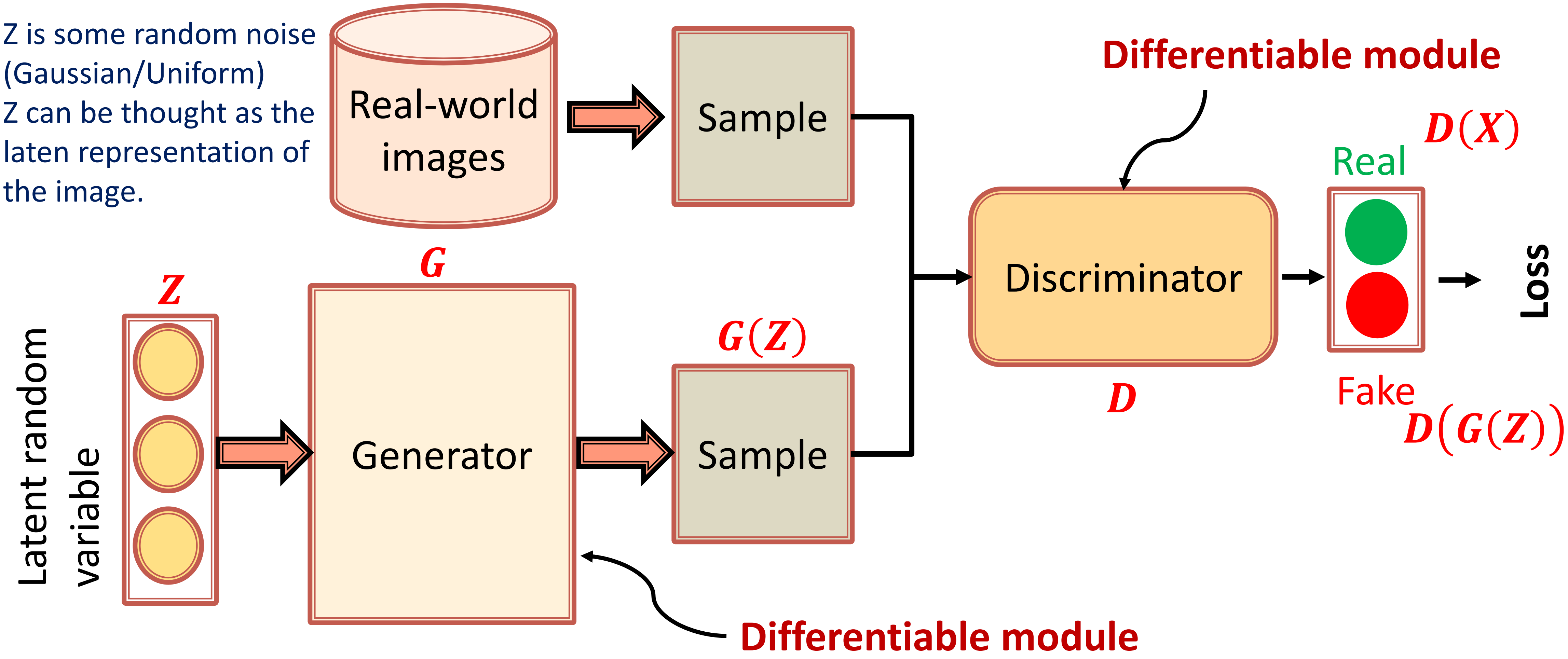
Example of GAN Working Procedure?

Generative Adversarial Network is a two-player game

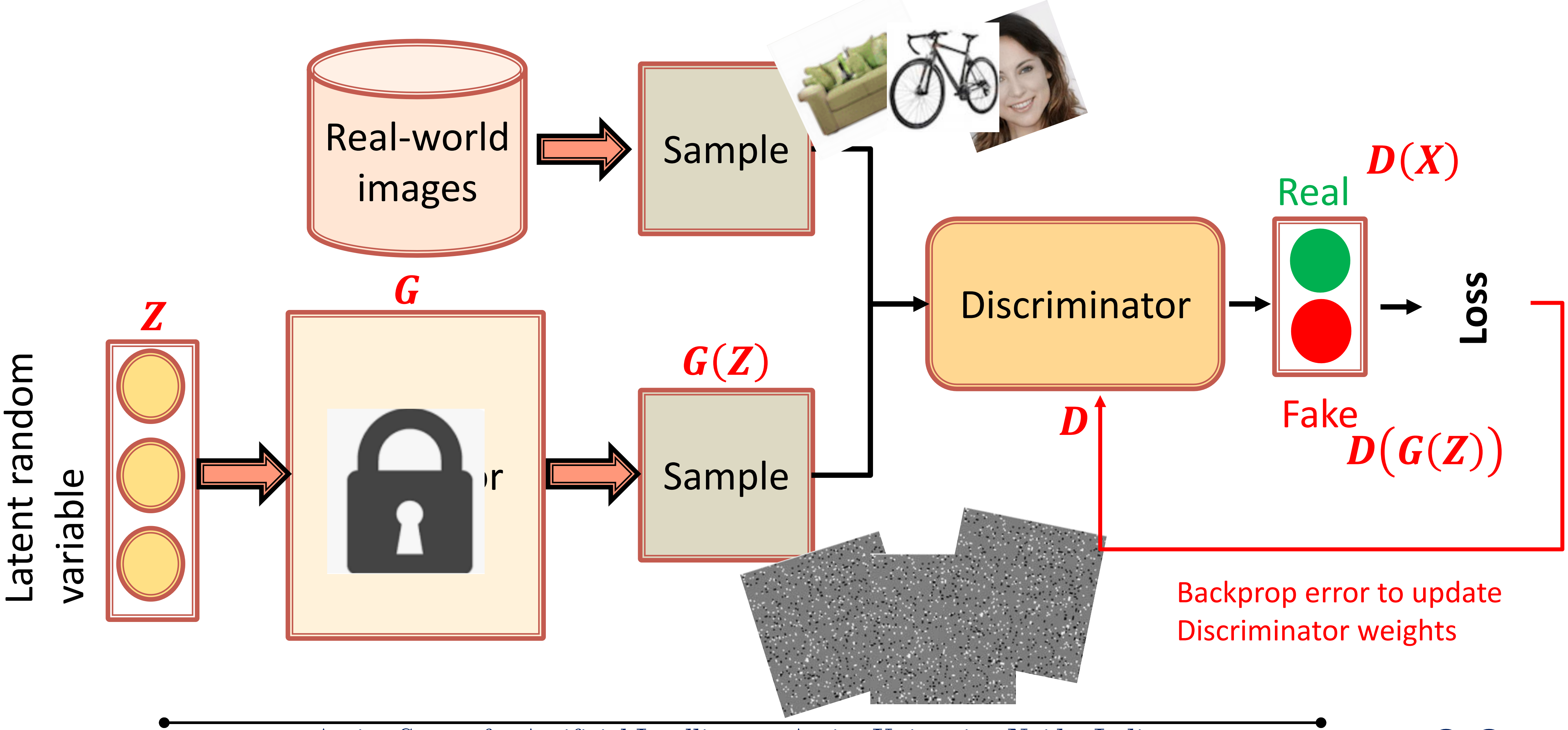
Ref. https://www.google.com/search?q=painter+and+detective+cartoon+images.

GAN's Architecture

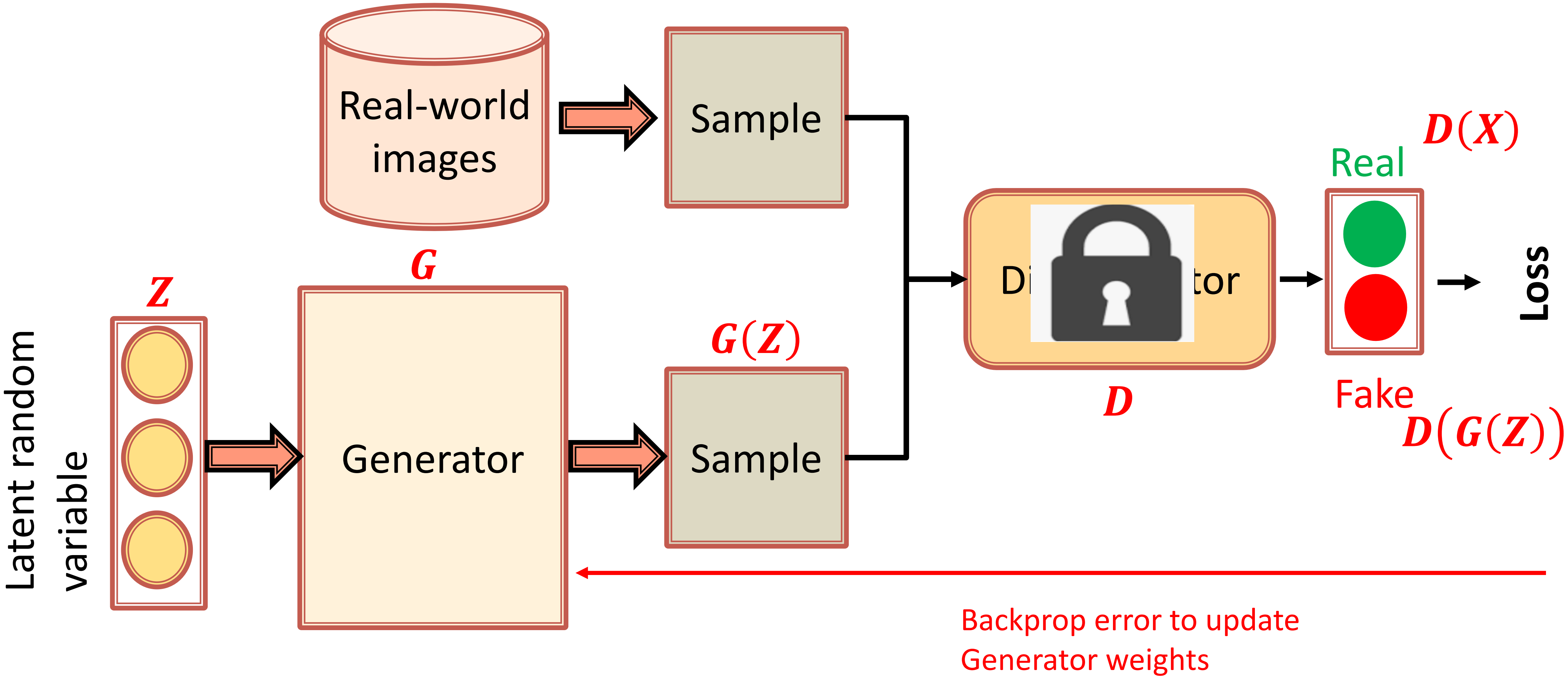
- Z is some random noise (Gaussian/Uniform)
- Z can be thought as the laten representation of the image.



Training Discriminator

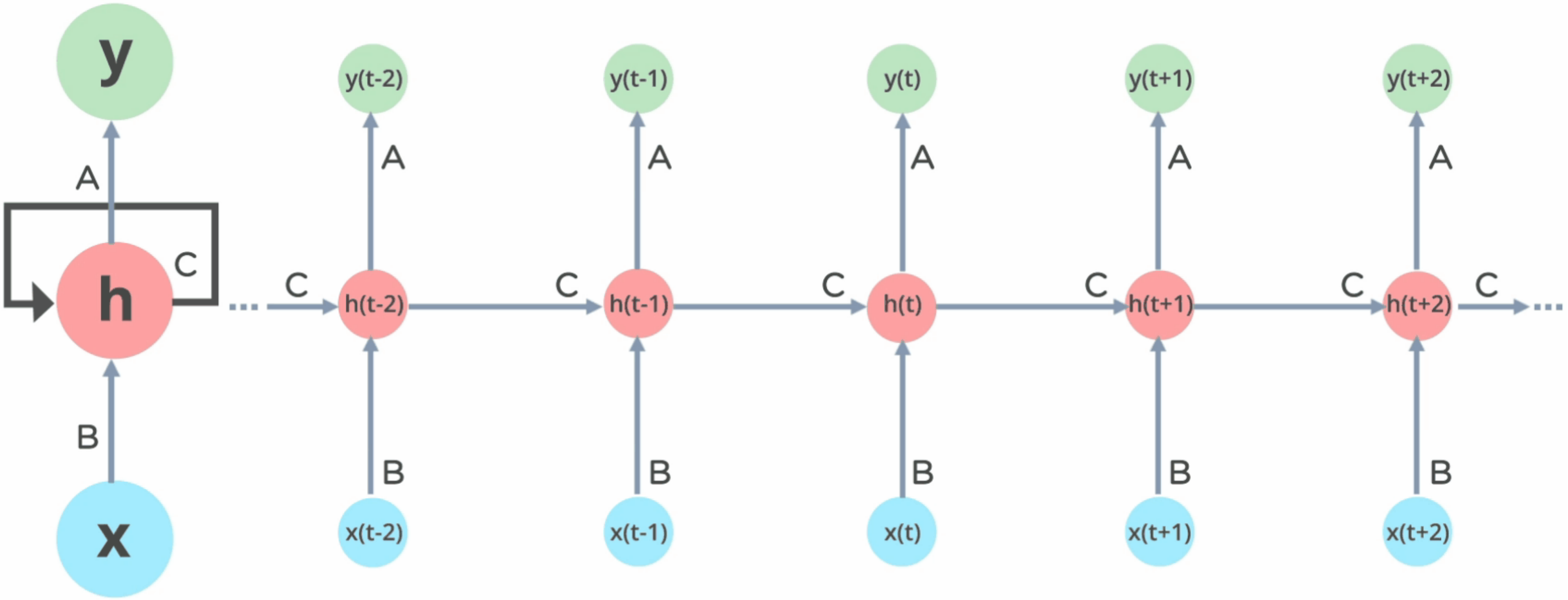


Training Generator



RNN/LSTM/ Language Models

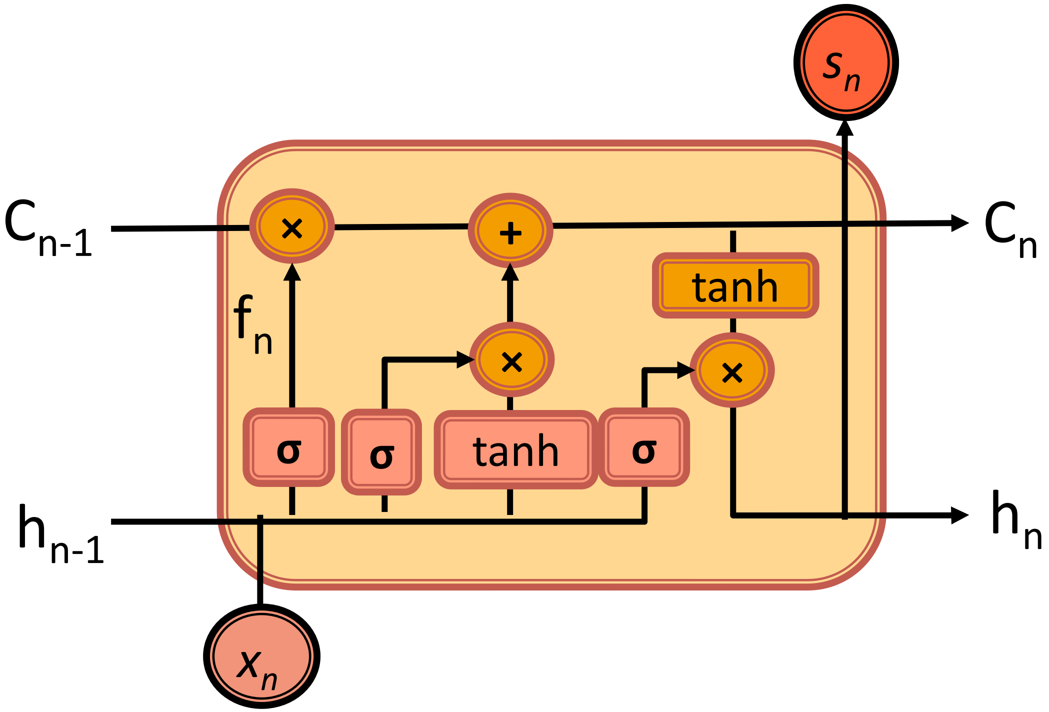
Recurrent Neural Networks



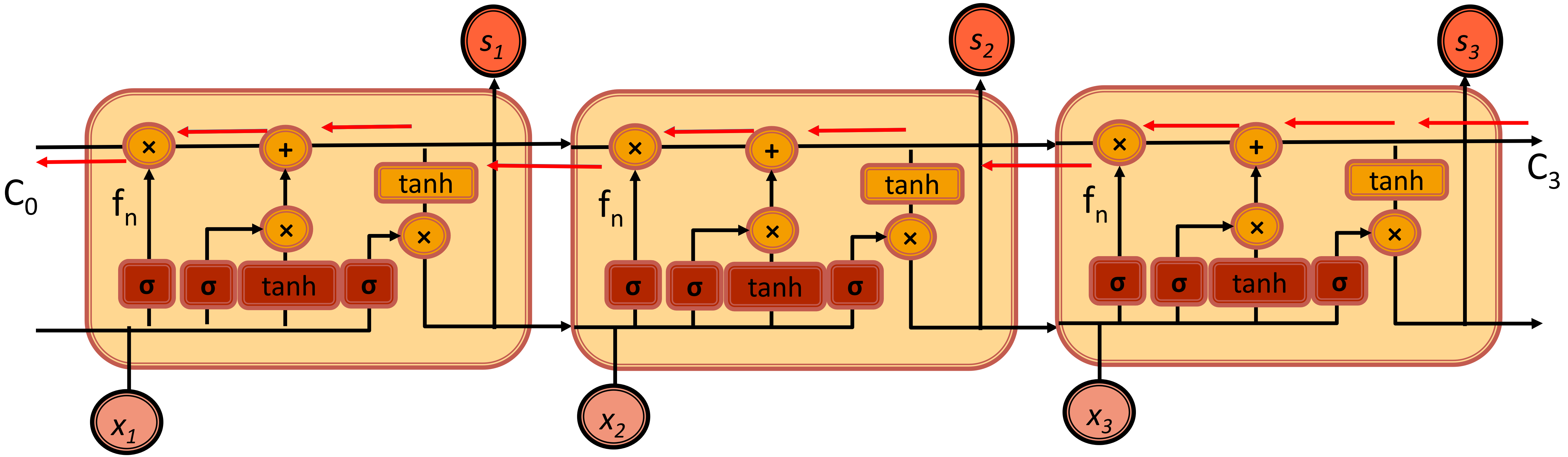
Source: https://www.simplilearn.com/tutorials/deep-learning-tutorial/rnn

