Developer Student Clubs

Introduction to Machine Learning

Machine Learning Zero to Hero | Day 01

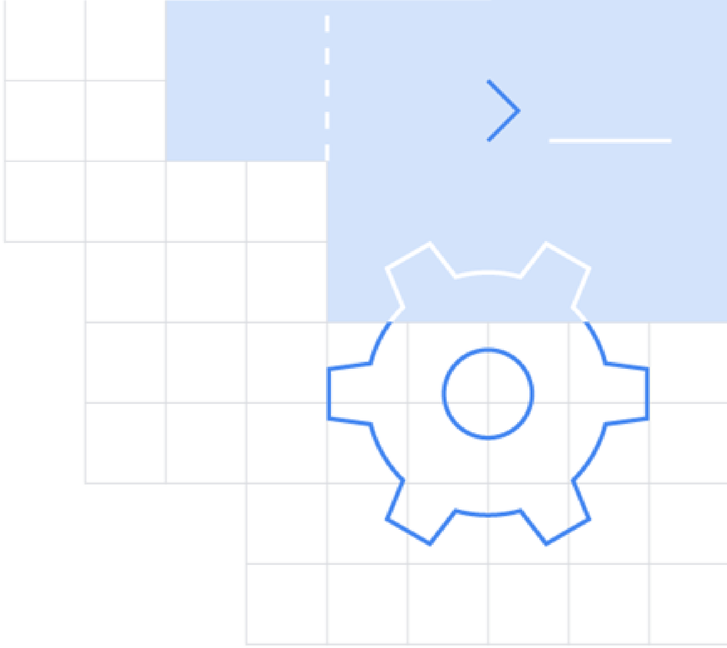
Muhammad Huzaifa Shahbaz
Developer Student Clubs Lead | Machine Learning Engineer
@mhuzaifadev

Google Developers

Agenda

- Why Machine Learning?
- What is Machine Learning?
- Machine Learning Process
- Types of Machine learning
- Applications of Machine Learning

Why Machine Learning?



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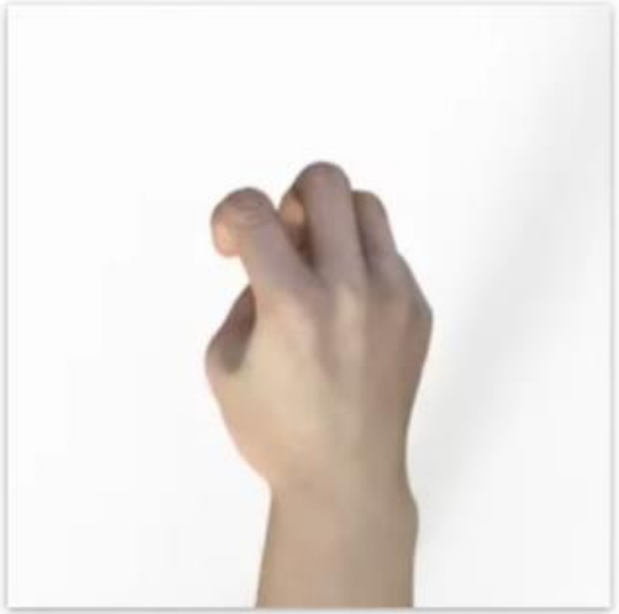
Rock – Paper – Scissor



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@lmoroney
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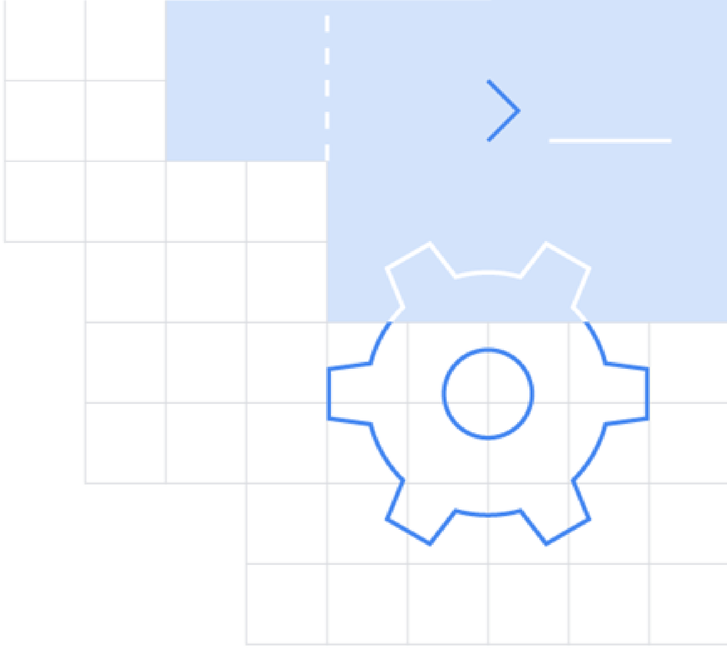
What is Machine Learning?



What is Machine Learning?

