

Government Engineering College, Gandhinagar
Getting started with Machine Learning
"Baby steps in Machine Learning with Google Colabs"

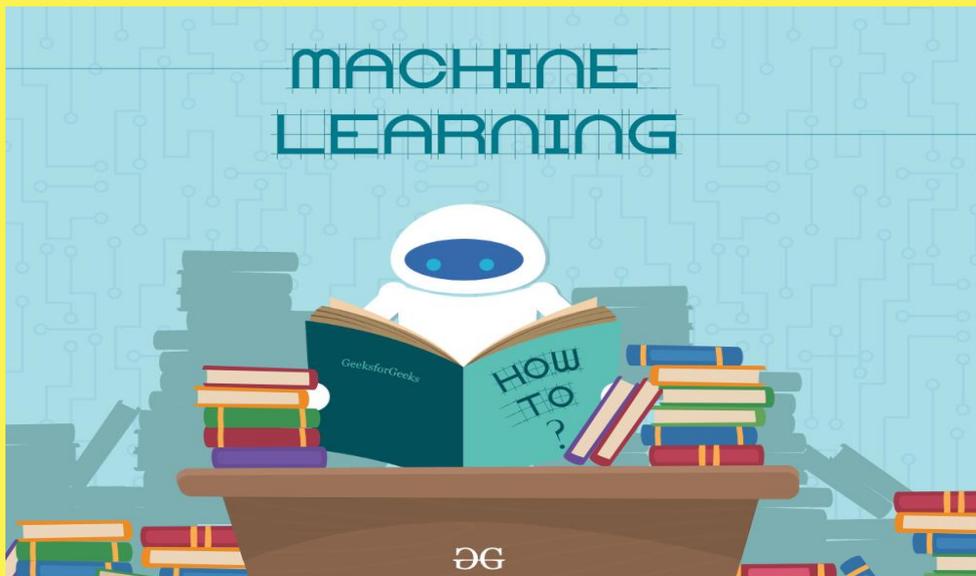
Date: 04 July 2020

Time: 04:30 PM onwards

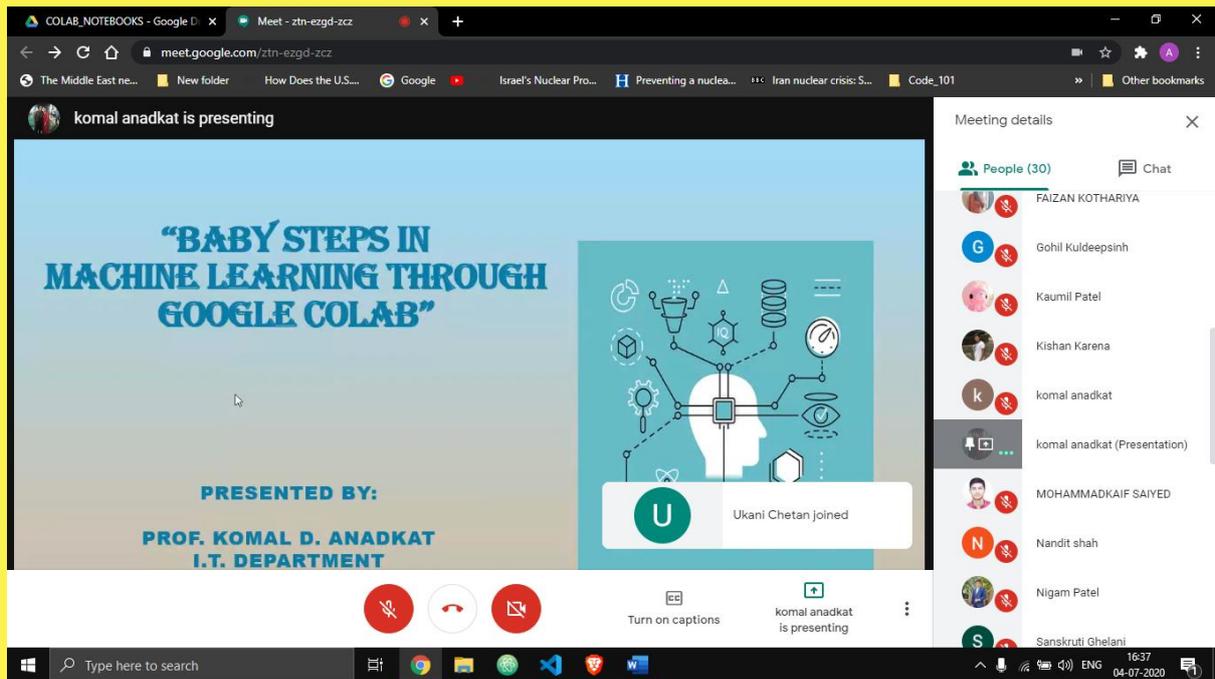
Speaker: Prof. Komal Anadkat (A.P.I.T)