Long Short-Term Memory (LSTM)

- Computational block
- Track information
- Maintain a cell state
- Use Gates



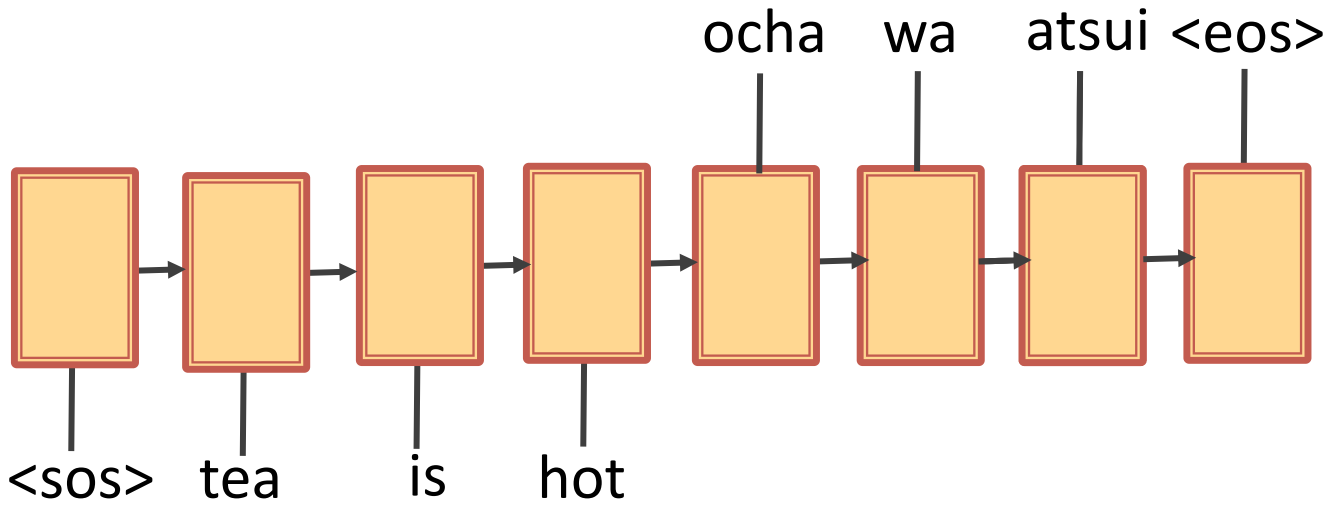
LSTM Gradient Flow



Uninterrupted gradient flow

Applications of RNN/LSTM/ Language Model

Machine Translation

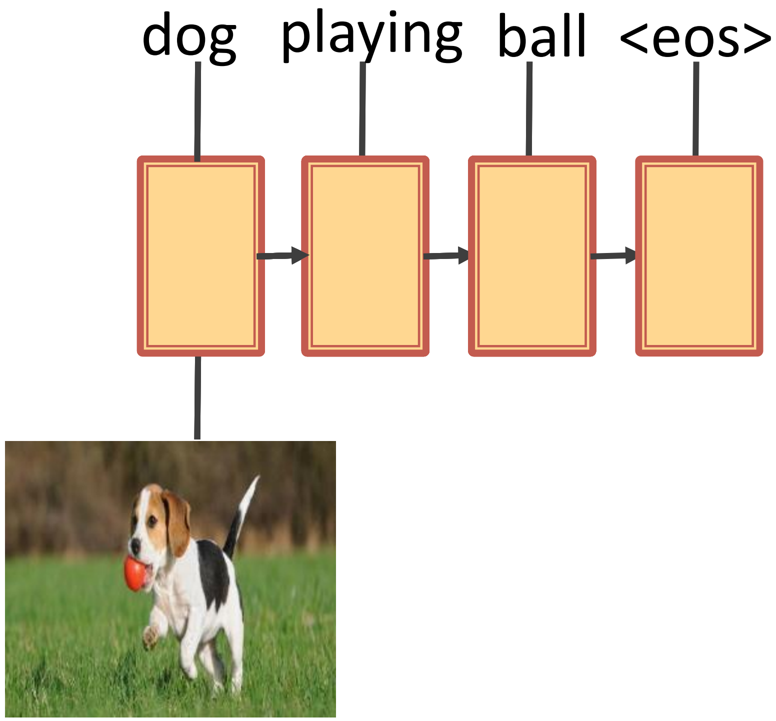


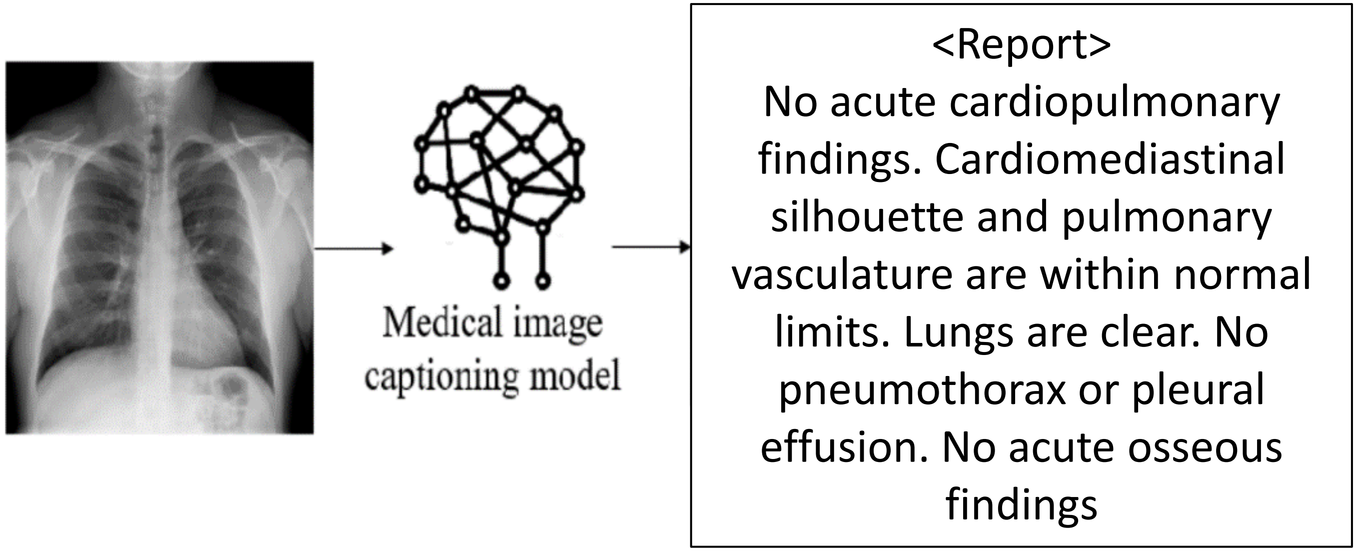
Language Learning

Source: https://www.simplilearn.com/tutorials/deep-learning-tutorial/rnn

Applications of RNN/LSTM/ Language Model

Image Captioning

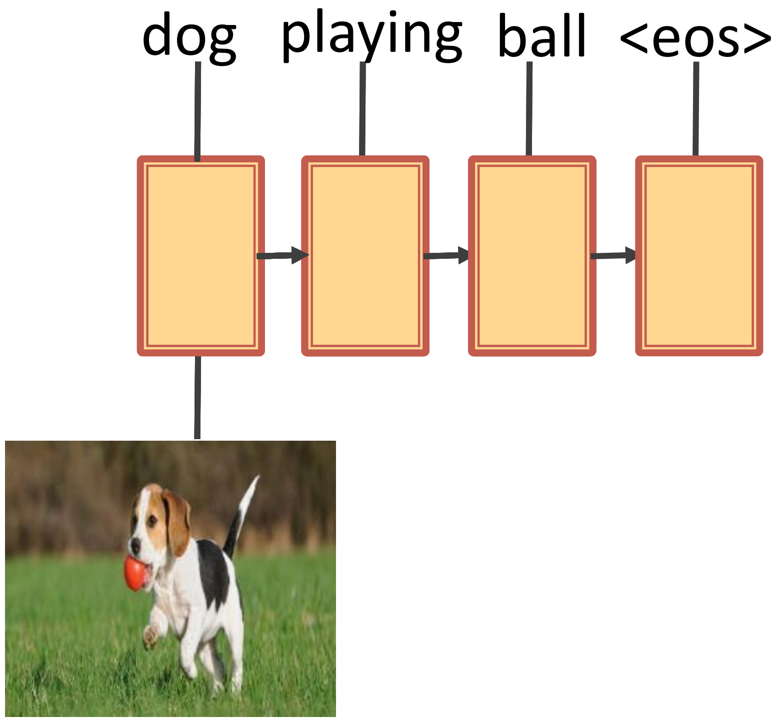


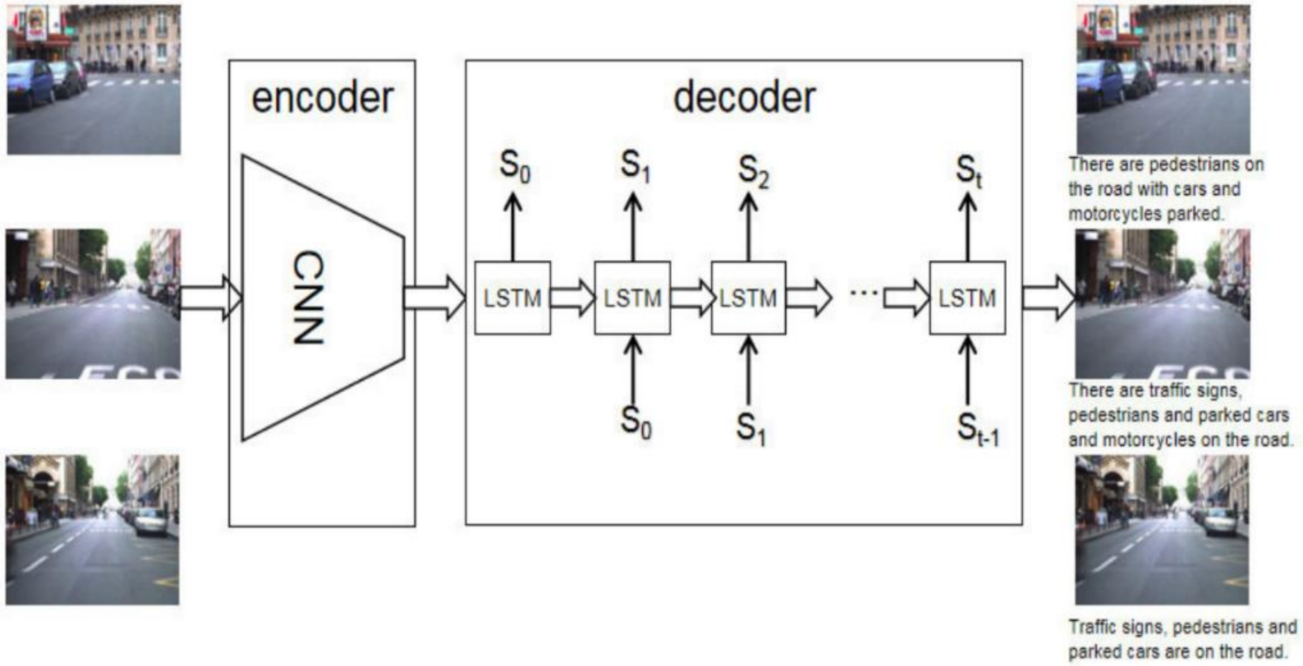


Health care

Source: **DOI:** 10.1109/ACCESS.2021.3124564

Image Captioning

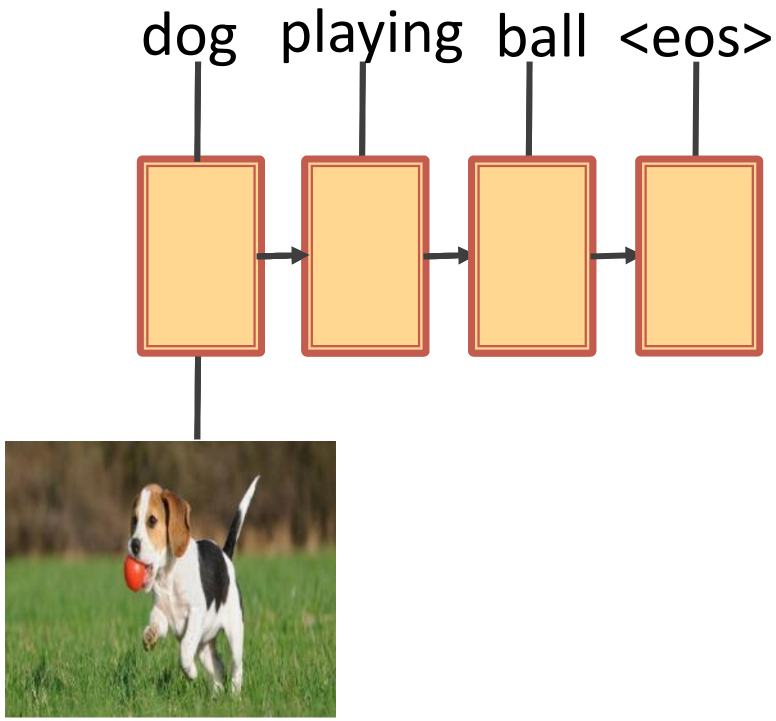




Autonomous Driving

Source: doi:10.1109/access.2020.3047091

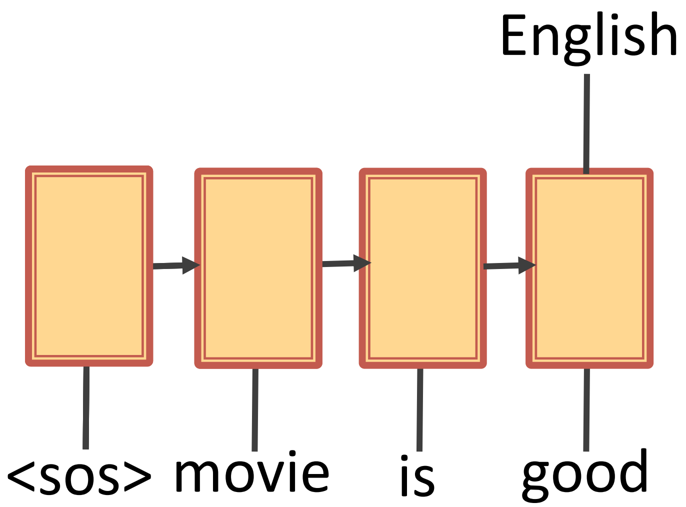
Image Captioning

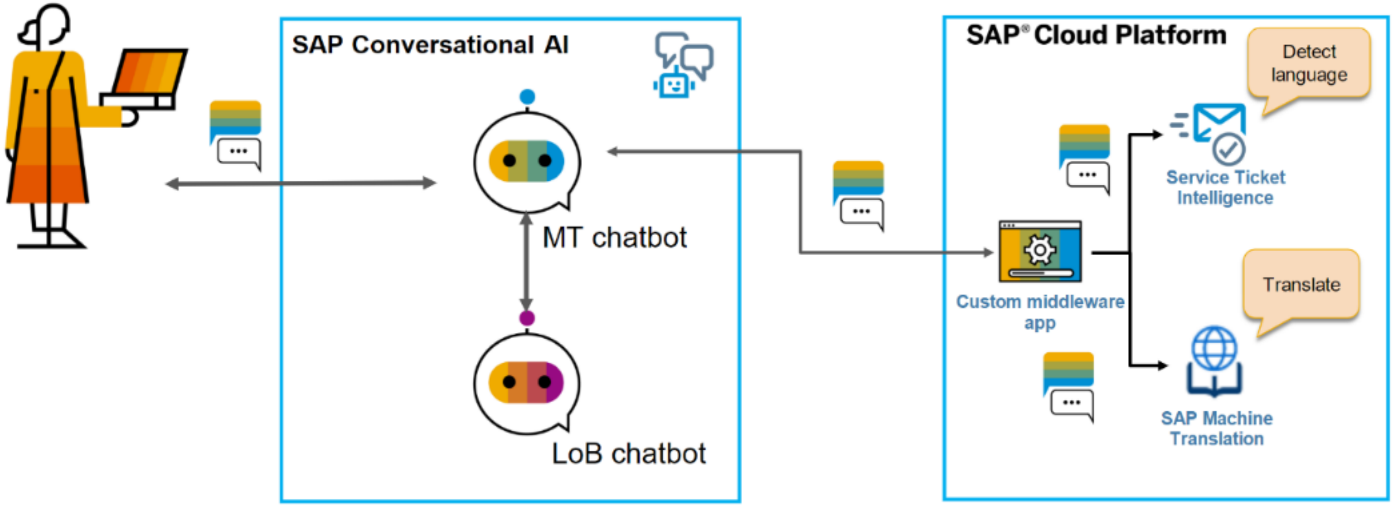


Social Media Analysis

Source: https://techcrunch.com/2019/10/16/live-caption-googles-automatic-captioning-technology-is-now-available-on-pixel-4/

Language Classification





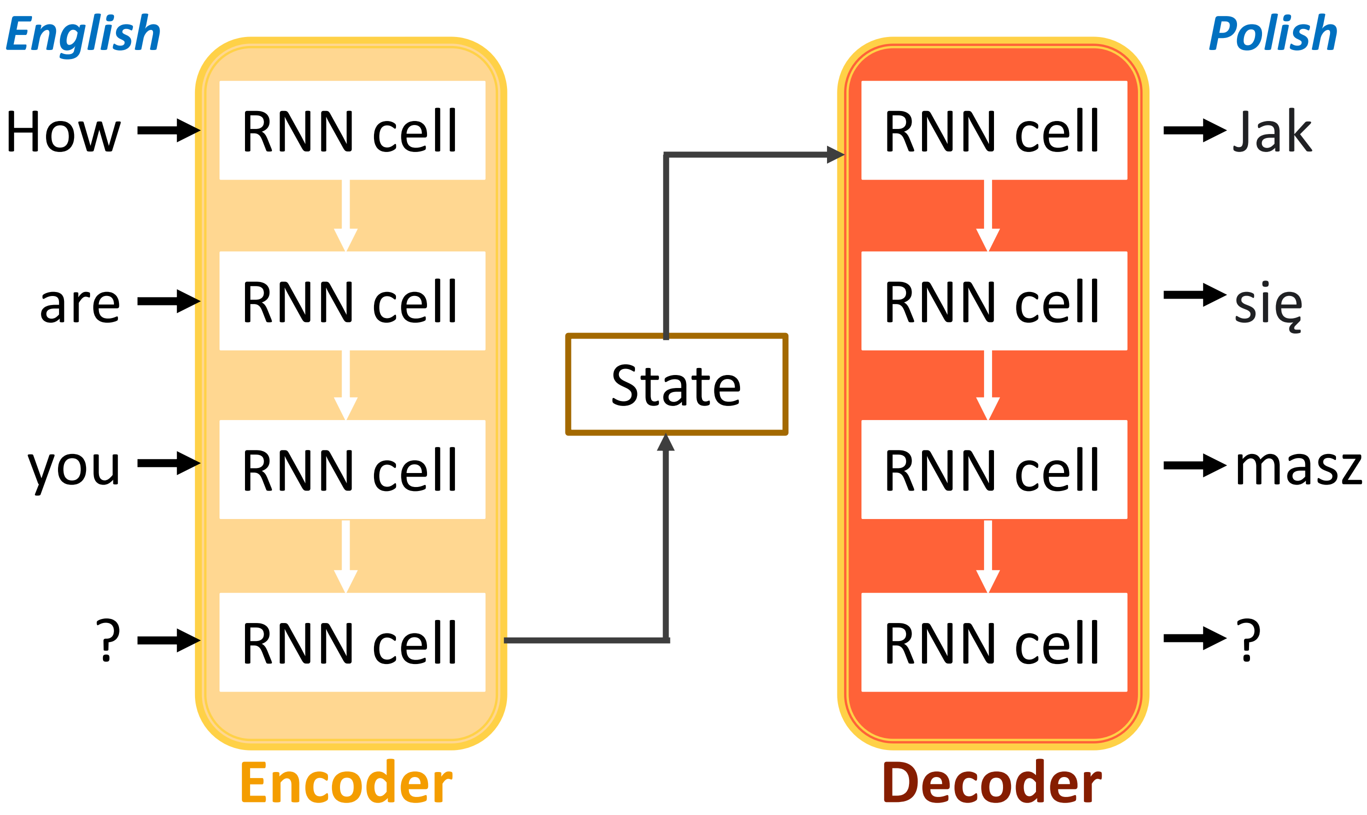
Multilingual Chatbots

Source: https://blogs.sap.com/2020/10/28/how-sap-teams-built-multilingual-chatbots-via-machine-translation-using-sap-translation-hub-and-sap-conversational-ai/

Problems with RNNs

- RNNs involve sequential computation
- Can’t parallelize = time-consuming
- RNNs “forget” past information
- No explicit modeling of long and short-range dependencies

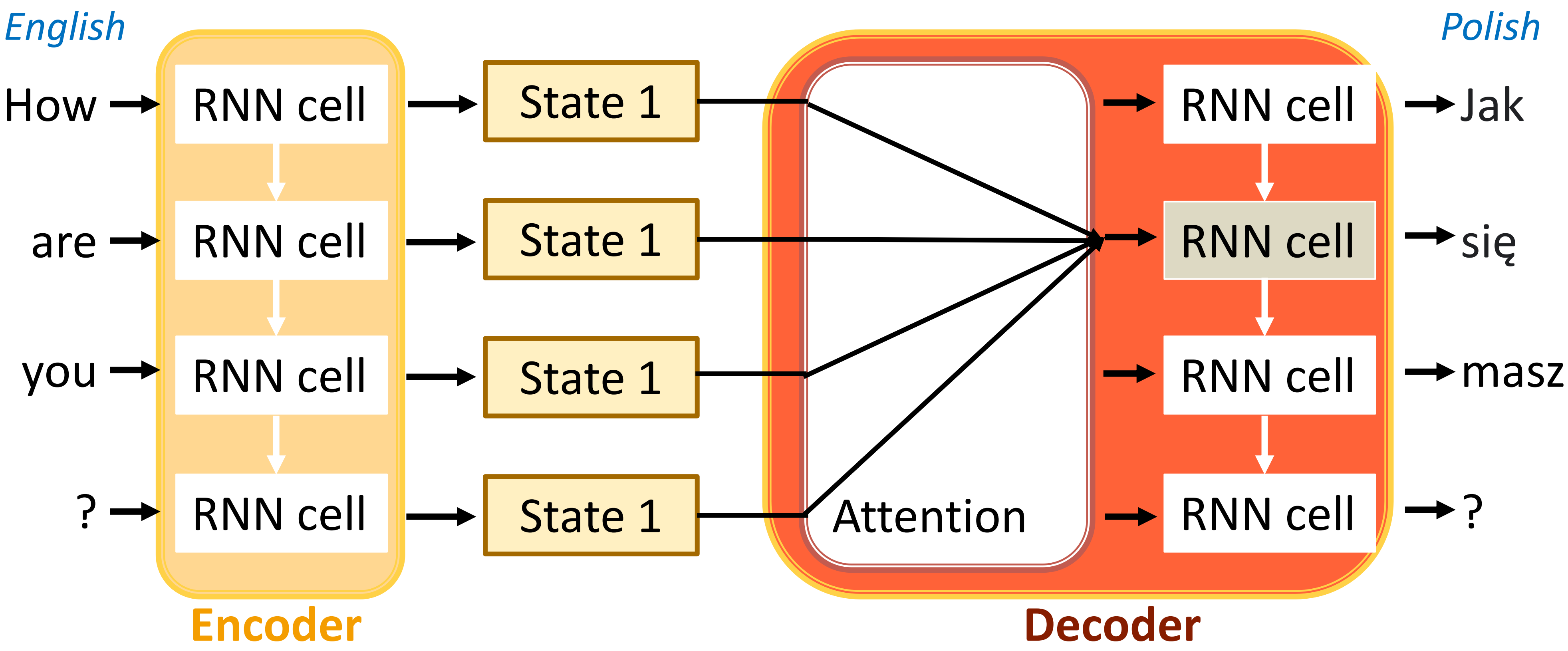
An Encoder-Decoder Architecture with a Pair of RNNs



Limitations:

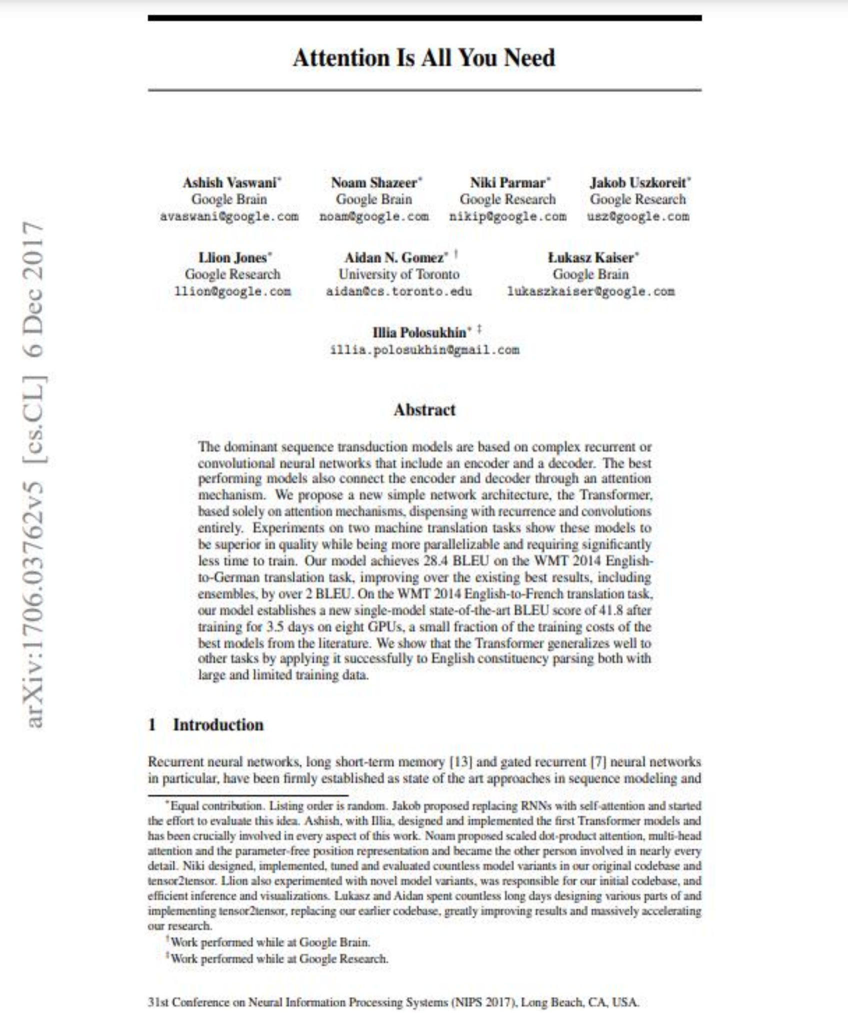
- Final hidden state of the encoder creates an information bottleneck.
- This is especially challenging for long sequences.

Solution: Attention Mechanisms



Main idea: Generate a hidden state at each step rather than having a single hidden state for entire input sequence.

A new modelling paradigm: Transformer



arXiv:1706.03762v5 [cs.CL] 6 Dec 2017

Attention Is All You Need

Ashish Vaswani* Google Brain avaswani@google.com
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Llion Jones* Google Research llion@google.com
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Abstract

The dominant sequence transduction models are based on complex recurrent or convolutional neural networks that include an encoder and a decoder. The best performing models also connect the encoder and decoder through an attention mechanism. We propose a new simple network architecture, the Transformer, based solely on attention mechanisms, dispensing with recurrence and convolutions entirely. Experiments on two machine translation tasks show these models to be superior in quality while being more parallelizable and requiring significantly less time to train. Our model achieves 28.4 BLEU on the WMT 2014 English-to-German translation task, improving over the existing best results, including ensembles, by over 2 BLEU. On the WMT 2014 English-to-French translation task, our model establishes a new single-model state-of-the-art BLEU score of 41.8 after training for 3.5 days on eight GPUs, a small fraction of the training costs of the best models from the literature. We show that the Transformer generalizes well to other tasks by applying it successfully to English constituency parsing both with large and limited training data.