So called Artificial Intelligence: May be the Last Revolutionary Invention Human ever made

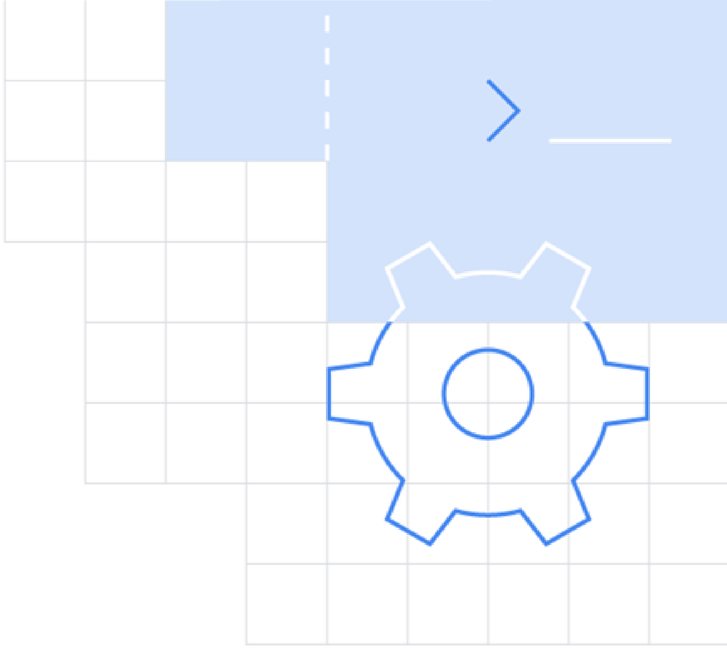
Machine Learning is the ability to automatically learn and improve from experience without being explicitly programmed. **Machine learning** focuses on the development of computer programs that can access data and use it learn for themselves.

It is a subset of Artificial Intelligence (AI) which provides machines the ability to learn automatically & improve from experience without being explicitly programmed.

What is Machine learning?

Traditional Programming vs Machine Learning (AI)

Machine Learning Process



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Machine learning Process

1- Define the objective of the Problem
2- Data Gathering
3- Data Preprocessing
4- Exploratory Data Analysis
5- Building a Machine Learning Model
6- Model Evaluation & Optimization
7- Predictions
8- Building a Model Package for reusability

Machine Learning Process

Step 01: Define the objective of the Problem

- What are we trying to predict?
- What are the target features?
- What is the input data?
- What kind of problem are we facing? Binary Classification or Clustering?

Machine Learning Process

Step 02: Data Gathering

For projects, we usually get data from Kaggle.

Kaggle, a subsidiary of Google LLC, is an online community of data scientists and machine learning practitioners. It's like a Play Store for Data scientists and Machine Learning Engineers. You can find numerous datasets and win competitions by Kaggle and outsource partners.

But in real world scenario, it's often, you are on your own to gather data.
Data is the key factor of your Machine Learning results.

Machine Learning Process

Step 03: Data Preprocessing

- Transform data into desired format
- Data Cleaning
    * Missing values
    * Corrupted data
    * Remove unnecessary data
- Reducing data dimensions

Machine Learning Process

Step 04: Exploratory Data Analysis

- You may need to visualize the data to understand the relations & correlations between the variables are understood.
- At this stage all the useful insights are drawn.
- It’s a post data cleaning process, here’s where the main dimensionality reduction and feature scaling enters.

Machine Learning Process

Step 05: Building a Machine Learning Model

- Split the data between training and test sets
- The Model is the Machine learning algorithm that predicts the output by using the data fed to it

Machine Learning Process

Step 06: Model Evaluation & Optimization

- Machine Learning model is evaluated by using the testing data set
- The accuracy of the model is calculated
- Further improvement in the model are done by using techniques like Parameter tuning

Machine Learning Process

Step 07: Prediction

- The outcome is predicted after performing parameter tuning and improving the accuracy of the model

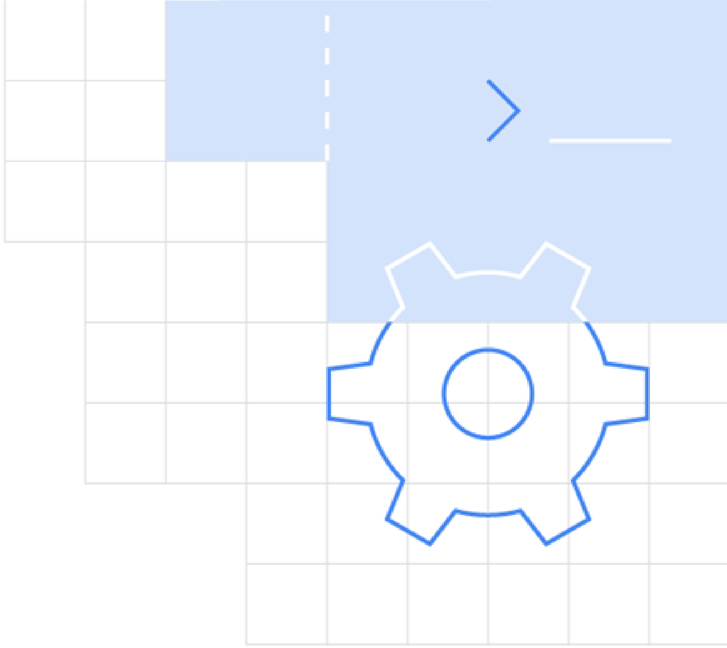
- This is a moment every ML engineer is waiting for. ☺

Machine Learning Process

Step 08: Building a Model Package for Production

- To put your machine learning model in production, you'll build a Package file.
- Simply, then import that package, and reuse by inputting the data and getting the answer.
- It's like we are back what we needed, but we won't need to hardcode, AI is doing for us.

