

Intelligent Agents

Lab 00 - Intro

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2025/2026

How to evaluate ?

Attendance	Activity	Tasks	Quizzes	Projects (<u>2 Projects</u>)	Total
20 Points	10 Points	40 Points	50 Points	150 Points	270 Points

- You must exceed 75% of attendance (attending 7 Sessions at least)
- The final project will contain all topics of the course (Intelligent Agent)

Background



Artificial Intelligence

Machine Learning

Deep Learning



MLP

CNN

GAN

RBFN

LSTM

Autoencoders

RNN

Support Vector
Machines

Gaussian Process
Regression

Random Forest

Linear Regression

Logistic Regression

K-Means Clustering

Cognitive Modeling

Planning

Search Algorithms

Rule Based Systems

Game Playing

Knowledge Representation and Reasoning

Propositional Calculus

PREREQUISITES

Skill	Tool/Topics
Programming Skills	Python, R or MATLAB (Python is Preferred)
Mathematics	Differential Calculus, Linear Algebra
Probability & Statistics	Descriptive Measurements (Mean, Mode, Median), Distributions, Event probability, Conditional Probability, Joint Distributions, Bayes Theorem, A/B Testing ... etc
Database	SQL
Data Visualization	Python –Preferred- (Matplotlib, Seaborn), Tableau, PowerBI
Software Engineering	APIs, Data Structure, Algorithms, Web Development and Mobile Development

tools:

- **statistical**
- **mathematical**
- **programming**
- **problem-solving**
- **data-management**

An abstract graphic on the left side of the image, consisting of white lines and circles on a dark blue background. The lines are vertical and horizontal, with small circles at the ends, resembling a circuit board or a network diagram.

WORLD OF LEARNING

What is Machine Learning

- Machine learning is a field of artificial intelligence (AI) that involves developing algorithms and statistical models that enable computers (Agents) to learn and improve from experience, without being explicitly programmed (Intelligent).