1 Introduction

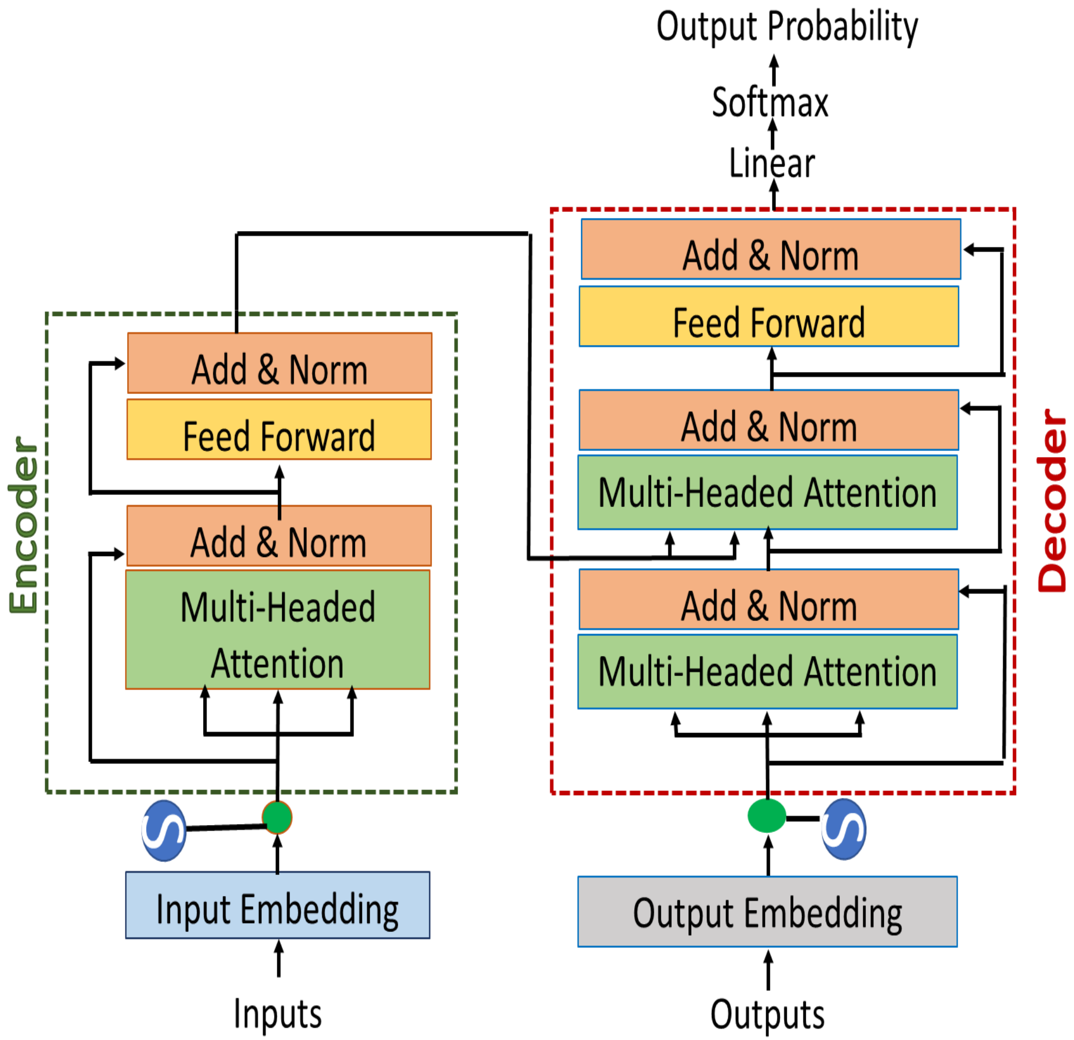
Recurrent neural networks, long short-term memory [13] and gated recurrent [7] neural networks in particular, have been firmly established as state of the art approaches in sequence modeling and

*Equal contribution. Listing order is random. Jakob proposed replacing RNNs with self-attention and started the effort to evaluate this idea. Ashish, with Illia, designed and implemented the first Transformer models and has been crucially involved in every aspect of this work. Noam proposed scaled dot-product attention, multi-head attention and the parameter-free position representation and became the other person involved in nearly every detail. Niki designed, implemented, tuned and evaluated countless model variants in our original codebase and tensor2tensor. Llion also experimented with novel model variants, was responsible for our initial codebase, and efficient inference and visualizations. Lukasz and Aidan spent countless long days designing various parts of and implementing tensor2tensor, replacing our earlier codebase, greatly improving results and massively accelerating our research.

†Work performed while at Google Brain.

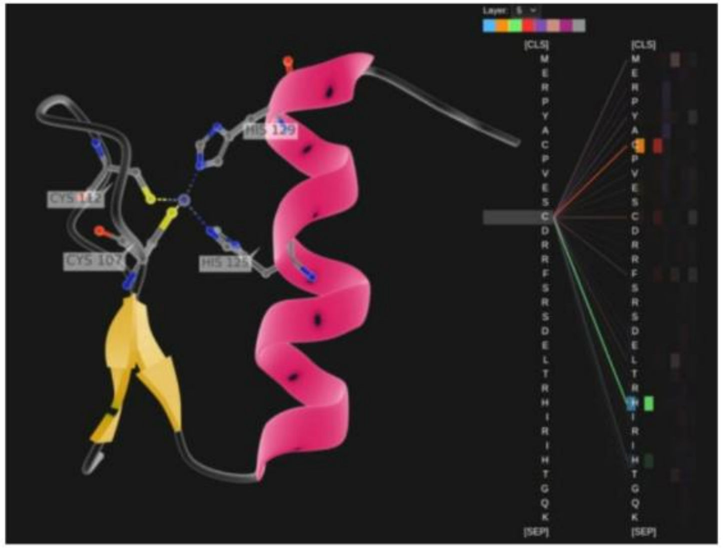
‡Work performed while at Google Research.

31st Conference on Neural Information Processing Systems (NIPS 2017), Long Beach, CA, USA.



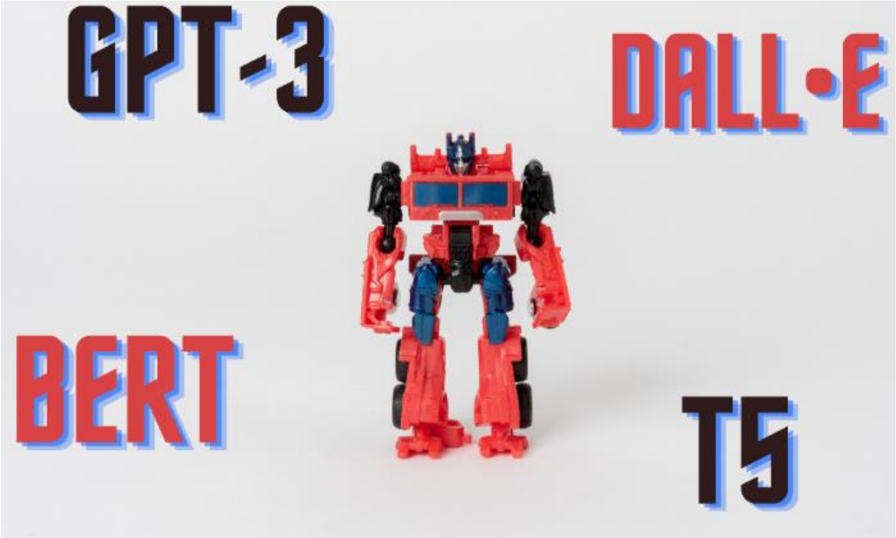
Ref: https://doi.org/10.48550/arXiv.1706.03762.

Applications of Transformer



Protein Sequence

https://blogs.nvidia.com/blog/2022/03/25/what-is-a-transformer-model/



Language Processing

https://daleonai.com/transformers-explained

An Old man playing football

Image Captioning

https://www.leewayhertz.com/vision-transformer-model/

AI is the most disruptive technology for the next decade

Infrastructure: Supercomputing AI Machines

NVIDIA DGX A100 @ 10petaflop

- *NVIDIA A100 Tensor Core GPU with 6,912 CUDA cores and 80GB of high-bandwidth memory (HBM2).*
- *NVIDIA Multi-Instance GPU (MIG) technology, which allows multiple users to share a single GPU*

Hardware Specifications

- Dual AMD EPYC 7003 series processors with up to 64 cores per processor
- Support for PCIe Gen4
- Support for up to 4TB of DDR4 memory

Software Specifications

- Supports various operating systems, including Linux (Red Hat, CentOS, SUSE, Ubuntu, and others) and VMware ESXi
- Supports every Deep Learning framework (Pytorch, TensorFlow, Apache Spark)

i. Advanced DGX2 A100 Supercomputing facilities with high-speed AI servers for accelerated workloads and improved productivity.
ii. Two NVIDIA DGX2 servers with 16 A100 GPUs.
iii. 10 Petaflop computing power for fast processing.

Research:

Some Core Areas

1. Machine Learning & Deep Learning.
2. Computer Vision.
3. Attention Models &Transformers
4. Sequence Modeling
5. Time Series analysis of AI.
6. NLP
7. Brain-Computer Interface.
8. Human-Computer Interface.
9. Generative AI.
10. LLM Finetuning & RAG.

Ongoing work in AI Applications

1. Healthcare applications & Medical Imaging
2. Cardiac & Pulmonary Signal Analysis
3. Biotic & Abiotic Stress Management
4. Assistive Device
5. Image Dehazing
6. Adversarial Attacks
7. Agriculture applications.
8. Civil Engineering for crack identification using computer vision.
9. Robotics applications for inverse kinematics
10. Many disease detection like - Alzheimer's, Many types of cancer, Osteoporosis, Sleep Disorders, Retinal Diseases, Brain Tumor……

[redacted]

Some of Our Collaborators

Government Organizations

- CSIR-National Physical Laboratory (NPL India, National Metrology Institute)
- King George's Medical University, Uttar Pradesh, Lucknow, India
- संजय गांधी स्नातकोत्तर आयुर्विज्ञान संस्थान
- All India Institute of Medical Sciences - Kalyani
- All India Institute of Medical Sciences Gorakhpur
- भा.कृ.अनु.प. राष्ट्रीय जैविक स्ट्रैस प्रबंधन संस्थान — ICAR-National Institute of Biotic Stress Management (Indian Council of Agricultural Research), Department of Agricultural Research and Education, Ministry of Agriculture and Farmers Welfare, Gover
- CSIR — The Innovation Engine of India
- CBRI — Central Building Research Institute, Roorkee
- ICMR — Indian Council of Medical Research, New Delhi
- NIE — National Institute of Epidemiology

International Collaborators

- Brno University of Technology
- Universidad de Las Palmas de Gran Canaria
- Universitat de València
- Tamkang University
- NTNU — Norwegian University of Science and Technology
- University of Ljubljana

Industry

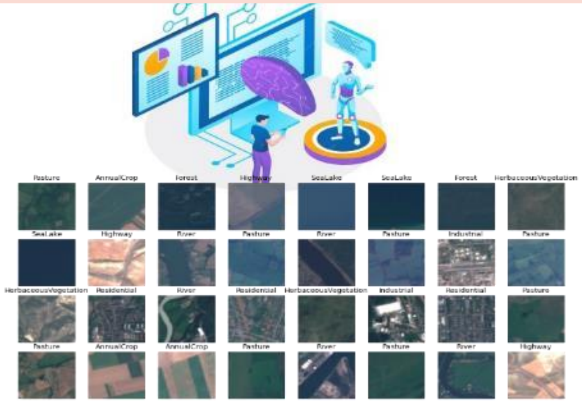
- DELSYS® — Wearable Sensors for Movement Sciences
- THALES — Building a future we can all trust
- SAMSUNG
- SAMSUNG DISPLAY
- GlobalLogic® — A Hitachi Group Company
- Coforge

AMITY UNIVERSITY

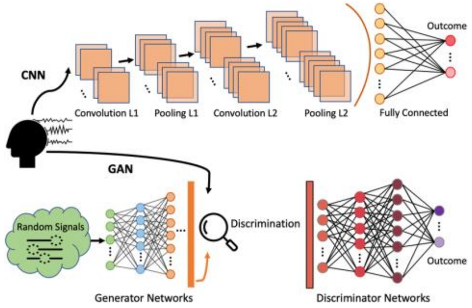
AMITY CENTRE FOR ARTIFICIAL INTELLIGENCE

Data Domains for Artificial Intelligence-based Analysis

Image Data

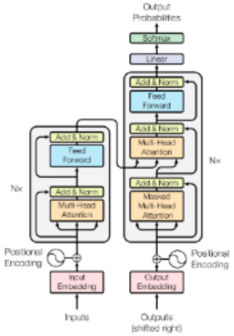


Convolutional Neural network (CNN), Generative Adversarial Network (GAN), Vision Transformer, Diffusion Models



Time Series/Text Data

Recurrent Neural Networks, Transformer, Attention Models, Large Language Models, LSTM, Natural Language Processing



Tabular Data

Gradient Boosting Models, RapidsAI, CuPy, Artificial Neural Networks, Attention Methods, ML classifiers and regressors

StatsModels Statistics in Python · Seaborn · pandas · xarray · scikit-learn · scikit-image · CuPy · NumPy · SciPy · matplotlib · jupyter · python · IPython

Selected Works : AI based Computer Vision Problems – Deep Vision

Digital Fundus Image

Detection and Segmentation of Retinal Diseases

Normal Camera Image

Detection of Cracks in Buildings

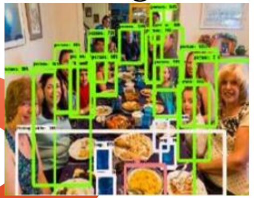
USG Image of Ovary

Detection of Polycystic Ovary Syndrome

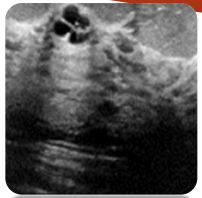
AI

Convolutional Neural Networks, Vision Transformers, Transfer Learning, Attention Modules, Capsule Neural Networks, Generative Adversarial Networks (GANs), Object detection models

Normal RGB Images



Object Detection



Detection of Breast Cancer

USG images

Detection of Osteoporosis

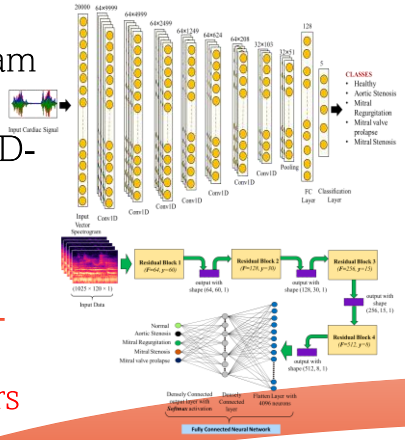
Knee X-Ray Images

Detection of Covid-19

Chest X-Ray Images

AI based Signal / Time Series Analysis

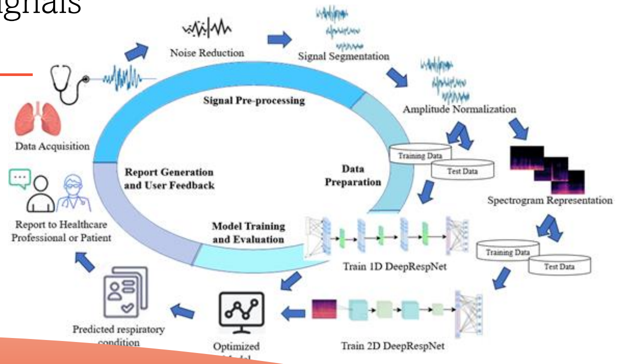
- PCG Phonocardiogram (20-200 Hz).
- Spectrogram (2D-CNN)



Detection of Cardiac Disorders

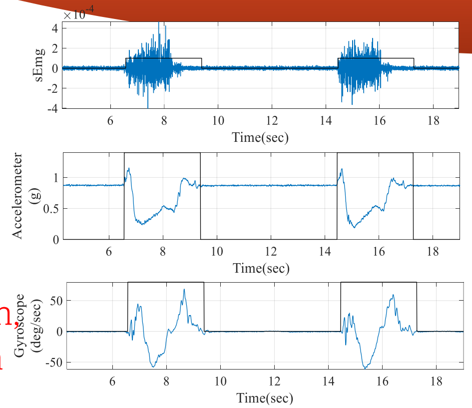
- Respiratory Signals
- Spectrogram

Classification of Respiratory Sounds



Deep Neural Network, Attention modules, ML classifiers, 1D and 2D convolutional Neural Networks

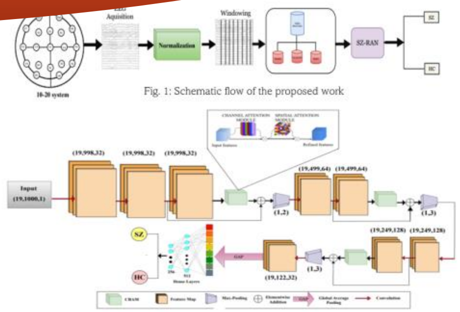
Electromyogram (EMG), Accelerometer, Gyroscope



Hand gesture Recognition 100 signing gestures from Indian Sign Language

- EEG Signals
- Scalogram

Schizophrenia detection system



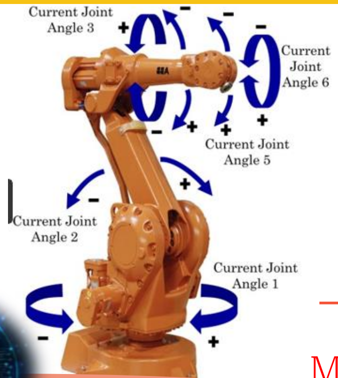
AI based Informatics / Tabular Data / CSV data

Socio Demographic Characteristics and Cytokine Genetic Parameters

Socio-Demographic Characteristics
- Age (in Years)
- Place of Residence
- Educational Status
- Socio-economic status
- Parity
- Menstrual Cycle
- Use of Contraception
- Smoking

Histopathological Parameters
- HR-HPV
- IL-6-597G/A
- IL-1 β-511C/T
- TNF-α-308G/A
- IL-1RN (86bp VNTR)

Prediction of Cervical Cancer

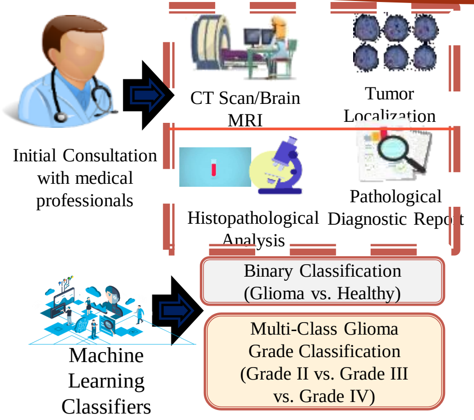


Six current joint angles, desired end effector position in cartesian space (x, y, and z coordinates), & desired end effector orientation (Yaw, Pitch, & Roll angles).