Types of Machine Learning



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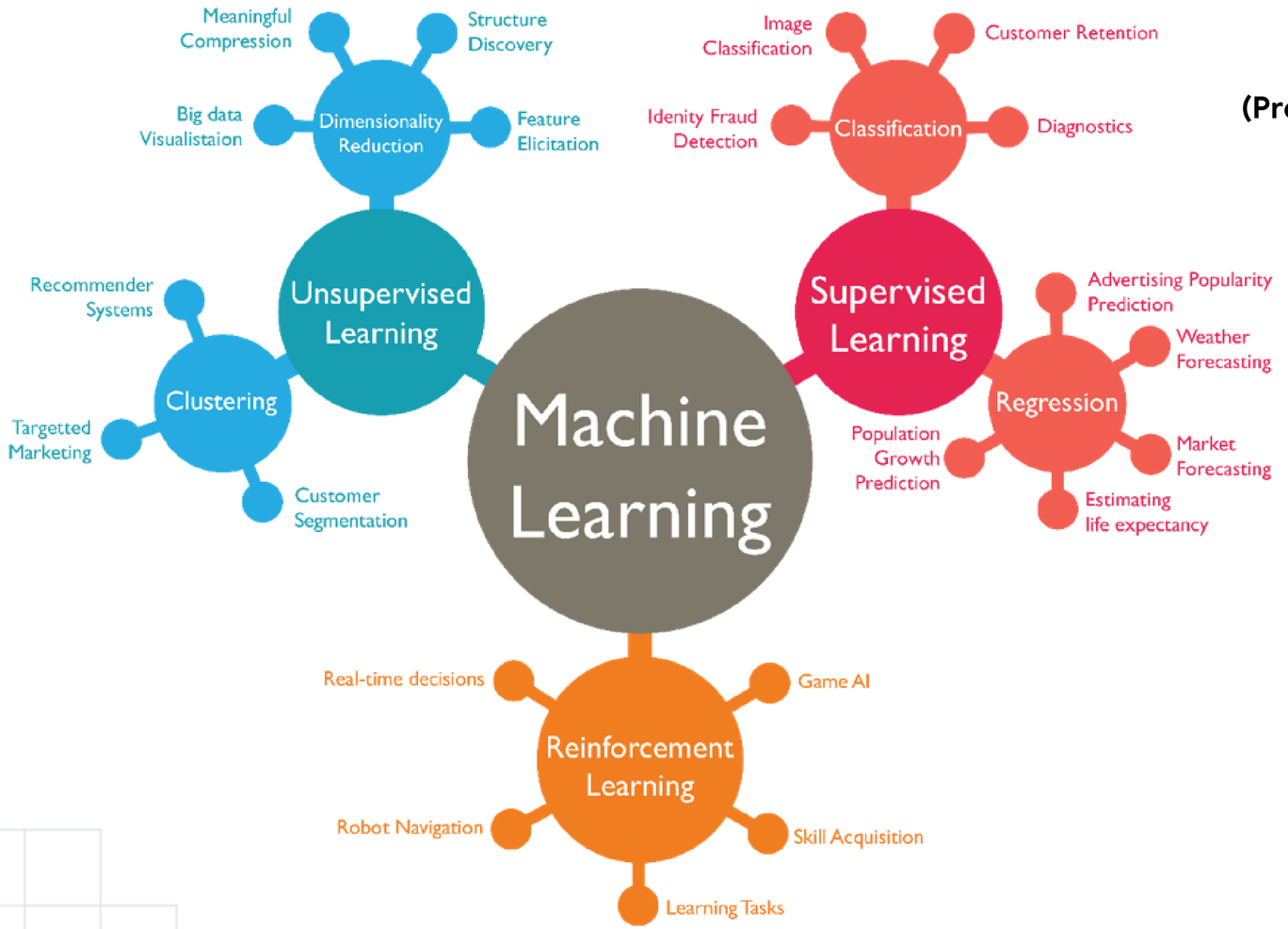
Types of Machine Learning

Data Driven
(Identify Clusters)

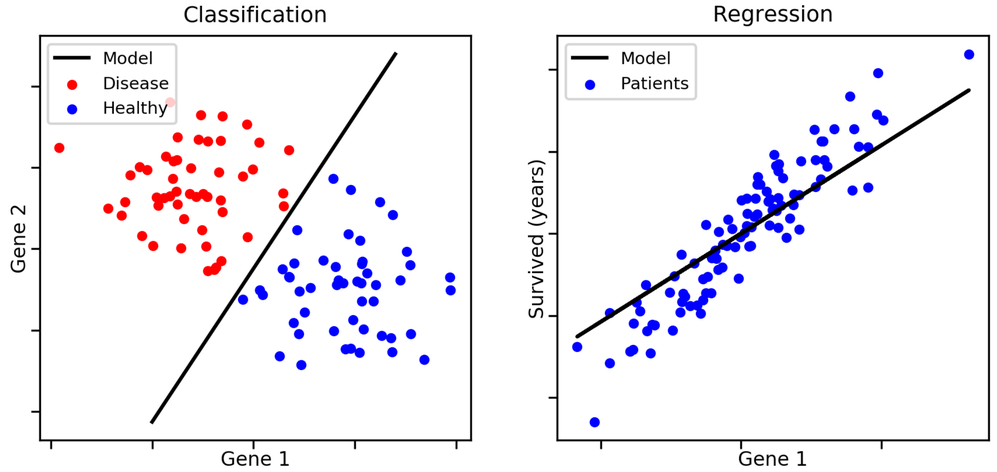


Task Driven
(Predict next value)