Meeting on: Google Meet

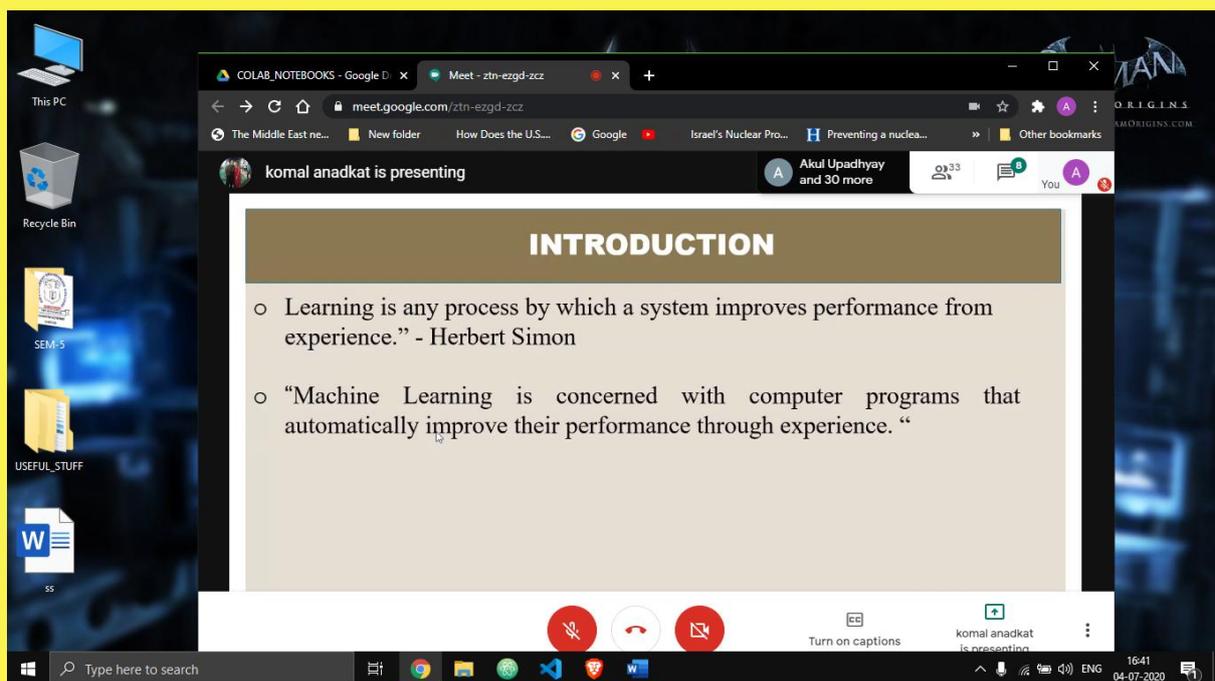
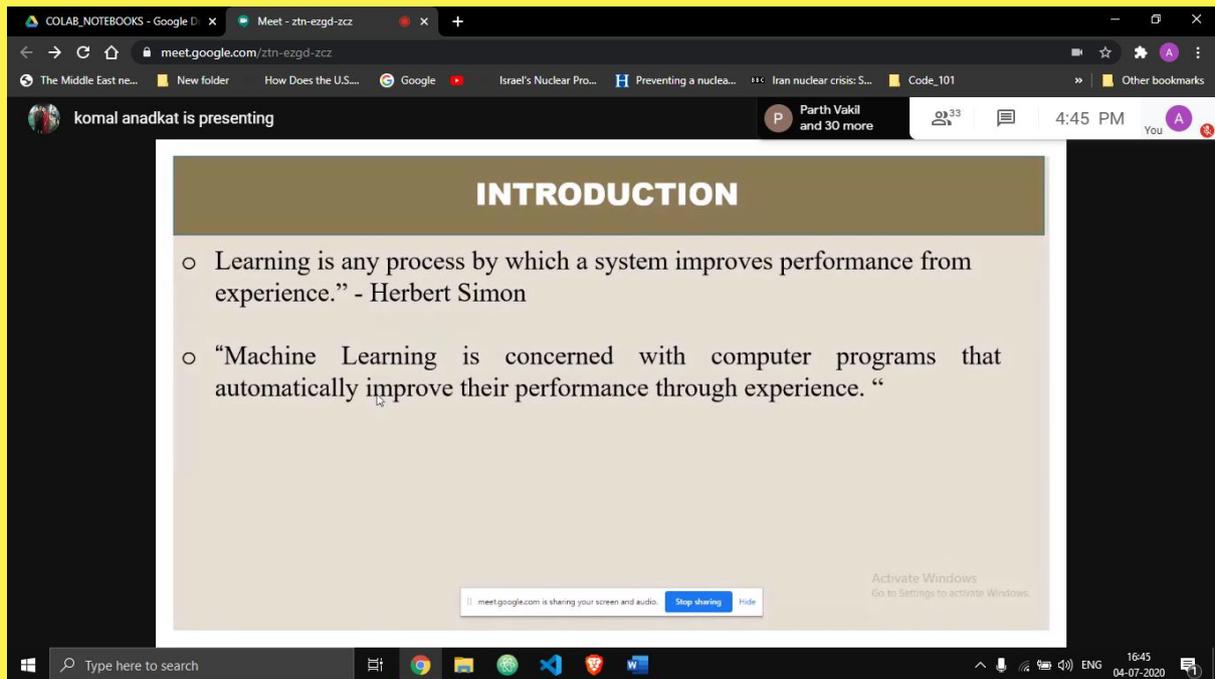