Traditional Programming Vs Machine Learning

■ Traditional Programming



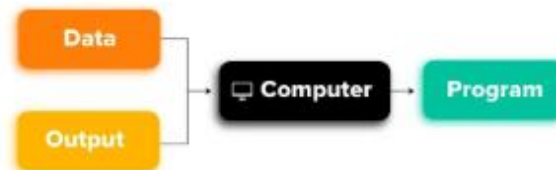
■ Machine Learning



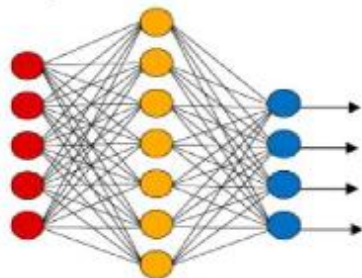
TRADITIONAL PROGRAMMING



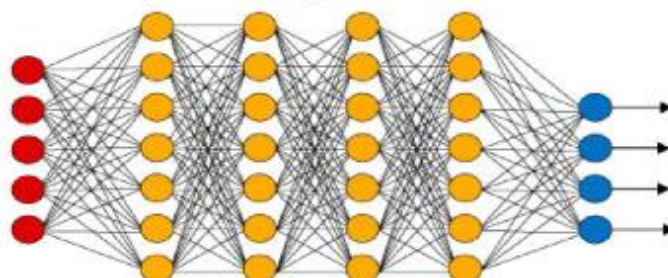
MACHINE LEARNING



Simple Neural Network



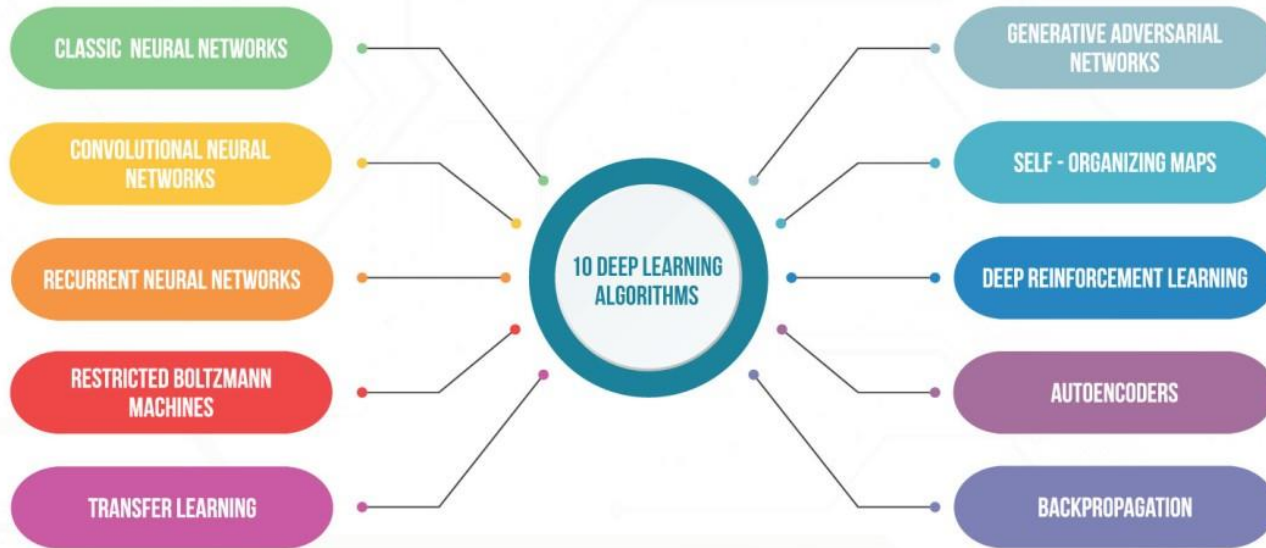
Deep Learning Neural Network



● Input Layer

● Hidden Layer

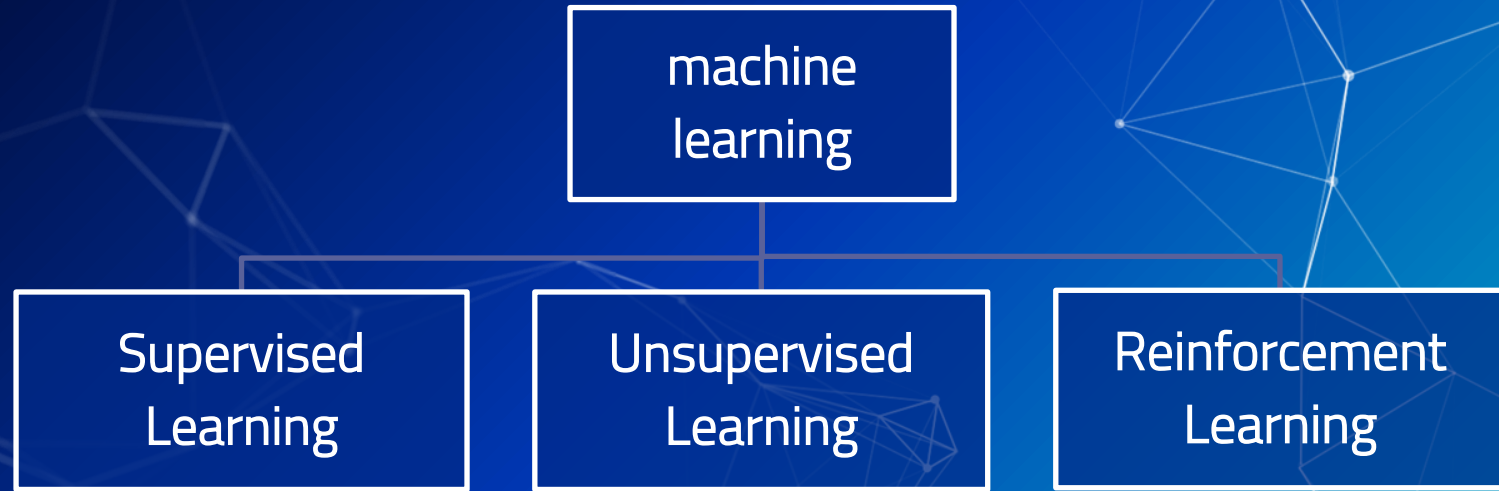
● Output Layer



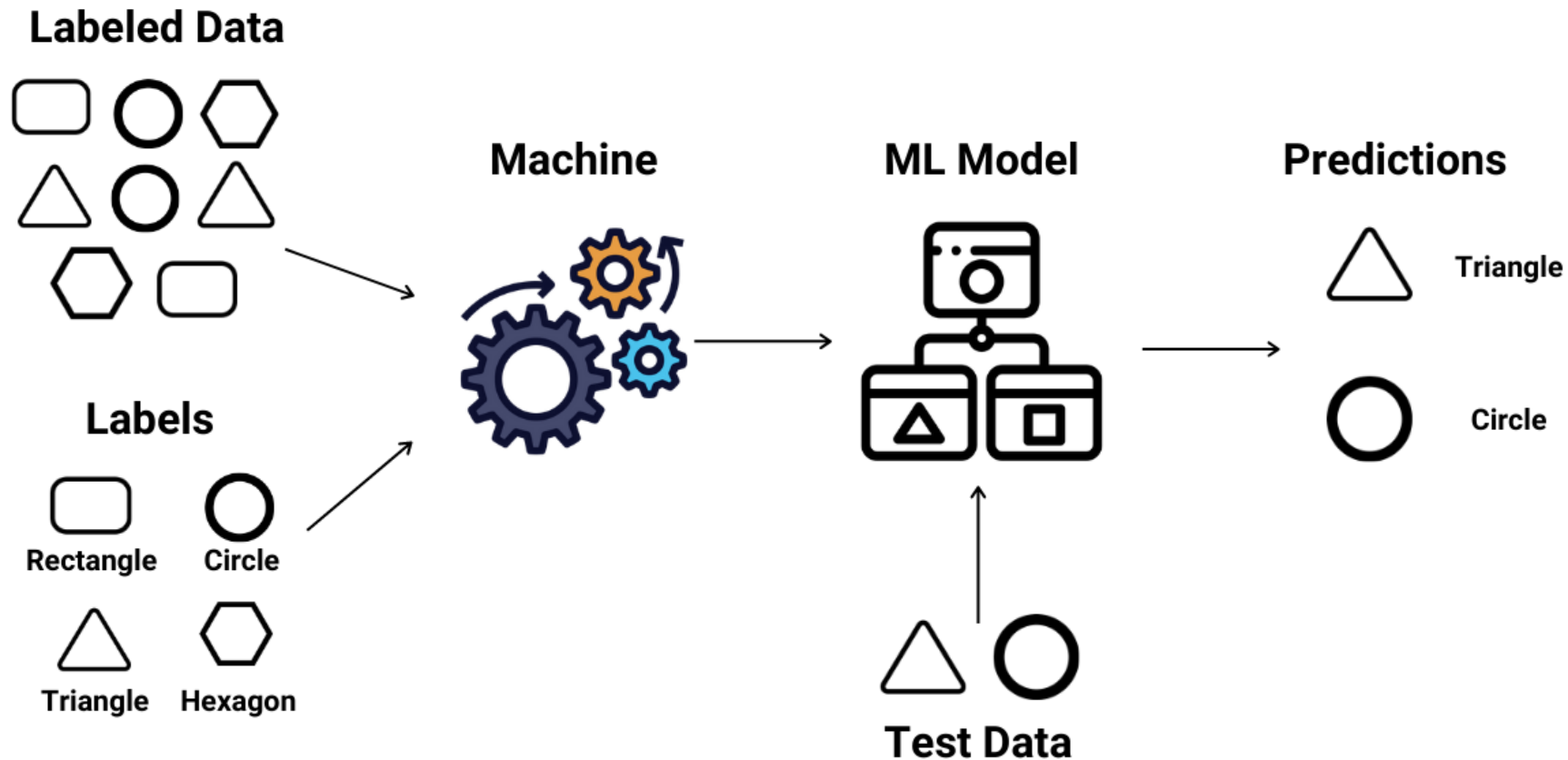
SOURCE: SHUTTERSTOCK

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TECHNOLOGY CONSULTANT

Types of Machine Learning