Learn from Mistakes

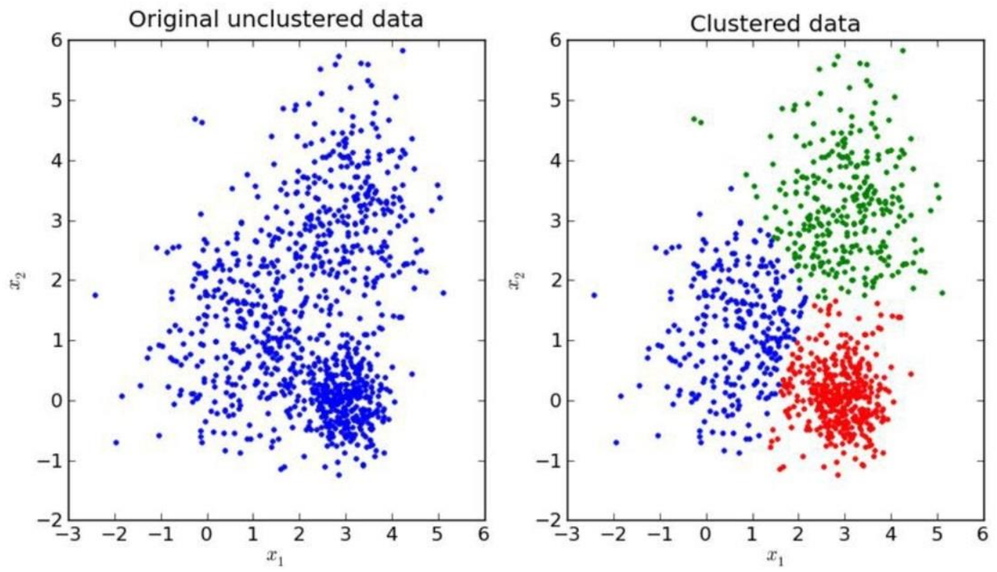
ML: Supervised Learning

Supervised Learning is a technique in which we teach or train the machine using labelled data



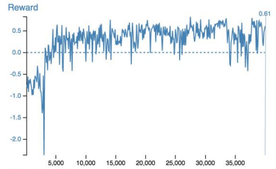
ML: Unsupervised Learning

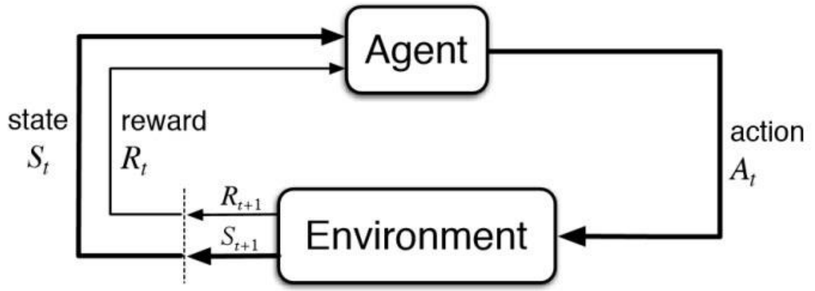
Unsupervised learning is the training of machine using information that is unlabeled and allowing the algorithm to act on that information without guidance.

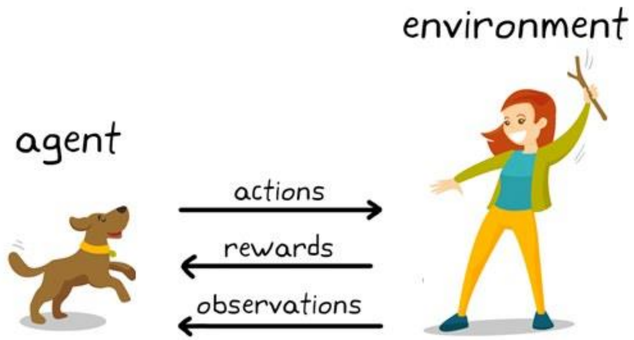


ML: Reinforcement Learning

Reinforcement Learning is a part of Machine Learning where an agent is put in an environment and he learns to behave in this environment by performing certain actions and observing the rewards which it gets from those actions.