In this technologically advanced 21st century Machine learning has already become a big part of our lives as end users we are using this technology every single day . From our YouTube video recommendations to the classic "ok google" commands we are surrounded with ML and its products so it's time we get started with ML ourselves.

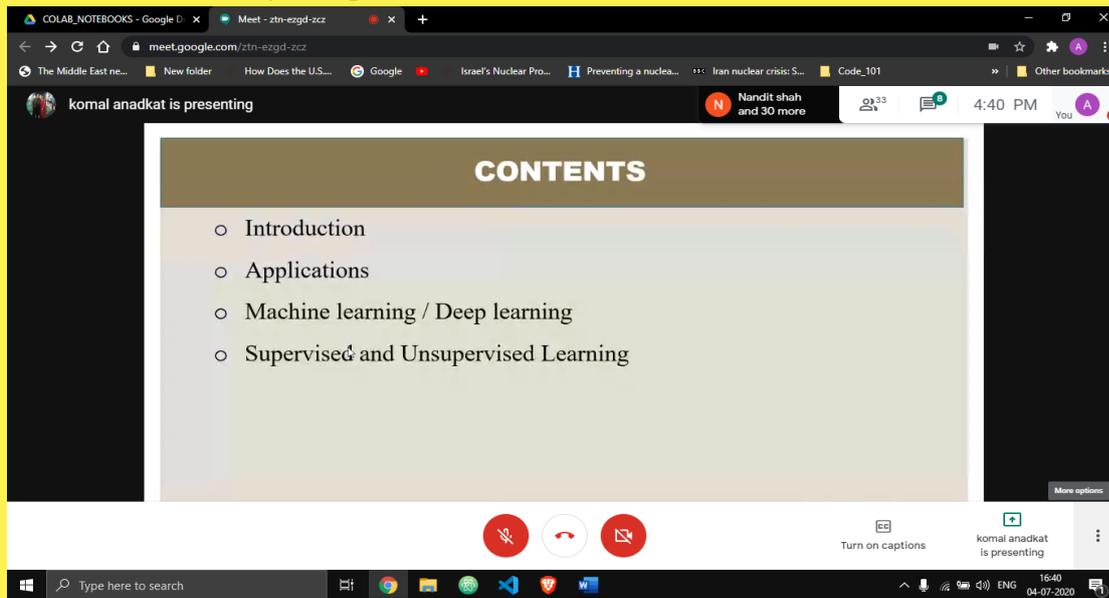


The meeting was scheduled to start at 4:30 however due to the interest and the punctuality of all participants the meeting commenced around 10 mins early. What followed was a quick introduction of the lecturer and a few ice breakers, we were now ready to dive into the world of ML.