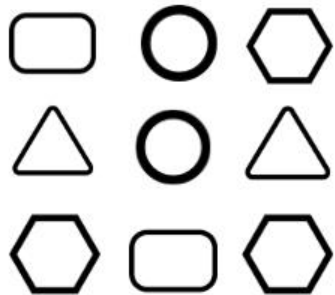


Supervised Learning



Unsupervised Learning

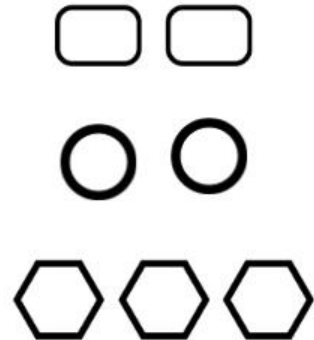
Unlabelled Data



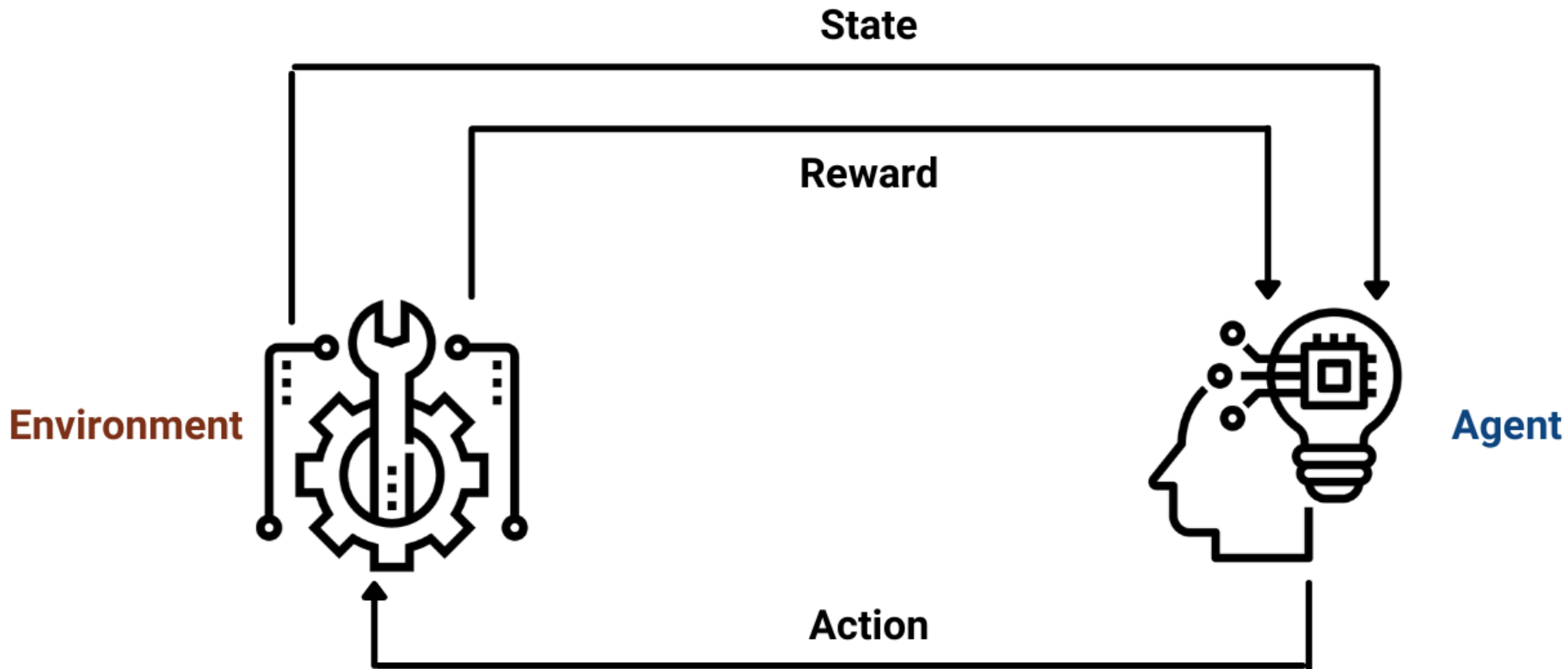
Machine



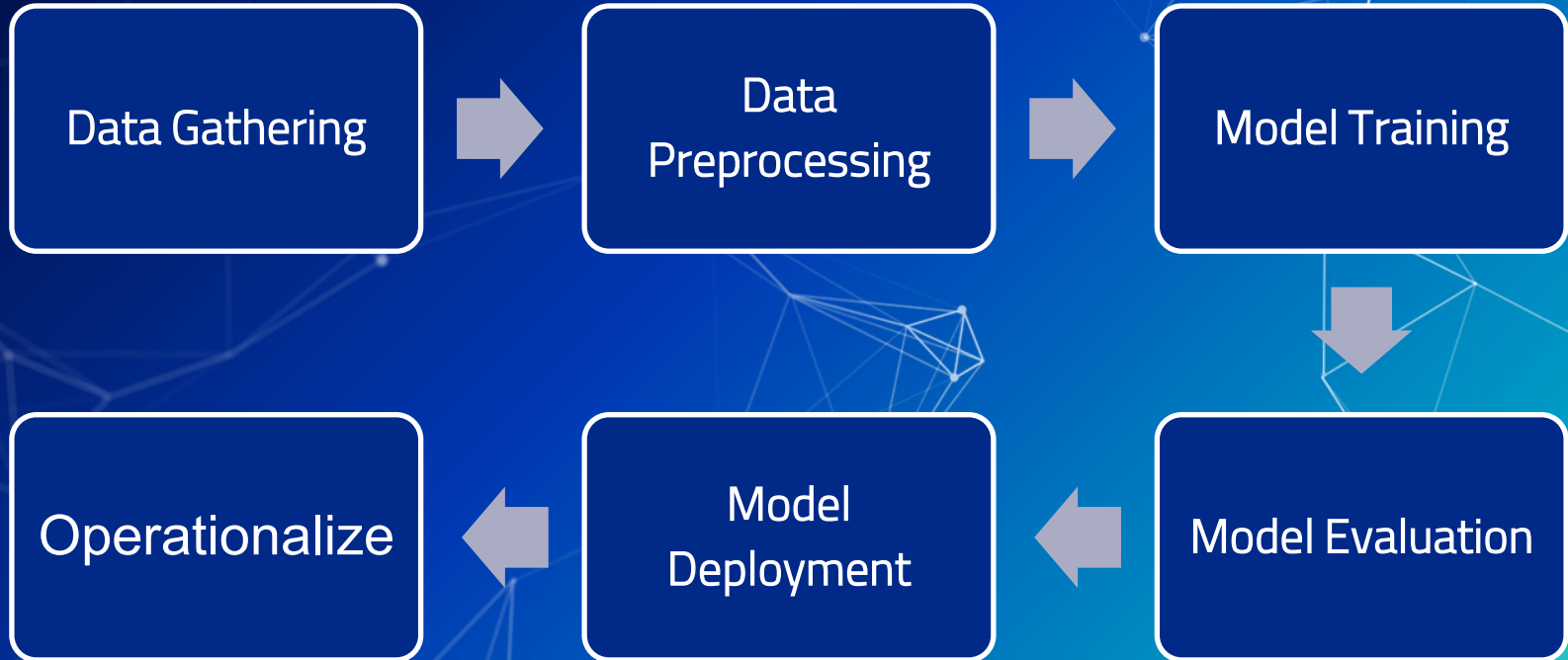
Results



Reinforcement Learning



Machine Learning Process



THE DATA SCIENCE PROCESS

PIPELINE



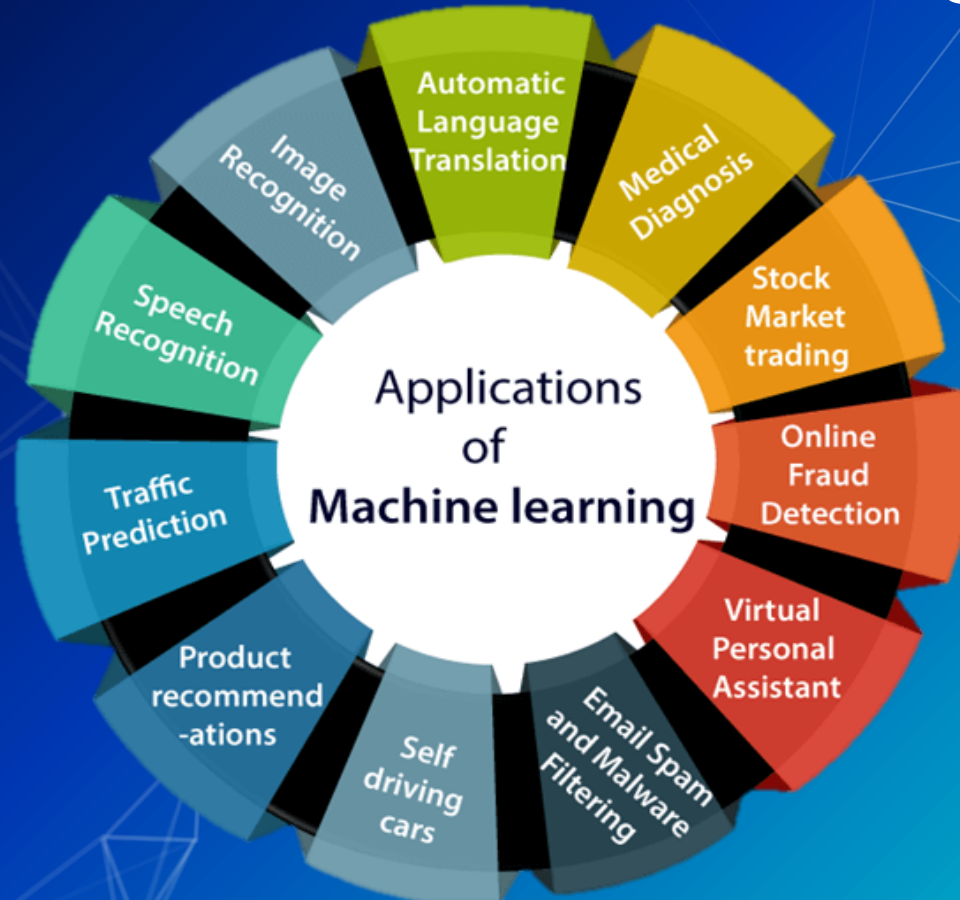
Data Engineers

Data Analysts

Machine Learning Engineers

Data Scientists

Applications of Machine Learning



why use Python in machine learning

- Wide range of libraries
- Easy to use and learn
- Large community support