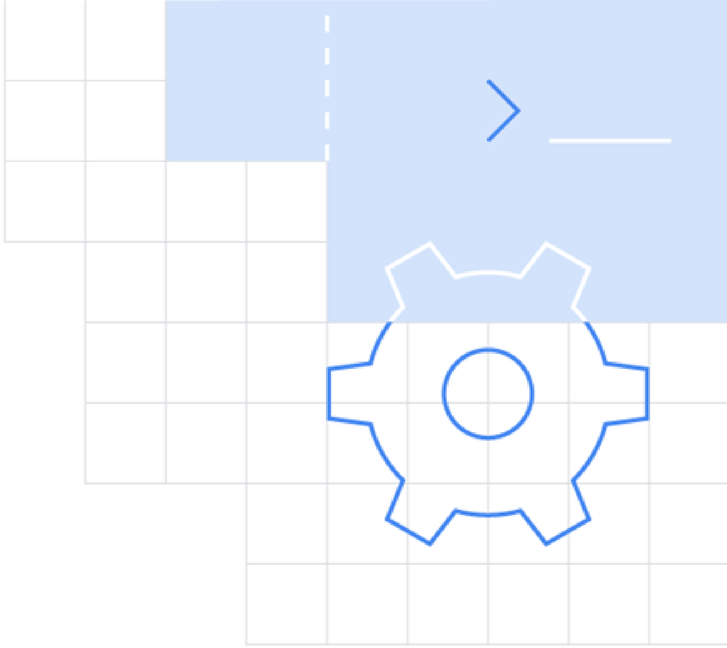




Comparing all Types of Learning

	Supervised Learning	Unsupervised Learning	Reinforcement Learning
Definition	The machine learns by using labelled data	The machine is trained on unlabeled data without any guidance	An agent interacts with its environment by producing actions & discovers errors or rewards
Type of Problems	Regression & Classification	Association & Clustering	Reward based
Type of data	Labelled Data	Unlabelled Data	No pre-defined data
Training	External Supervision	No Supervision	No Supervision
Approach	Map labelled input to known output	Understand patterns and discover Output	Follow trail and error method
Popular algorithms	Linear Regression, Logistic Regression, Support Vector Machine, KNN, etc	K-means, C-means, etc	Q-learning, SARSA, etc

Applications of Machine Learning



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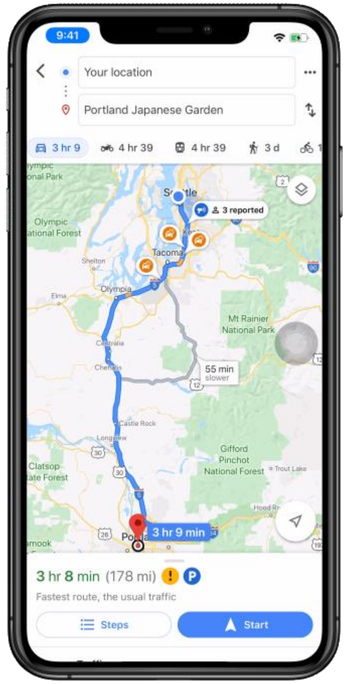
Applications of Machine Learning

Google Maps – Faster Route Selection

Despite of the usual traffic, you are on the fastest route

With our contributions, Google Maps is learning over time

It not just predict faster route according to current jams, but also consider the next hours traffic among your route.

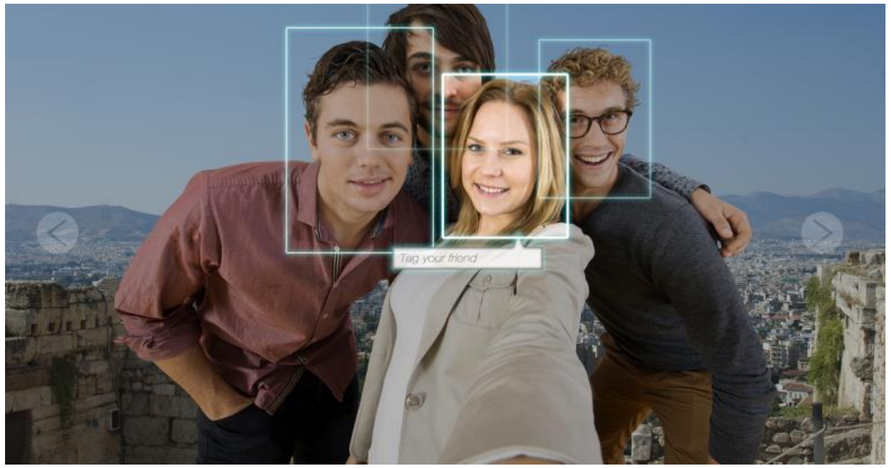


Applications of Machine Learning

Facebook – Auto Friend tagging Suggestion

Facebook suggests if you want to tag the person in the pic

Uses Facebook's Facial Recognition Algorithms (PyTorch)



Applications of Machine Learning

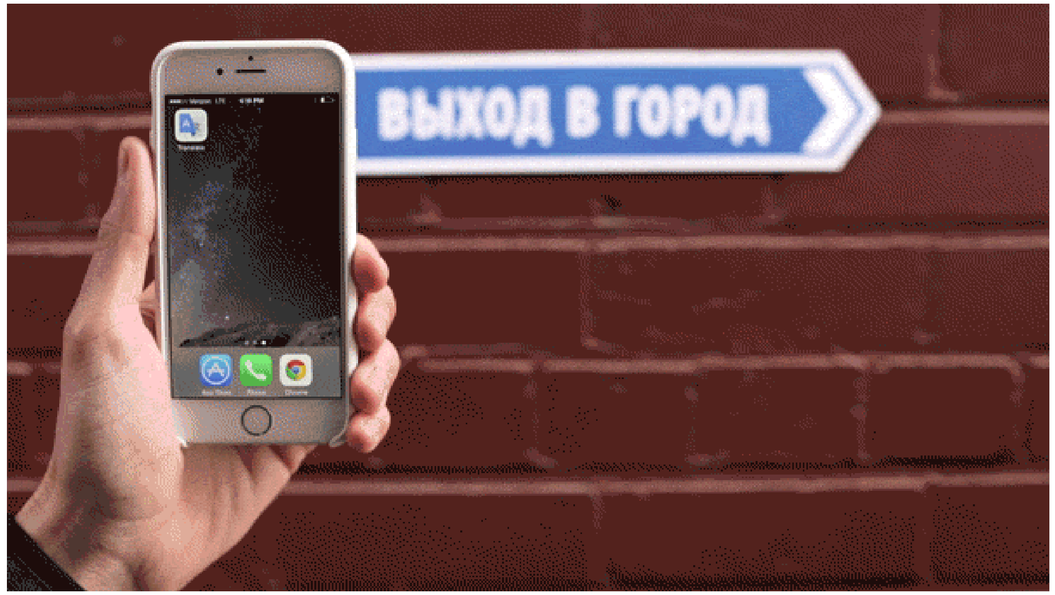
Google Translate – World's best translator on your hands