Optimized Inverse Kinematics Modeling and Joint Angle Prediction

LSTM models, ML classifiers, ML Regressors, BERT models

Histopathological Biomarkers



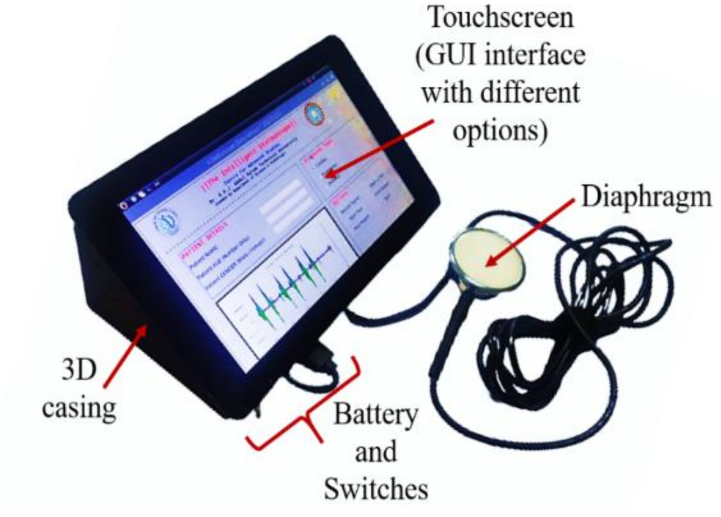
Detection of Prediction of Glioma

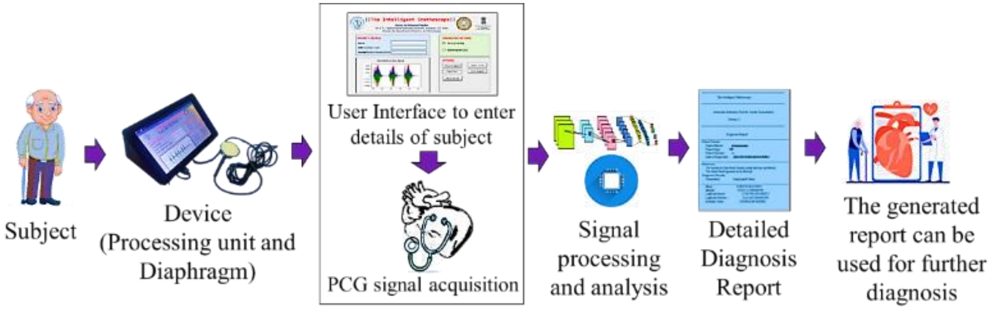
Statistical features derived from EMG signals

Hand gesture Recognition

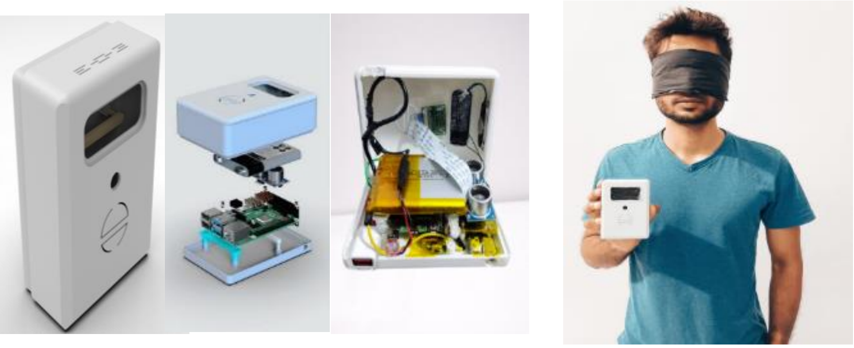
AI Models Deployed to make a Stand-Alone Device

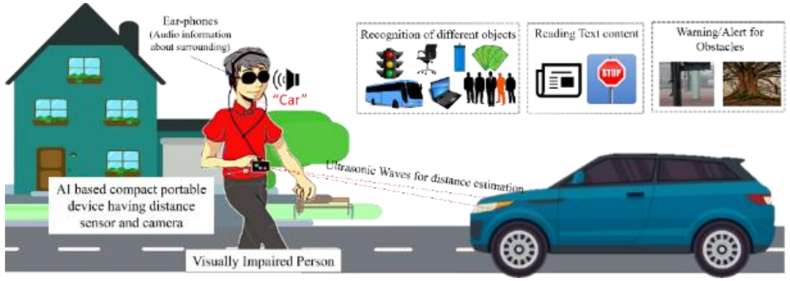
AI-CardioCare: Artificial Intelligence based Device for Cardiac Health Monitoring





AI-SenseVision: Artificial Intelligence-based Assistance for Visually Impaired People



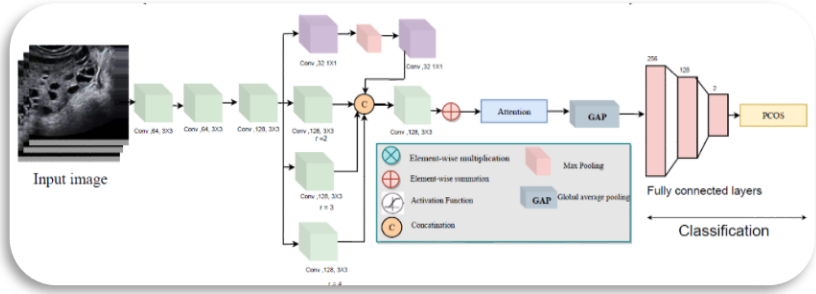


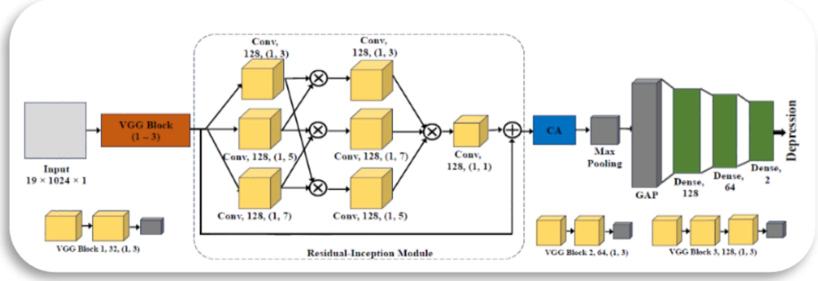
AI based Assistive device for Hearing impaired.

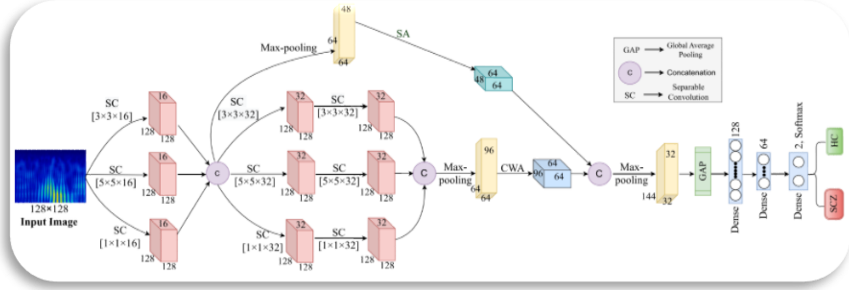
Low frequency signals from Accelerometer, Gyroscope. Models Used : Deep Learning, Time Series Deep Neural network (TSDNN). Application : Hand gesture Recognition, 100 signing gestures from Indian Sign Language.

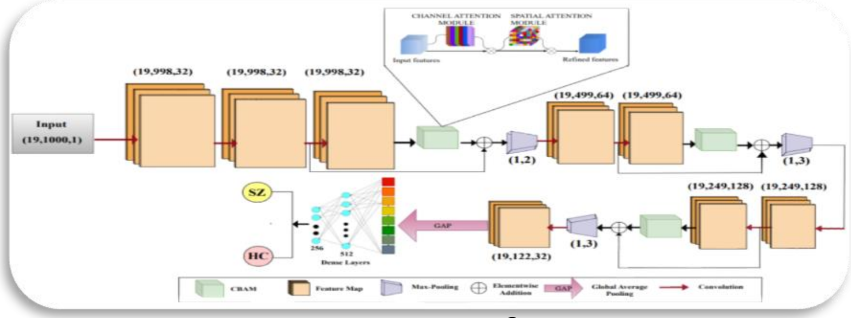
AI Architectures Developed

ALSD-Net	"ALSD-Net: Automatic Lung sounds Diagnosis Network from Pulmonary Signals" Neural Computing and Applications, DOI: 10.1007/s00521-021-06302-1, 2021, Springer Nature Publishers, SCI indexed impact factor 6.0.
SLINet	"SLINet: Dysphasia Detection in Children using Deep Neural Network" Biomedical Signal Processing and Control, Elsevier Publisher, DOI : doi.org/10.1016/j.bspc.2021.102798, Volume 68, July 2021, 102798. SCI indexed Impact Factor – 5.1.
1D-FHRNet	"1D-FHRNet: Automatic Diagnosis of Fetal Acidosis from Fetal Heart Rate Signals", Detection in Children using Deep Neural Network" Biomedical Signal Processing and Control, Elsevier Publisher, doi.org/10.1016/j.bspc.2021.102794, 2022, SCI indexed Impact Factor – 5.1
VirLeafNet	"VirLeafNet: Automatic Analysis and Viral Disease Diagnosis Using Deep-Learning in Vigna Mungo Plant" Ecological Informatics, doi.org/10.1016/j.ecoinf.2020.101197, 2020, Elsevier Publishers, SCI indexed Impact Factor – 5.1.
MSAN-Net	Multi-scale Attention Network for Early Detection of Alzheimer's Disease from MRI images" 15th International Congress on Ultra Modern Telecommunications and Control Systems and Workshops (ICUMT), 2023, Belgium, Publisher: IEEE Xplore Digital Library..
Cardi-Net	"Cardi-Net: A Deep Neural Network for classification of Cardiac disease using Phonocardiogram Signal" , Computer Methods and Programs in Biomedicine, Elsevier Publishers, doi.org/10.1016/j.cmpb.2022.106727, 2022, SCI indexed Impact Factor – 6.1.
Osteo-Net	"Osteo-Net: A Robust Deep Learning-Based Diagnosis of Osteoporosis Using X-ray images," 2022 45th International Conference on Telecommunications and Signal Processing (TSP), 2022, pp. 91-95, Publisher: IEEE Xplore Digital Library, doi: 10.1109/TSP55681.2022.9851342.
DeepRespNet	"DeepRespNet: A Deep Neural Network for Classification of Respiratory Sounds" Biomedical Signal Processing and Control, Elsevier Publishers, DOI: doi.org/10.1016/j.bspc.2024.106191, 2024, SCI indexed Impact Factor - 5.1.



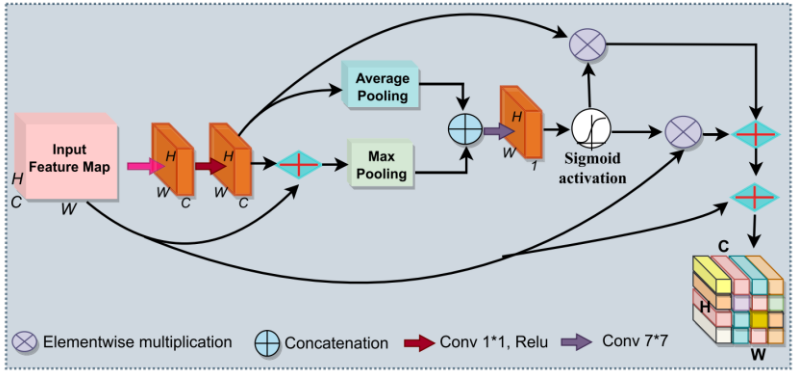


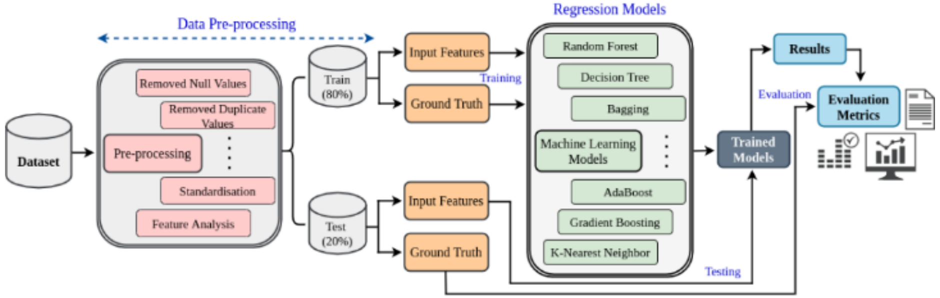


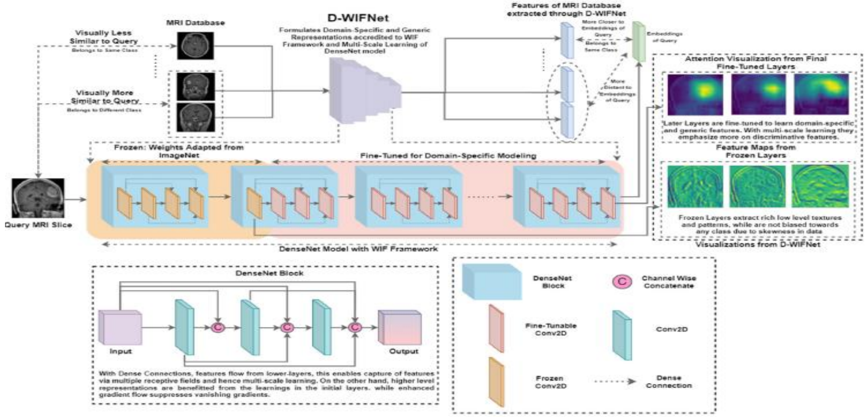


AI Architectures Developed

VisionCervix	"VisionCervix: Papanicolaou Cervical Smears Classification Using Novel CNN-Vision Ensemble Approach" Biomedical Signal Processing and Control, Elsevier Publishers, doi.org/10.1016/j.bspc.2022.104156, 2022, SCI indexed Impact Factor - 5.1.
EyeDeep-Net	"EyeDeep-Net: a multi-class diagnosis of retinal diseases using deep neural network" Neural Computing & Applications, Springer Verlag Publishers, DOI: doi.org/10.1007/s00521-023-08249-x, 2023, SCI indexed Impact Factor – 6.0.
MacD-Net	"MacD-Net: An Automatic Guided Ensemble Approach for Macular Pathology Detection using Optical Coherence Tomography Images" International Journal of Imaging Systems and Technology, Wiley Publishers, DOI: 10.1002/IMA.22954, 2023, SCI indexed, Impact Factor 3.3.
Microcell-Net	"Microcell-Net: A deep neural network for multi-class classification of microscopic blood cell images" Expert Systems, Wiley Publishers, DOI: https://doi.org/10.1111/exsy.13295, 2023, SCI indexed Impact factor – 3.3.
FCCS-Net	"FCCS-Net: Breast Cancer Classification Using Multi-Level Fully Convolutional-Channel and Spatial Attention-based Transfer Learning Approach" Biomedical Signal Processing and Control, Elsevier Publishers, DOI: 10.1016/j.bspc.2024.106258, SCI indexed Impact Factor - 5.1.
VisionDeep-AI	"VisionDeep-AI: Deep Learning-based Retinal Blood Vessels Segmentation and Multi-class Classification Framework for Eye Diagnosis"- Biomedical Signal Processing and Control, Elsevier Publishers, https://doi.org/10.1016/j.bspc.2024.106273, SCI indexed Impact Factor - 5.1.
AI-SenseVision	"AI-SenseVision: A Low-cost Artificial Intelligence-based Robust and Real-time Assistance for Visually Impaired People" IEEE Transactions on Human-Machine Systems, DOI: 10.1109/THMS.2024.3375655, 2024, SCI indexed Impact Factor – 3.6.
EMViT-Net	"EMViT-Net: A novel transformer-based network utilizing CNN and multilayer perceptron for the classification of environmental microorganisms using microscopic images" Ecological Informatics, DOI: https://doi.org/10.1016/ j.ecoinf.2023.102451, December 2023, Elsevier Publishers, SCI indexed Impact Factor : 5.1.