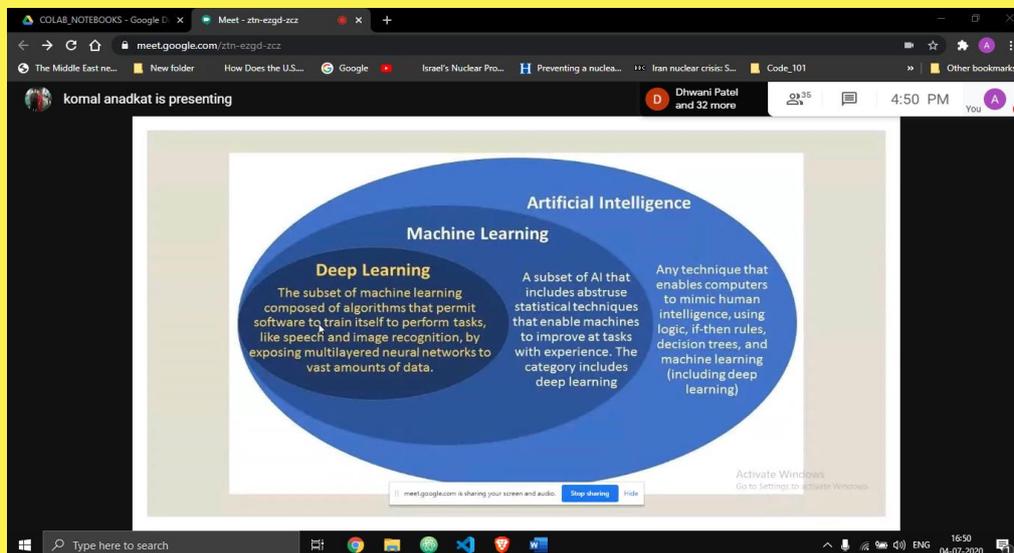


A strong foundation is the secret to a steady high rise, similarly a solid base on the basics was needed, so first an introduction to the subject

and the day's goals were covered.



After establishing the basics a quick look on what, why and why now for ML followed.



The screenshot shows a Google Meet window with a presentation slide. The slide title is "WHY MACHINE LEARNING?". The content includes a bulleted list of reasons for machine learning. The meeting interface shows the presenter's name as "komal anadkat" and the time as 4:52 PM. The Windows taskbar is visible at the bottom.

WHY MACHINE LEARNING?

- Develop systems that can automatically adapt and customize themselves to individual users. – Personalized news or mail filter
- Discover new knowledge from large databases (data mining). – Market basket analysis (e.g. diapers and beer)
- Ability to mimic human and replace certain monotonous tasks - which require some intelligence. - like recognizing handwritten characters .
- Develop systems that are too difficult/expensive to construct manually because they require specific detailed skills or knowledge tuned to a specific task (knowledge engineering bottleneck).

The screenshot shows a Google Meet window with a presentation slide. The slide title is "WHY NOW?". The content includes a bulleted list of factors contributing to the current state of machine learning. The meeting interface shows the presenter's name as "komal anadkat" and the time as 4:57 PM. The Windows taskbar is visible at the bottom.

WHY NOW?

- Flood of available data (especially with the advent of the Internet)
- Increasing computational power
- Growing progress in available algorithms and theory developed by researchers
- Increasing support from industries

Next a detailed discussion on its many applications took place. Insights on how ML actually works were also shared and some real life examples to make sure the students could relate.

A very important aspect of ML vs Deep Learning was covered (focusing on the various training techniques). Supervised and Unsupervised Learning were covered at length.

COLAB_NOTEBOOKS - Google D... Meet - ztn-ezgd-zcz

meet.google.com/ztn-ezgd-zcz

The Middle East ne... New folder How Does the U.S... Google Israel's Nuclear Pro... Preventing a nuclea... Iran nuclear crisis: S... Code

komal anadkat is presenting

SUPERVISED LEARNING

The diagram illustrates the supervised learning workflow. It starts with 'Input Raw Data' (a cluster of multi-colored dots). This data is split into a 'Training Data set' and a 'Desired Output' (a target value). The training data is fed into an 'Algorithm' (represented by a person icon), which is supervised by a 'Supervisor' (represented by a person at a desk). The algorithm's output goes to 'Processing' (represented by gears). The final 'Output' consists of three distinct clusters of data points (red, green, and purple).

Activate Windows
Go to Settings to activate Windows.