Language is no more a barrier

Free, fast and providing almost accurate translation

Realtime translation using Camera

Transcribing (Coming soon)



Applications of Machine Learning

Tesla – Full Self Driving Car (Commercial)

Driverless Cars

Tesla's AI is currently driven by NVIDIA's H/W mainly focuses on semi-supervised learning.

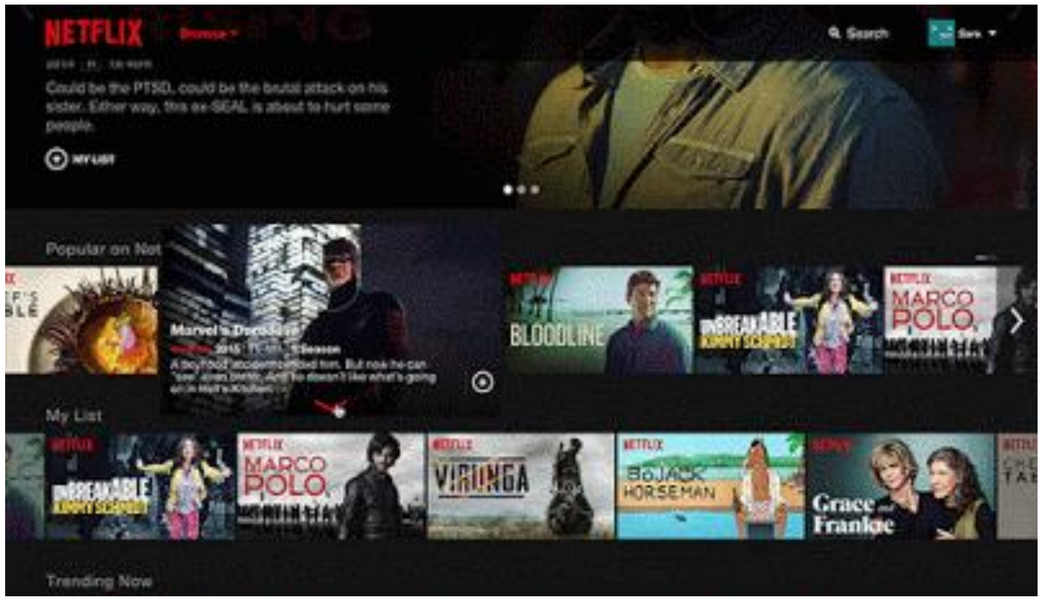
Tesla also introduced Tesla Supercomputer requires no Lidar, 50X faster, also utilizing Reinforcement learning, specifically built to utilize most out of Computer Vision.

Applications of Machine Learning

Netflix – Best Recommendation System

Netflix generates a grid of movies similar to your interest

75% of users selects movies based on Netflix's recommendation



Applications of Machine Learning

Moley – Kitchen Robotic Chef

Can replicates dish cooked by any master chef in the world

It learns from hundreds of Master Chefs

Fully human like sensitive and fast

Applications of Machine Learning

Planes – Auto Pilot & Auto Landing

Able to stay on the straight course

Autoland ability (even in mild turbulence)

95% of Long-Haul flight is done by AI Navigation

FMC (after 2000) are highly assistable to pilots

Applications of Machine Learning

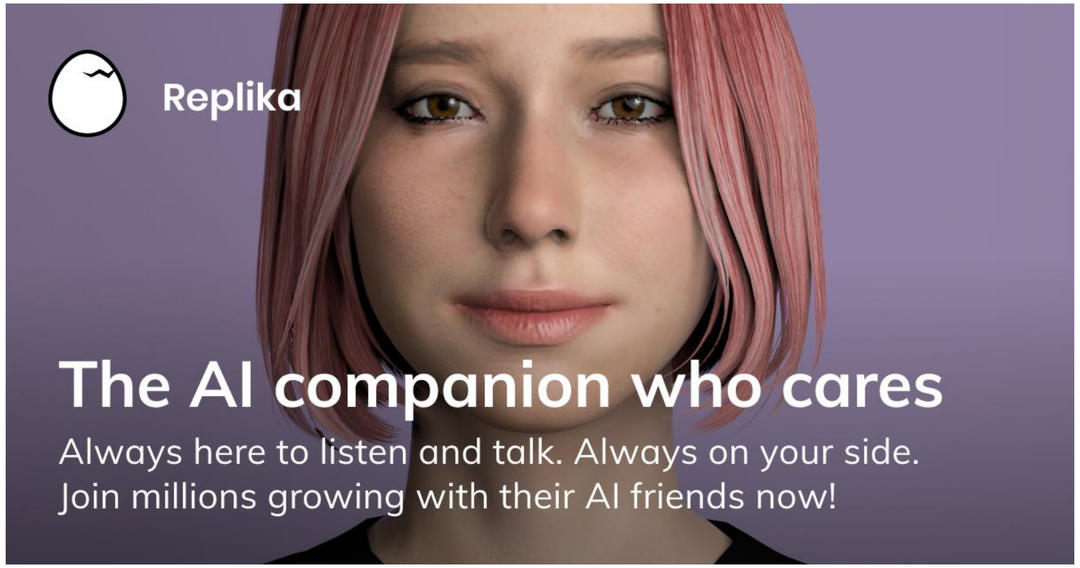
Replika – Your virtual Life Companion/Partner