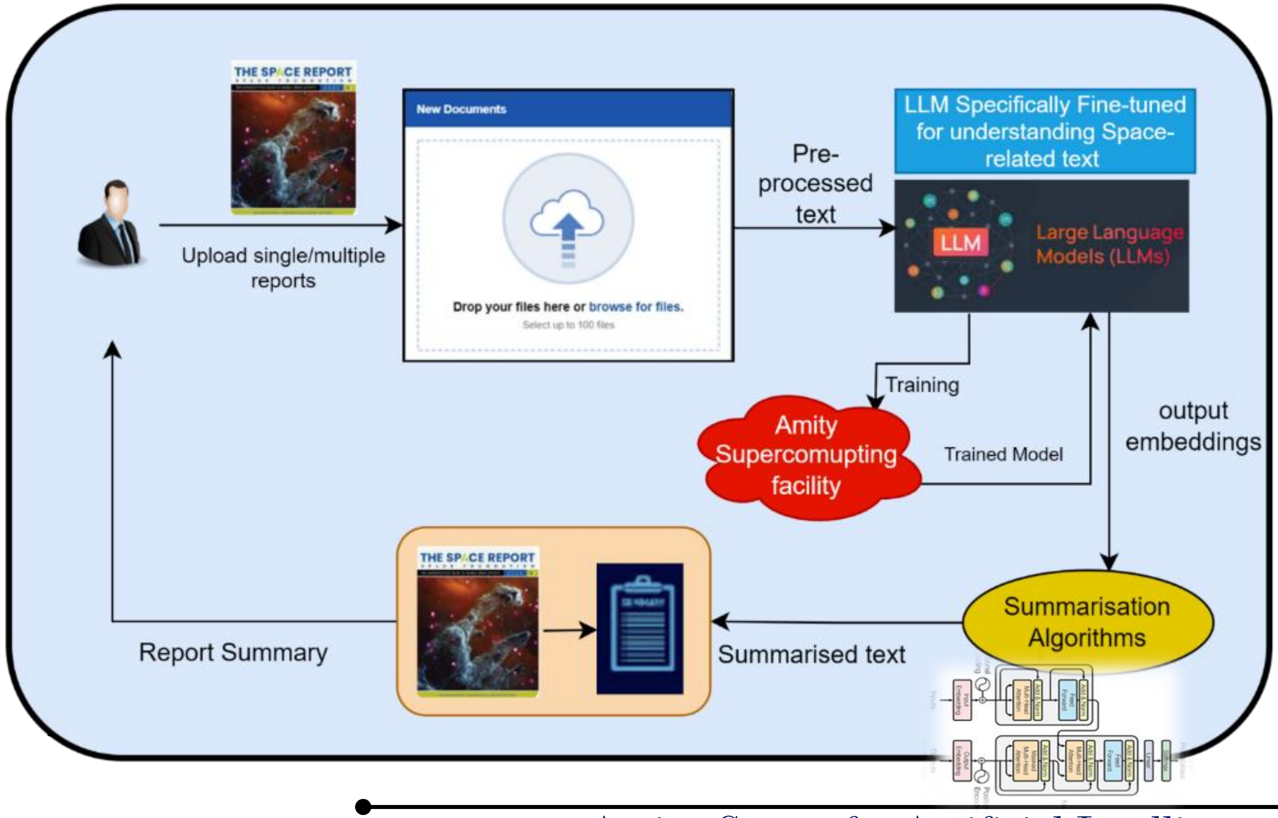




Automatic Summarization of Space Mission Reports/Scientific Documents Using Large Language Models

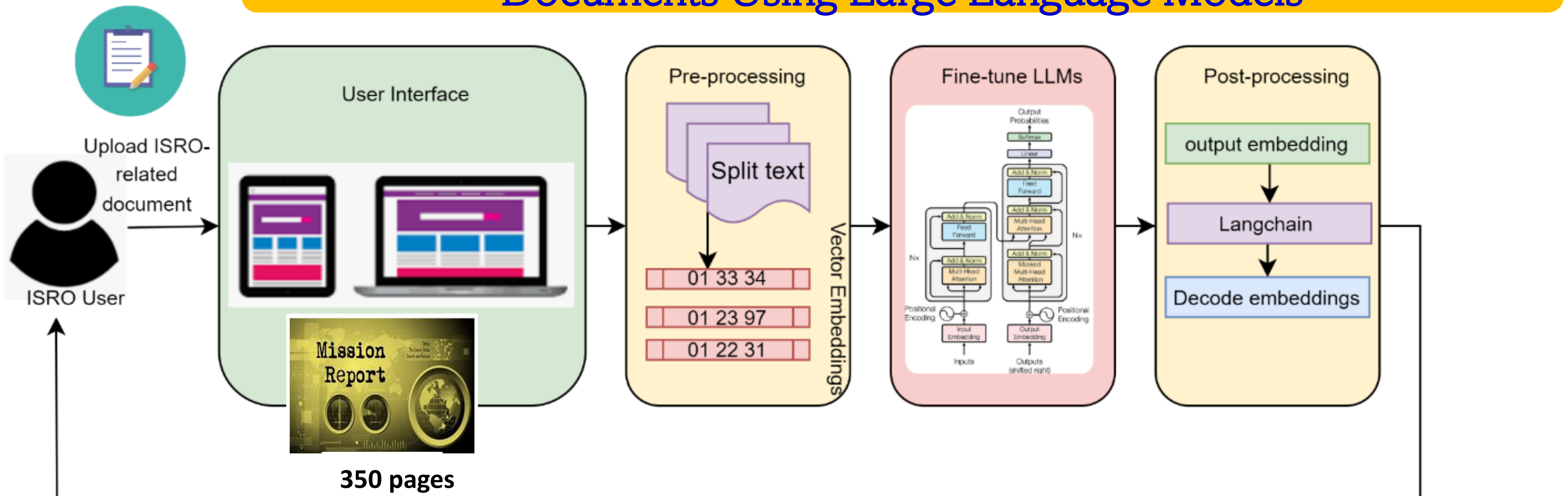
Objective:

- Develop Language Model (LLM)-based algorithms for summarizing space mission reports, logs, and telemetry data.
- Provide concise and informative summaries for mission control and decision-makers.



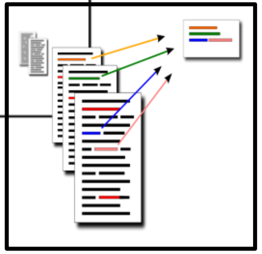
LLM-based Algorithms	Utilize advanced **natural language processing techniques** with models like Transformers and **Retrieval-augmented Generation (RAG)**.
Automatic Summarization	Develop algorithms employing **LangChain** and **Transformer-based** approaches for automated summarization.
Informative Summaries	Generate summaries containing crucial mission details, findings, and anomalies.
Scalable Solution	Implement a **scalable system** integrated with vector databases to process **large volumes of mission data** efficiently.

Automatic Summarization of Space Mission Reports/Scientific Documents Using Large Language Models



summarised text report

ISRO is India's premier space agency, leading in space exploration.
Its achievements include successful satellite launches for various purposes.
The Mars Orbiter Mission made India the fourth space agency to reach Mars orbit.
Chandrayaan missions have explored the moon, confirming the presence of water molecules.
ISRO's Indian Regional Navigation Satellite System (IRNSS) provides accurate positioning and timing information.
International collaborations enhance ISRO's capabilities and foster cooperation in space endeavors.



Models/Technologies

Transformers:
- Leveraging pre-trained language models such as BERT, GPT, and T5 for text processing and summarization.

Retrieval-augmented Generation (RAG):
- To enhance the quality and relevance of generated summaries.

LangChain:
- for seamless integration of language models into summarization algorithms.

Vector Databases:
- Utilize Chroma, Faiss, and Qdrant for efficient storage and retrieval of mission data.

Expected Outcomes:
- Development of robust LLM-based algorithms for automatic summarization of space mission reports.
- Provision of concise and informative summaries to aid mission control and decision-makers.

Potential Impact:
- Facilitates quick and informed decision-making during space missions.
- Enhances efficiency and productivity in mission control operations.

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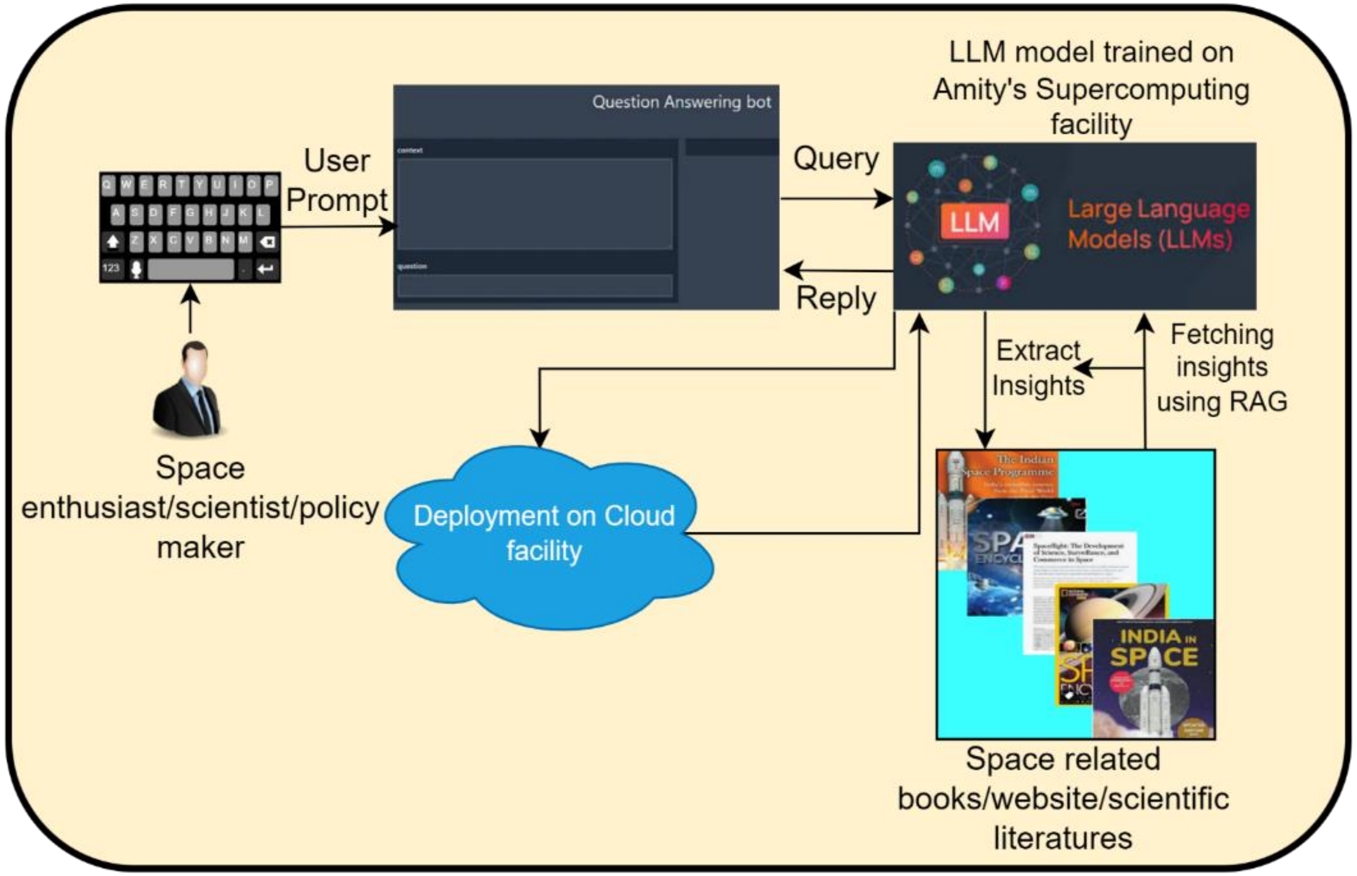
SpaceGPT: Space Knowledge Unlocked: Unraveling Insights from Scientific Literature of Space Explorations Using Large Language Models

Objective: Develop an AI system leveraging advanced NLP techniques to extract insights from vast scientific literature on Space exploration.



- Extract key insights from research papers, mission data, websites and e-books on space exploration.
- Capable of processing large volumes of text data related to space exploration from diverse sources.
- User-Friendly Interface

Key Features

Models/Technologies

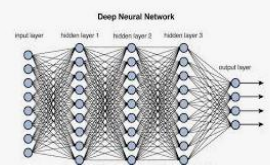
Transformers, Retrieval-augmented generation (RAG), LangChain, Vector databases (Chroma, Faiss, and Qdrant), Streamlit/Gradio/FastAPI for interactive app development.

HUGGING FACE

Llama 3

LangChain

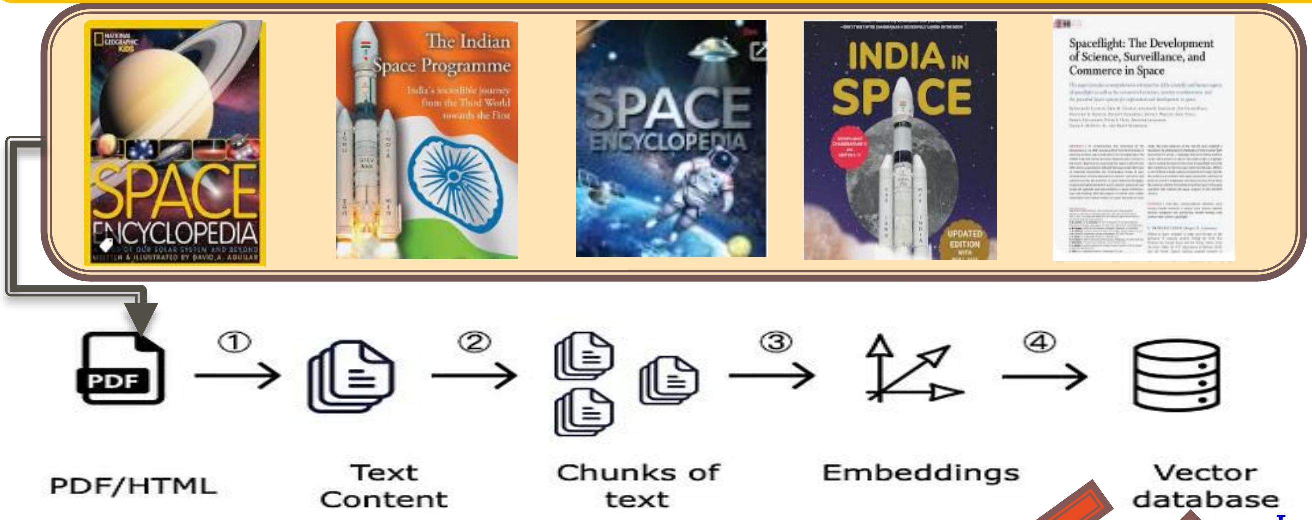
Retrieval Augmented Generation



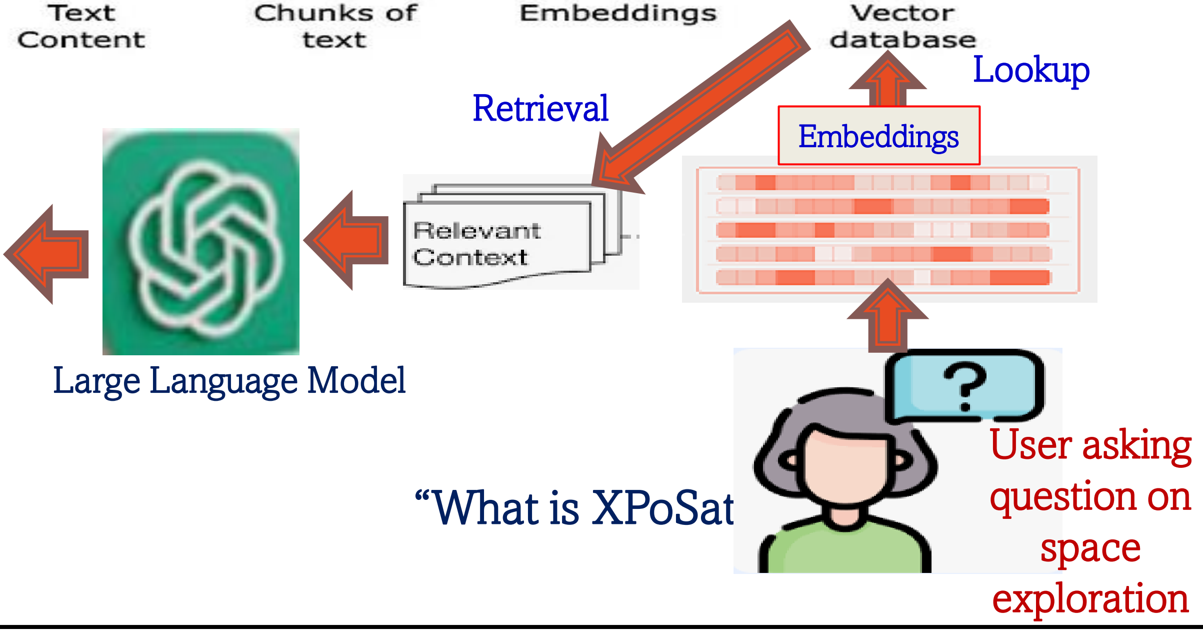
FAISS
Scalable Search With Facebook AI

Streamlit

SpaceGPT: Space Knowledge Unlocked: Unraveling Insights from Scientific Literature of Space Explorations Using Large Language Models



XPoSat (X-ray Polarimeter Satellite) is the first dedicated scientific satellite from ISRO to carry out research in space-based polarization measurements of X-ray emission from celestial sources.