- Interoperability with other languages
- Scalability



PYTHON (JUPYTER NOTEBOOK)

Most Preferred Programming Language in 2023

Recently used in most applications of the Computer Science

Jupyter Notebook is an open-source web app and the preferred IDE of Python since it organize your code very well. Additionally, some similar platforms support it (Kaggle – Google Collab)

Interesting Fact

Jupyter is a reference to 3 Programming Languages

Julia, Python, R



In [13]: *# importing libraries*

```
from __future__ import print_function
from ipywidgets import interact, interactive, fixed, interact_manual
from IPython.core.display import display, HTML

import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import plotly.express as px
import folium
import plotly.graph_objects as go
import seaborn as sns
import ipywidgets as widgets
```

In [14]: *# loading data right from the source:*

```
death_df = pd.read_csv('https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_data/csse_covid_19_data/confirmed_df = pd.read_csv('https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_data/recovered_df = pd.read_csv('https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_data/country_df = pd.read_csv('https://raw.githubusercontent.com/CSSEGISandData/COVID-19/web-data/data/cases_country.csv')
```

In [15]: confirmed_df.head()

In [16]: recovered_df.head()

In [17]: death_df.head()

In [18]: country_df.head()

jupyter

1. Scientifics Computing Libraries



Pandas

(Data structures & tools)



NumPy

(Arrays & matrices)



SciPy

(Integrals, solving differential equations, optimization)

2. Visualization Libraries



Matplotlib

(plots & graphs, most popular)



Seaborn

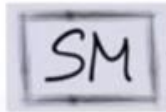
(plots : heat maps, time series, violin plots)

3. Algorithmic libraries



Scikit-learn

(Machine Learning : regression, classification,...)