Free to use

More than your mobile assistant

It’s like you are really having fun with your partner

Way too advance, making you feel like a human



Spoiler: She can fall in love and can highly mad on you!

Depends on you ;-)

Prerequisites

Learning

- Python 3
- High School Mathematics
- Commitment of 16hrs+/week

Google Colaboratory

Integrated with Tesla GPU & Google TPU

Colaboratory, or "Colab" for short, allows you to write and execute Python in your browser, with

- Zero configuration required
- Free access to GPUs
- Easy sharing

Whether you're a **student**, a **data scientist** or an **AI researcher**, Colab can make your work easier.

Practice

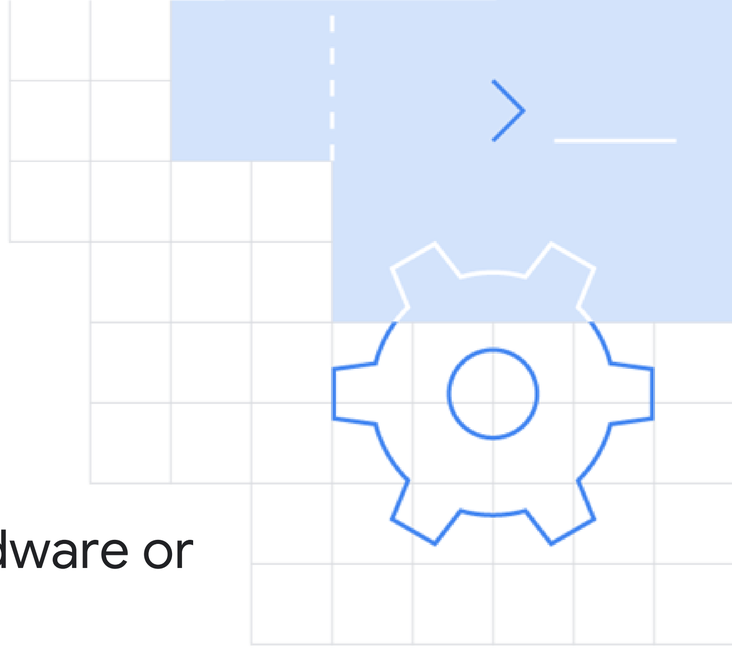
To be nearly perfect in AI, you'll need 1000 hours of dedicated contribution

But AI is the only invention, which is being used to do more inventions

“Coal was not bad; we switched to Oil for the sake of progress,
Oil is not bad; we are switching to Solar for the sake of progress,
Horses were not bad; we switched to cars for the sake of progress,
Man-working is not bad; we’re switching to automation for the sake of progress,
Human Intelligence is not bad; we’re switching to AI for the sake of progress”

Muhammad Huzaifa Shahbaz

A huge misconception



Artificial Intelligence is a service that requires a core interface, hardware or software.

So, don’t halt your UI learning like Android, Flutter, Web, because if you don’t know Product development, how will you showcase your AI?

UI can be in any form, webapps, mobile apps, games, AR, robotics, etc

Data Preprocessing

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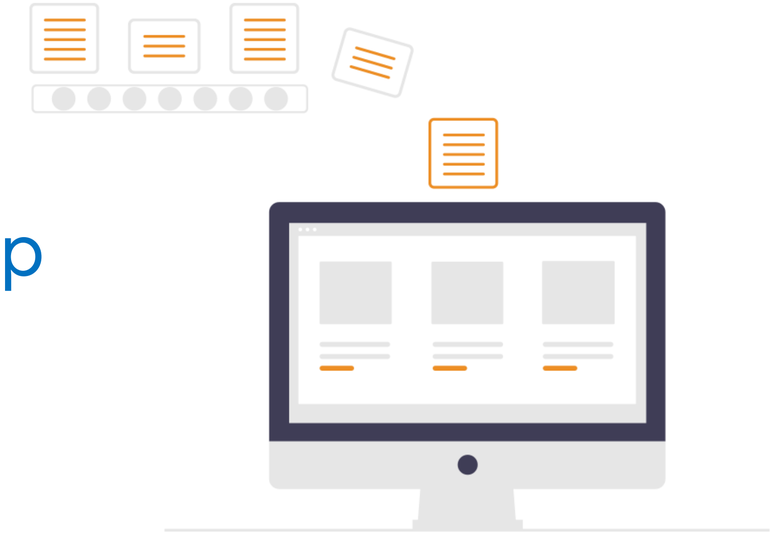