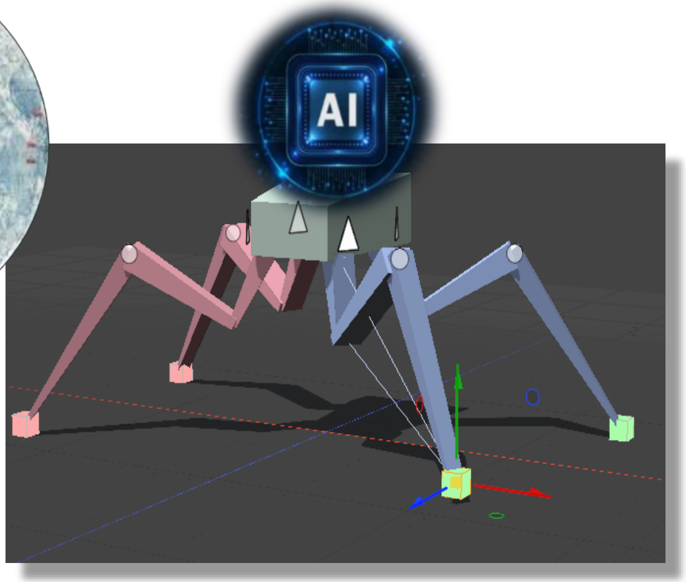
Expected Outcomes:

- Robust AI system extracting insights from space exploration literature.
- Enhanced accessibility of knowledge for researchers, policymakers, and space agencies.

Potential Impact:

- Informed decision-making for future space missions.
- Collaboration and knowledge sharing among researchers and institutions.
- Advancements in space exploration technology and scientific understanding of space environments.

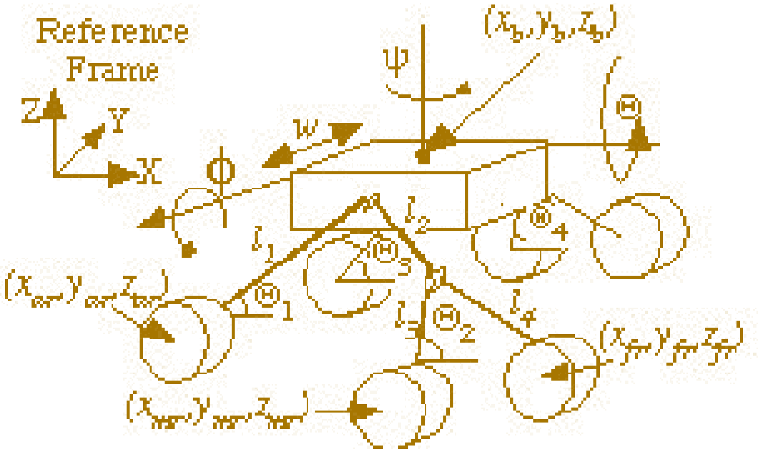
AI-Driven Optimization for Space Exploration: Enhancing Rover Kinematics and Lunar Landing Site Characterization



Optimizing rover kinematics in space exploration involves inverse kinematics, trajectory planning, obstacle avoidance, and terrain mapping, utilizing machine learning and deep learning techniques for efficiency and adaptability. Moreover, AI is essential for analyzing data from lunar orbiters and rovers to assess potential Moon landing sites, prioritizing safety and resource accessibility for upcoming missions.

Key Features:

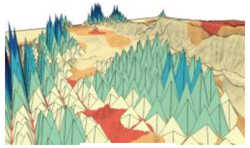
- Utilize ML algorithms for precise rover navigation via terrain mapping and obstacle avoidance.
- Develop predictive models for adaptable rover movements based on environmental conditions.
- Implement reinforcement learning for safer rover behavior in uncertain environments.
- Explore deep neural networks for real-time obstacle detection and decision-making.



Datasets: Terrain Mapping Data, Rover Camera Feeds, sensor data (Camera, Lidar etc.)

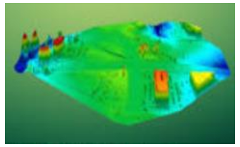
AI-Driven Optimization for Space Exploration: Enhancing Rover Kinematics and Lunar Landing Site Characterization

Phase1:



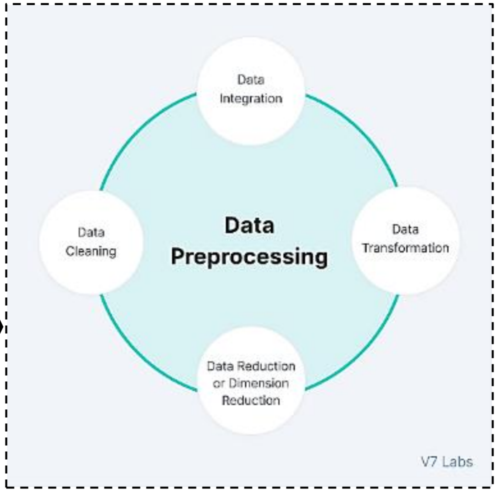
Terrain Mapping Data

Rover Camera Feeds

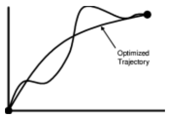


Sensor Data: LiDAR, IR, and telemetry data

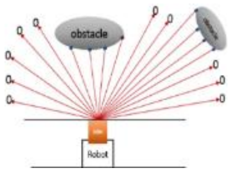
Data Collection



Sensor data integration and data pre-processing



Trajectory Optimization

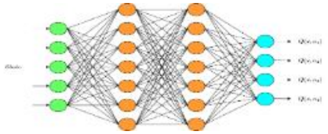


Obstacle Detection

Adaptive Behavior in dynamic and uncertain environments.

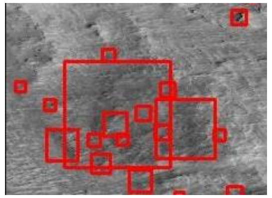
Machine learning, reinforcement learning

Deep learning, object detection models



deep Q-networks or proximal policy optimization

Model Selection and Model Training



Model Evaluation

Model Deployment onto the rover's onboard systems

Models/Technologies: Machine Learning Algorithms, Deep Neural Networks, Reinforcement Learning Techniques, Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Transformers etc.

AI-Driven Optimization for Space Exploration: Enhancing Rover Kinematics and Lunar Landing Site Characterization

Phase1:

Challenges addressed through proposed work

Dynamic Environments:

Space conditions are unpredictable, requiring rovers to adapt to changing terrain and obstacles.

Limited Resources:

Rovers have finite computing power, necessitating lightweight algorithms for efficient navigation.

Data Variability:

Sensor data may be noisy, requiring robust preprocessing and augmentation techniques.

Generalization:

Models must generalize to diverse environments encountered during missions.

Real-Time Performance:

Rovers need quick decision-making capabilities for safe navigation.

Interpretability:

Understanding AI decisions is vital for mission safety and trust.

Expected Outcomes:

- AI-driven advancements in rover kinematics will lead to improved navigation accuracy, enabling safer and more efficient exploration of space environments.
- Enhanced Adaptability: Machine learning and deep learning techniques will enhance rover adaptability in dynamic and uncertain environments, ensuring mission success in challenging conditions.

Potential Impact:

- Mission Success: AI-driven advancements in rover kinematics will contribute to mission success by enabling precise navigation and obstacle avoidance in space exploration missions.
- Efficient Resource Utilization: Optimized rover movements and adaptive behavior will lead to more efficient resource utilization, reducing mission costs and enhancing overall mission effectiveness.

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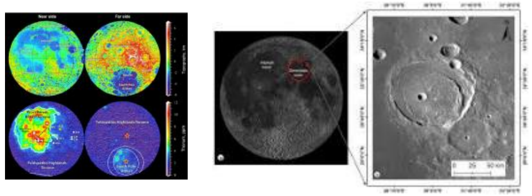
AI-Driven Optimization for Space Exploration: Enhancing Rover Kinematics and Lunar Landing Site Characterization

Phase 2:

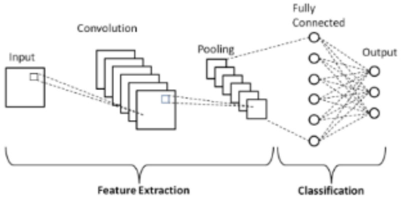
Lunar orbiters and rovers



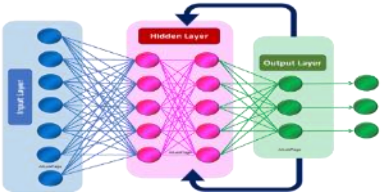
images, terrain maps, mineral composition, and radiation levels

Data Collection

Deep Neural Network

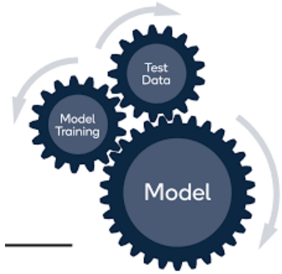


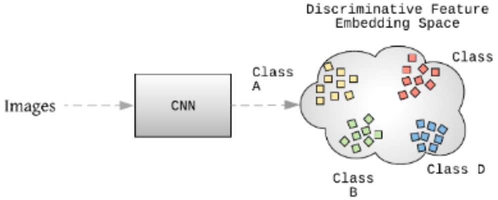
Recurrent Neural Networks



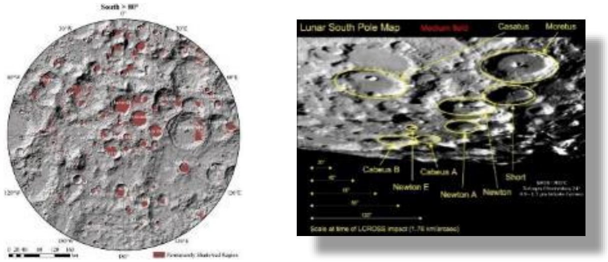
Feature Extraction

(Terrain ruggedness, mineral distribution, presence of water ice, and other geological characteristics.)





Model Training and Validation



Safety criteria

(low slope, stable terrain, absence of hazardous obstacles, and minimal surface hazards)

Resource availability criteria

(presence of water ice, minerals, and other resources)

Site Classification

Possible Outcomes

- AI analysis facilitates the identification of safe landing sites by pinpointing areas with low slope, minimal surface hazards, and stable terrain, ensuring safe landings.
- Analysis of mineral composition and water ice distribution uncovers resource-rich landing sites, optimizing mission planning and enhancing the success of lunar missions through data-driven decision-making.

STUDENT INNOVATORS @ ACAI

AMITY UNIVERSITY

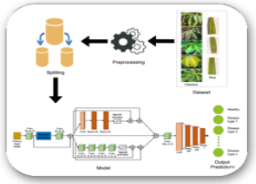
AMITY CENTRE FOR ARTIFICIAL INTELLIGENCE

STUDENT INNOVATIONS

Deep Learning and computer vision for Plant Disease Identification

Rashi Chauhan
B.Tech Student (2021-25)
Amity School of Engineering & Technology

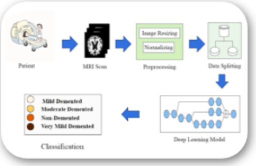
Area: Computer Vision, Deep Learning



Multi-scale Attention Network for Early Detection of Alzheimer's Disease from MRI images

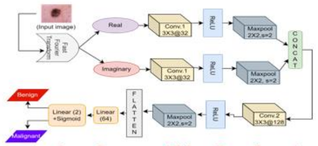
Vaishali Aggarwal
B.Tech Student (2021-25)
Amity School of Engineering & Technology

Area: Computer Vision, Deep Learning



Skin cancer Classification using Convolution Neural Network Fortified with Fast Fourier Transform

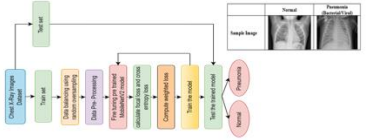
Ambica Pradhan
B.Tech Student (2022-2026)
Amity School of Engineering & Technology



Area: Computer Vision, Deep Learning

Combining Focal loss with Cross-entropy loss for Pneumonia Classification with a Weighted Sampling Approach

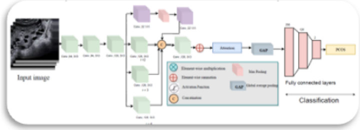
Parth Thirwani
B.Tech Student (2022-26)
Amity School of Engineering & Technology



Area: Computer Vision, Deep Learning

Attention-based Multi-scale Deep Neural Network for Diagnosis of Polycystic Ovary Syndrome from USG Images

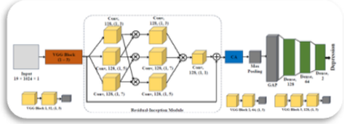
Suzain Rashid
B.Tech Student (2021-25)
Amity School of Engineering & Technology



Area: Computer Vision, Deep Learning

Attention-based VGG-Residual-Inception Module for EEG-Based Depression Detection

Gautam Verma,
B.Tech Student (2020-24)
Amity School of Engineering & Technology

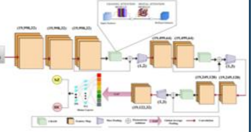


Area: Time Series, Deep Learning

A residual attention based Deep Neural Networks for Schizophrenia detection using EEG signals

Sunidhi Singh
B.Tech Student (2020-24)
Amity School of Engineering & Technology

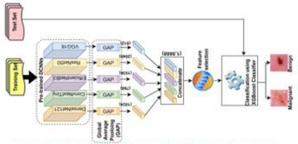
Srishti Singh
B.Tech Student (2020-24)
Amity School of Engineering & Technology



Area: Time Series, Deep Learning

Skin Lesion Classification using Deep Feature Fusion and Selection Using XGBoost Classifier

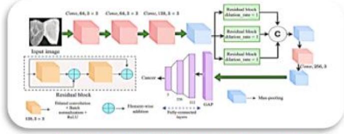
Anant Krisn Bais
Integrated Bachelors and Masters, Biotechnology (2019 – 2024)
Amity Institute of Biotechnology



Area: Computer Vision, Deep Learning

Dilated Multi-scale Residual Block-based Deep Network for Detection of Breast Cancer from MRI Images

Himanshi Sinha
B.Tech Student (2021-2025)
Amity School of Engineering & Technology