Statsmodels

(Explore data, estimate statistical models, and perform statistical tests.)



TensorFlow

 PyTorch

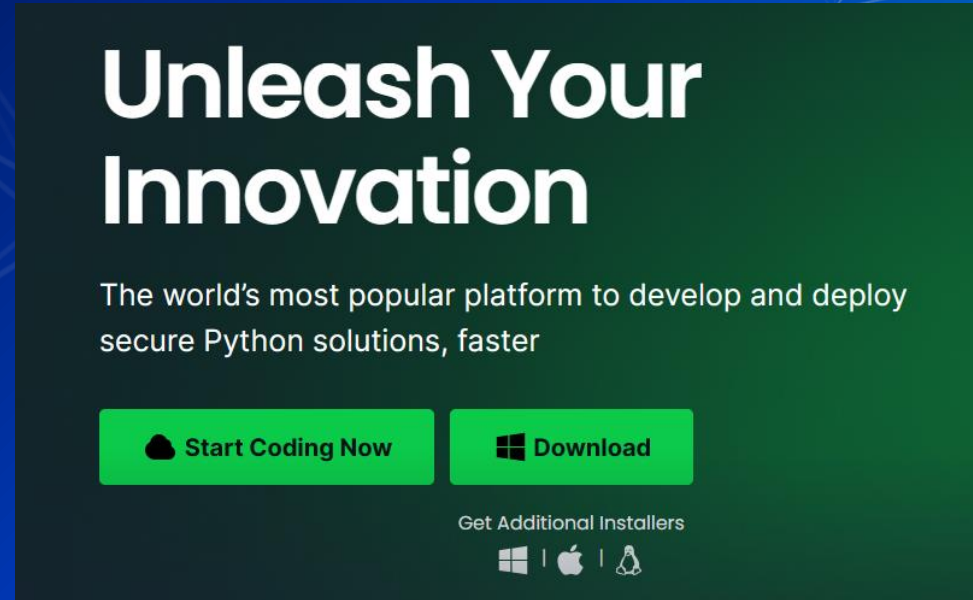
TENSORFLOW & PYTORCH



ANACONDA®

USING ANACONDA PLATFORM

■ Download Anaconda From The Given Link (anaconda.com)

A screenshot of the Anaconda website banner. It features a dark green background with white text and a blue gradient at the bottom. The main headline is 'Unleash Your Innovation'. Below it is a sub-headline: 'The world's most popular platform to develop and deploy secure Python solutions, faster'. There are two prominent blue buttons: 'Start Coding Now' with a cloud icon and 'Download' with a Windows icon. At the bottom, there is a link 'Get Additional Installers' followed by icons for Windows, Apple, and Linux (Tux).

Unleash Your Innovation

The world's most popular platform to develop and deploy secure Python solutions, faster

 **Start Coding Now**

 **Download**

Get Additional Installers

 |  | 

SETUP YOUR KAGGLE ACCOUNT

The Biggest Data science and Machine Learning Platform in the world

It provide a **HUGE** number of Datasets freely to be used in the projects

There are some free courses for short hours of some topics such as (Data Visualization, Data Analysis, Machine Learning, Advanced Machine Learning ... etc)

kaggle







**PREPARE
YOUR
GITHUB**

A person is shown from the chest up, wearing a VR headset. The entire image has a blue monochromatic filter. A white geometric network of lines and dots is overlaid on the image, particularly concentrated around the person's face and the VR headset. The text "THANKS!" is in the top left, and "Any questions?" is below it. The page number "31" is in the bottom right.

THANKS!

Any questions?