Register for next workshop

https://bit.ly/dscmlw02

8PM, Oct 02

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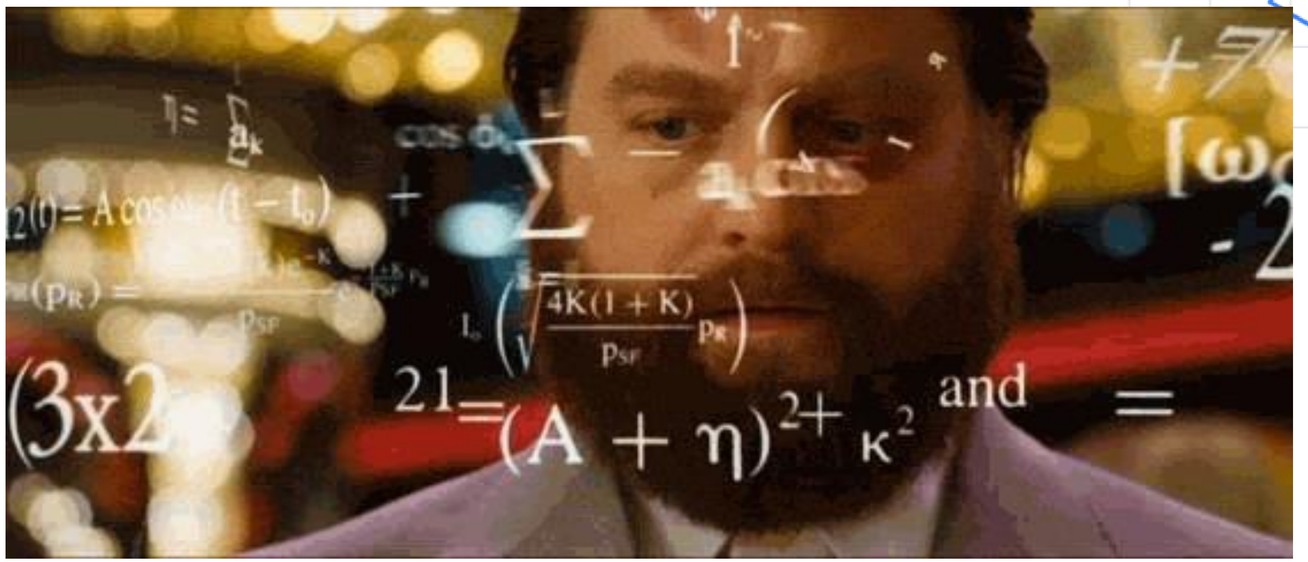
Q/A



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Register for next workshop
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Oct 05, 1 PM - 3 PM

Aptech Computer Education,
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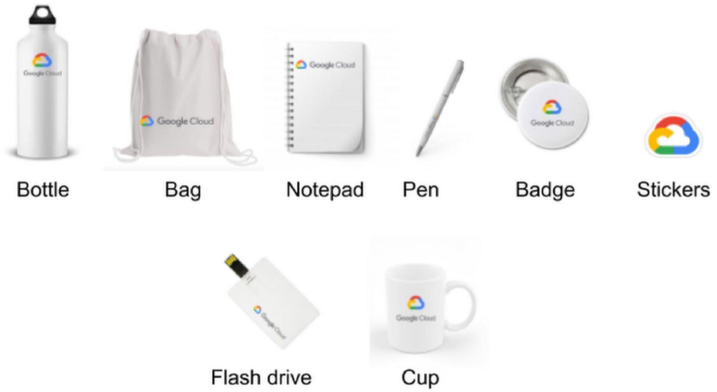

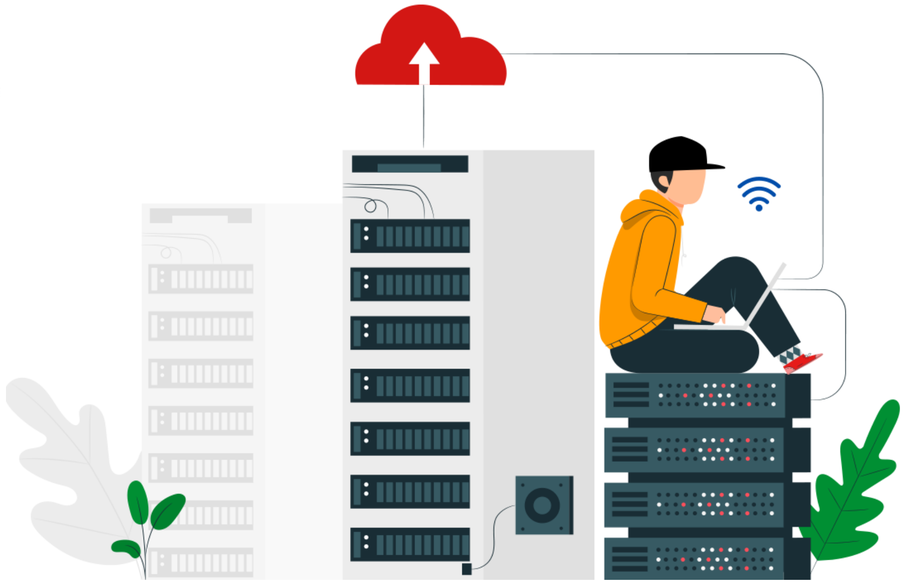

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First Come First Serve
Only 70 attendees
***No Reserving Quota**

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Thank You!

Special Thanks to **KODERSHUB**

Muhammad Huzaifa Shahbaz
Developer Student Clubs Lead | Machine Learning Engineer
@mhuzaifadev