Area: Computer Vision, Deep Learning

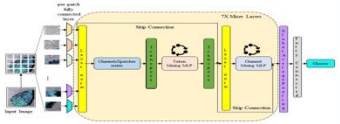
Multi-Head Attention-Based Transfer Learning Approach for Plant Disease Detection

Rudra Shaurya
B.Tech Student (2021-25)
Amity School of Engineering & Technology

Area: Computer Vision, Transfer Learning

A Lightweight Meta-Ensemble Approach for Plant Disease Detection Suitable for IoT-based Environments

Lucky Rajput
M.Tech Student (2022-24)
Amity School of Engineering & Technology

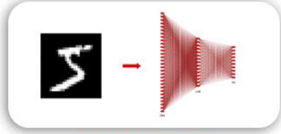


AI in Plant Pathology

Area: Deep Learning, IoT

Enhancing Deep Neural Network Convergence and Performance: A Hybrid Activation Function Approach by Combining ReLU and ELU Activation

Divyam Aggarwal
B.Tech. Student (2022-26)
Amity School of Engineering & Technology

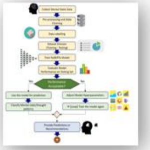


Area: Deep Learning

Leveraging Transformers for Early Detection of Depression Tendency in Textual Data

Srishti Verma
B.Tech Student (2021-25)
Amity Institute of Biotechnology

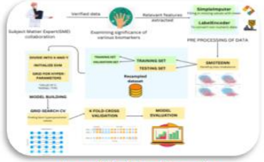
Vishal
B.Tech Student (2021-25)
Amity Institute of Biotechnology



Area: Machine Learning

Machine Learning Pipeline for Multi-Grade Classification in Pancreatic Cancer Detection Using Urinary Biomarkers

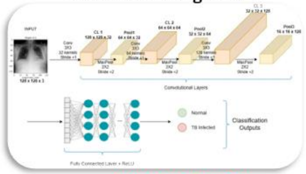
Pragya Pandey
B.Tech Student (2020-24)
Amity School of Engineering & Technology



Area: Machine Learning

Optimized TBNet: Building a Robust Neural Network for Precise Tuberculosis Diagnosis

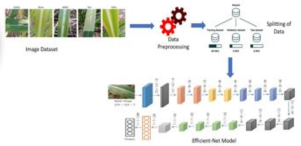
Avaneesh Garg
B.Tech. Student (2022-26)
Amity School of Engineering & Technology



Area: Deep Learning

CaneGuard: A Cutting-Edge Approach to Sugarcane Leaf Disease Classification!

Siddharth Sharma & Divyan Tiwari
B.Tech. Student (2022-26)
Amity School of Engineering & Technology

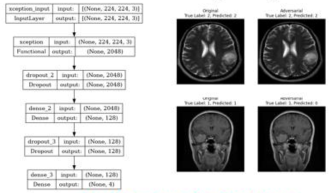


Area: Deep Learning

STUDENT INNOVATIONS

Adversarial Defence against DeepFake attacks in Medical Image Analysis

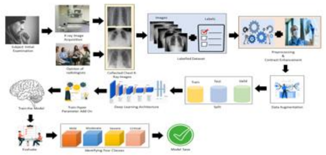
Ambica Pradhan
B.Tech Student (2022-2026)
Amity School of Engineering & Technology



Area: Deep Learning, Deepfakes

AI-driven Classification and Segmentation Framework for COVID-19 Diagnosis from Chest X-ray Images

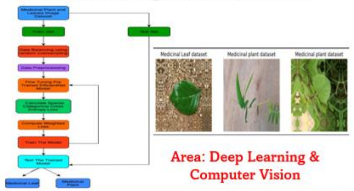
Anshika Chauhan
B.Tech. Student (2021-25)
Amity School of Engineering & Technology



Area: Deep Learning

Indian Medicinal Plants and Leaves Classification Using EfficientNet Model

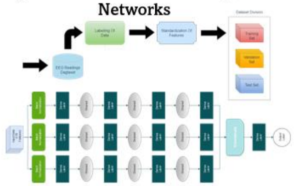
Aditya Rawat
B.Tech Student (2022-2026)
Amity School of Engineering & Technology



Area: Deep Learning & Computer Vision

Epileptic Seizure Detection Using Neural Networks

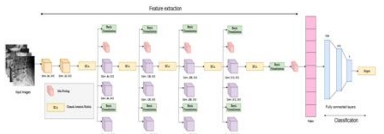
Abner Koshy Thomas
B.Tech Student (2022-2026)
Amity School of Engineering & Technology



Area: Deep Learning & Computer Vision

Attention-Guided Convolutional Neural Networks for Multi-class Spinal Lesion Classification of X-ray Radiographs

Suzain Rashid
B.Tech Student (2021-25)
Amity School of Engineering & Technology

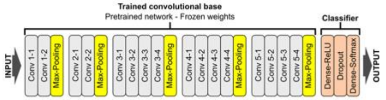


Proposed Attention-guided CNN model architecture for classification Spinal Lesion

Area: Deep Learning

Early Detection of Pediatric Pneumonia using Transfer Learning

Hiyaa Malik
B.Tech. Student (2022-26)
Amity School of Engineering & Technology



AI framework used for Training

Area: Deep Learning

Precision MRI Hippocampus Segmentation Using Autoencoders for Advanced Neuroimaging Insights

Alveera Fatima
B.Tech Student (2022-2026)
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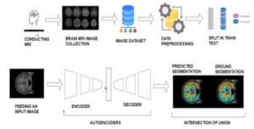
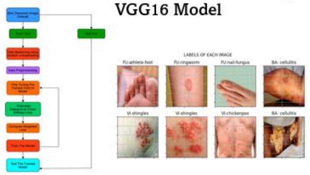


Area: Deep Learning & Computer Vision

Skin Disease Classification Using VGG16 Model

Aryan Dadwal
B.Tech. Student (2022-26)
Amity School of Engineering & Technology



Area: Deep Learning & Computer Vision

Tuberculosis detection using Convolution Neural Network

Janga Bharat Reddy
B.Tech Student (2022-2026)
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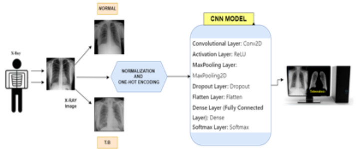
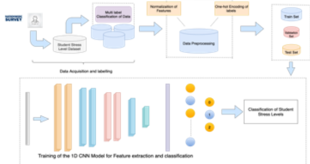


Area: Deep Learning

A Convolutional Neural Network for Multi-Class Classification of Student Stress Levels

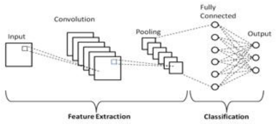
Dereddy Hitesh Reddy
B.Tech Student (2022-2026)
Amity School of Engineering & Technology



Area: Deep Learning

A Deep Neural Network for predicting Schizophrenia using EEG Brainwaves

Devashish Tyagi
B.Tech Student (2022-2026)
Amity School of Engineering & Technology

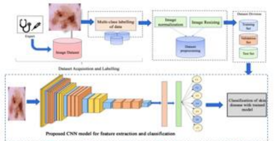


Block diagram of the proposed CNN-based Schizophrenic detetion model

Area: Deep Learning & Time Series

A Deep Neural Network for Multi-Class Classification of Skin lesions Dermatoscopic Images

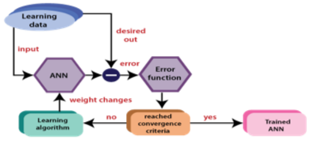
Himanshu Kumar Saw
B.Tech Student (2022-2026)
Amity School of Engineering & Technology



Area: Deep Learning & Computer Vision

Unveiling Safer Skies: Cutting-edge Space Debris Detection with DNN Model

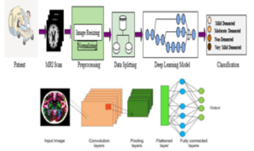
Shreya Rajesh
B.Tech Student (2022-2026)
Amity School of Engineering & Technology



Area: Deep Learning

A Deep Neural Network for Identifying and Analyzing Alzheimer's Disease using Custom CNN Model

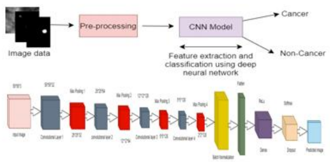
Aadi Jain
B.Tech. Student (2022-26)
Amity School of Engineering & Technology



Area: Deep Learning

Customized CNN model for Breast Cancer Detection

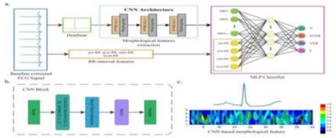
Muskan Sethi
B.Tech Student (2022-2026)
Amity School of Engineering & Technology



Area: Deep Learning & Computer Vision

Melodies of the Heart: Categorization of Cardiac Rhythm Sounds Using Deep learning

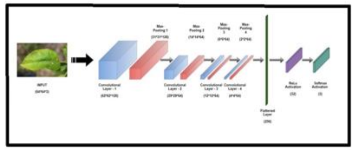
Praveen Pandey
B.Tech. Student (2022-26)
Amity School of Engineering & Technology



Area: Deep Learning & Time Series

STUDENT INNOVATIONS

Guardians of the Orchard: CNN's Insight into Apple Leaf Disease Classification



Rohit Tarun R G
B.Tech Student (2022-2026)
Amity School of Engineering & Technology

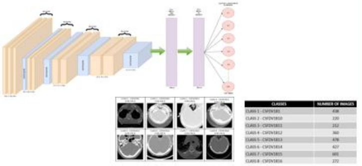
Area: Deep Learning & Computer Vision

Comparative study of Convolution Neural Networks (CNN) and Long Short-Term Memory (LSTM) for Phishing Attack Detection

Vansh Bansal
B.Tech Student (2022-2026)
Amity School of Engineering & Technology

Area: Deep Learning

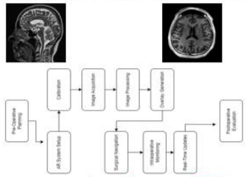
Deep learning model for automated detection of cervical spine injuries from CT scan images.



Purvak Singh
B.Tech Student (2022-2026)
Amity School of Engineering & Technology

Area: Deep Learning & Computer Vision

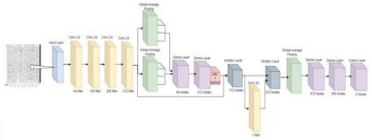
Augmented Reality In Surgery: Improving Surgical Navigation And Patient Safety



Bhrigu Patel & Ria Singh
B.Tech Student (2020-2024)
Amity School of Engineering & Technology

Area: Computer Vision

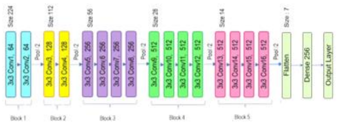
Alzheimer's Detection using a Convolutional Neural Network with CBAM Attention



Saksham Chaudhary
B.Tech Student (2022-2026)
Amity School of Engineering & Technology

Area: Deep Learning

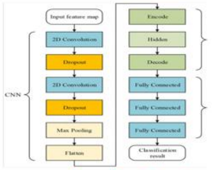
A Deep Neural Network for Multi-Class Classification of Microscopic Blood Cell Images



Vasu Gupta
B.Tech. Student (2022-26)
Amity School of Engineering & Technology

Area: Deep Learning & Computer Vision

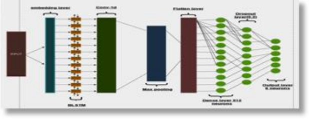
EEG Brain Signal Emotion Classification Using Artificial Intelligence



Ashita Chauhan & Sonvi Tyagi
B.Tech Student (2020-2024)
Amity School of Engineering & Technology

Area: Deep Learning

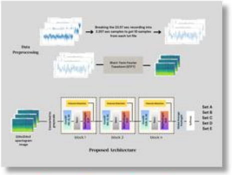
Emotion classification of short-form text in social media using BLSTM-CNN model



Chinmay Unnithan & Aaditya Yadav
B.Tech Student (2022-2026)
Amity School of Engineering & Technology

Area: Deep Learning

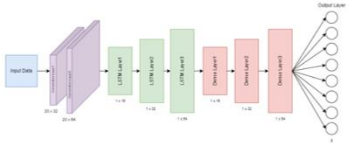
NeuroAttention: Attention-Driven Deep Learning Model for Accurate Seizure Detection and Monitoring



Abdullah Habib
B.Tech Student (2021-2025)
Amity School of Engineering & Technology

Area: Deep Learning

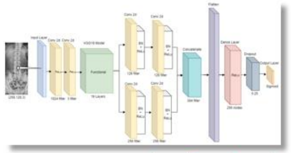
Energy Management for Smart Cities by Classifying Faults in Power Grids



Divyam Aggarwal
B.Tech. Student (2022-26)
Amity School of Engineering & Technology

Area: Deep Learning

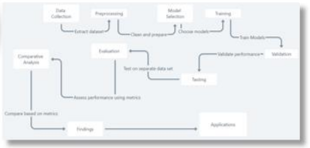
Spinal lesion detection using customized VGG19 CNN with Dual-Path Architecture and Batch Normalization for Enhanced Binary Classification



Keshav Sharma
B.Tech Student (2022-2026)
Amity School of Engineering & Technology

Area: Deep Learning

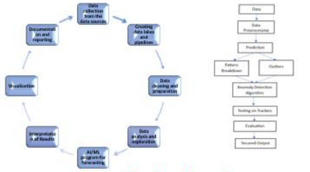
Beyond The Lyrics: Comparative Analysis Of Deep Learning Approaches For Sentiment Classification In Song Lyrics



Avni Tonger & Gauri Tyagi
B.Tech Student (2020-2024)
Amity School of Engineering & Technology

Area: Deep Learning

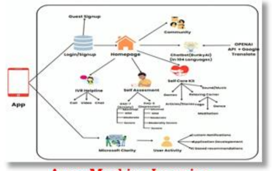
Anomaly based intrusion detection and network security system



Bhoomika Sharma
B.Tech Student (2020-2024)
Amity School of Engineering & Technology

Area: Machine Learning

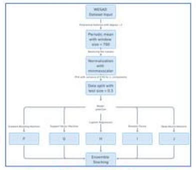
Android Based Application to help detect level of Mental Illness and Providing Support



Ravinder Singh
B.Tech Student (2022-26)
Amity School of Engineering & Technology

Area: Machine Learning

SensiCalm Analysis: Multi-Modal Stress Tracking



Hitesh & Nikita
B.Tech Student (2020-2024)
Amity School of Engineering & Technology

Area: Ensemble Learning

On December 12, 2023, Prof. M.K. Dutta, the Director of the Amity Centre for Artificial Intelligence, spoke on National Television on the Global Partnership on Artificial Intelligence (GPAI), which the Honorable PM had inaugurated in Pragati Maidan.

On December 29, 2023, Prof. M.K. Dutta, the Director of the Amity Centre for Artificial Intelligence, spoke on National Television in a Discussion on the Issue of Data infringements in the context of the incident of New York Times legal suit against Microsoft and OpenAI

Prof. M.K.Dutta Director of Amity Centre for Artificial Intelligence in a Discussion on AI telecasted by National TV on 9th June 2023

Prof. M.K.Dutta, Director of Amity Centre for Artificial Intelligence in a Discussion on Artificial intelligence based deepfake threats in National Television on 24 Nov 2023.

----------------------------------USRF Fellowship 2023 Students-------------------------------

Student Participants and Faculty in “Bootcamp in Deep Learning Technologies” organized by Amity Centre for Artificial Intelligence from 30th May to 23rd June 2023

Prof. M. K. Dutta, Director of ACAI delivered an Invited Talk on the Track of Artificial intelligence on 17th Jan 2024 in India International Science Festival in Biotech Science Cluster, Faridabad. https://www.scienceindiafest.org/

A Discussion Session on AI applications with the Faculty of BioTechnology

Visit of People from our Centre for a meeting with Samsung on 06th January 2024.

Amity University has signed a Non-Disclosure Agreement (NDA) with Thales Group on 05th April 2024 (Friday), as we plan work together in some industry-related projects.

Shri Daniel J., Senior Advisor, United Service Institution of India, visited our Amity Centre for Artificial Intelligence (ACAI) Lab.

Visit of People from our Centre for a meeting in NPL (National Physical Laboratory) Delhi on 22nd December 2023.

Thank You