Type here to search

COLAB_NOTEBOOKS - Google D... Meet - ztn-ezgd-zcz

meet.google.com/ztn-ezgd-zcz

The Middle East ne... New folder How Does the U.S... Google Israel's Nuclear Pro... Preventing a nuclea... Iran nuclear crisis: S... Code_101

komal anadkat is presenting

Tarang Viroja and 30 more 5:13 PM

UNSUPERVISED LEARNING

- When we have unclassified and unlabeled data, the system attempts to uncover patterns from the data. There is no label or target given for the examples. One common task is to group similar examples together called clustering.

Unsupervised Learning

The diagram shows the unsupervised learning process. It begins with 'Input Raw Data' (a cluster of multi-colored dots). This data goes through 'Interpretation' (represented by a person icon) and is then processed by a 'Learning Algorithm' (represented by a gear icon). The algorithm's output goes to 'Processing' (represented by gears). The final 'Output' consists of three distinct clusters of data points (red, green, and purple). A legend indicates 'Unknown Output' and 'No Training Data Set'.

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17:13 04-07-2020

After providing the necessary theoretical introduction it was now time for some hands on practicals !.

```
Intro_to_colab.ipynb
File Edit View Insert Runtime Tools Help Last edited on 5 July
+ Code + Text
Connect Editing
Printing out Hello World
[ ] print('hello')
hello
Printing out the time of the Virtual Machine
[ ] import time
print(time.ctime())
Fri Jul 3 16:28:41 2020
Importing NumPy Library
[ ] import numpy as np
```

```
Intro_to_colab.ipynb
File Edit View Insert Runtime Tools Help Last edited on 5 July
+ Code + Text
Connect Editing
Basic plots using matplotlib
[ ] import numpy as np
from matplotlib import pyplot as plt

y = np.random.randn(100)
x = [x for x in range(len(y))]

plt.plot(x, y, '-')
plt.fill_between(x, y, 200, where = (y > 195), facecolor='g', alpha=0.6)

plt.title("Sample Plot")
plt.show()
Sample Plot

```

```
Intro_to_colab.ipynb
File Edit View Insert Runtime Tools Help Last edited on 5 July
+ Code + Text
Connect Editing
Reading and working with an actual Dataset
1. using scikit, pandas seaborn and matplotlib
2. working with the dataframe
[ ] import numpy as np
import pandas as pd
import pandas.util.testing as tm

from matplotlib import pyplot as plt

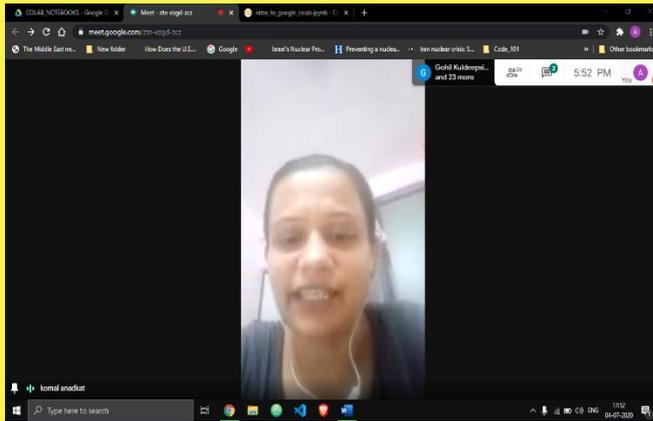
import seaborn as sns

from sklearn.model_selection import train_test_split
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import confusion_matrix

from joblib import dump, load
cols = ['sepal_length', 'sepal_width', 'petal_length', 'petal_width', 'class']
df = pd.read_csv('https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data', names=cols)
df.head()

df.describe()
sns.pairplot(df, hue='class');
sns.heatmap(df.corr(), annot=True)

df['class_encoded'] = df['class'].apply(lambda x: 0 if x == 'Iris-setosa' else 1 if x == 'Iris-versicolor' else 2)
df['class_encoded'].unique()
/usr/local/lib/python3.6/dist-packages/ipykernel_launcher.py:3: FutureWarning: pandas.util.testing is deprecated. Use the functions in the public API at pandas.testing instead.
This is deprecated from the following packages: pandas.util.testing, pandas.util.testing
```



After a brief explanation of the various ML techniques and a QnA session it was time to say goodbye, having given

students all the tools they need and pointing them in the right direction to get started with ML, it was indeed in many ways "Baby steps into the world of ML".

