

Machine Learning Model Deployment

How to deliver Machine Learning from Experiment to solutions

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Let's imagine this scenario


After finishing your Analysis on a dataset and finally you created **the best performance** machine learning model in Jupyter Notebook.

How can people **make use** of your result ?

Iris_101.ipynb

Iris Flower Prediction

Iris Flower Prediction is a classic **Multivariate Classification Problems** often used for Intro Machine Learning especially it's features or characteristic:



Iris Versic

The Iris dataset was used in **Problems**, and can also be fo

It includes three iris species > species is linearly separable t

Since it's very popular dataset **Seaborn**.

Load Library and

We will use **Seaborn** to loa
String we will use Tree Cl

```
[1]: import pandas as pd
import seaborn as sns
import matplotlib.pyplot
from sklearn.pipeline imp
from sklearn.preprocessing
from sklearn.ensemble imp
from sklearn.model_select
from sklearn.metrics imp
```

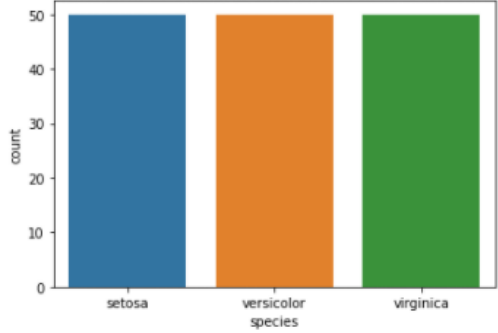
```
[2]: df = sns.load_dataset('i
df.head()
```

```
[2]:      sepal_length  sepal_width
```

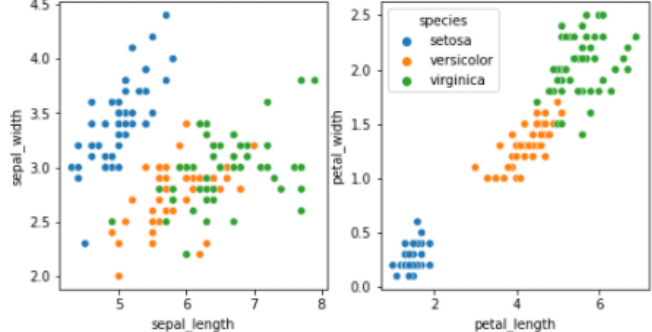
Exploratory Data Analysis

Usually before we started to modelling, we will take a look to the data to analyze the feature for prediction

```
[3]: sns.countplot(x='species',data=df)
plt.title('Count of Data available for Each Class ')
plt.show()
```




```
[4]: fig, (ax1, ax2) = plt.subplots(ncols=2, figsize=(8,4))
sns.scatterplot(x='sepal_length', y='sepal_width', hue='species', ax=ax1, data=
sns.scatterplot(x='petal_length', y='petal_width', hue='species', ax=ax2, data=
plt.show()
```



The number of each class label is 50, hence the data is balanced for each class.

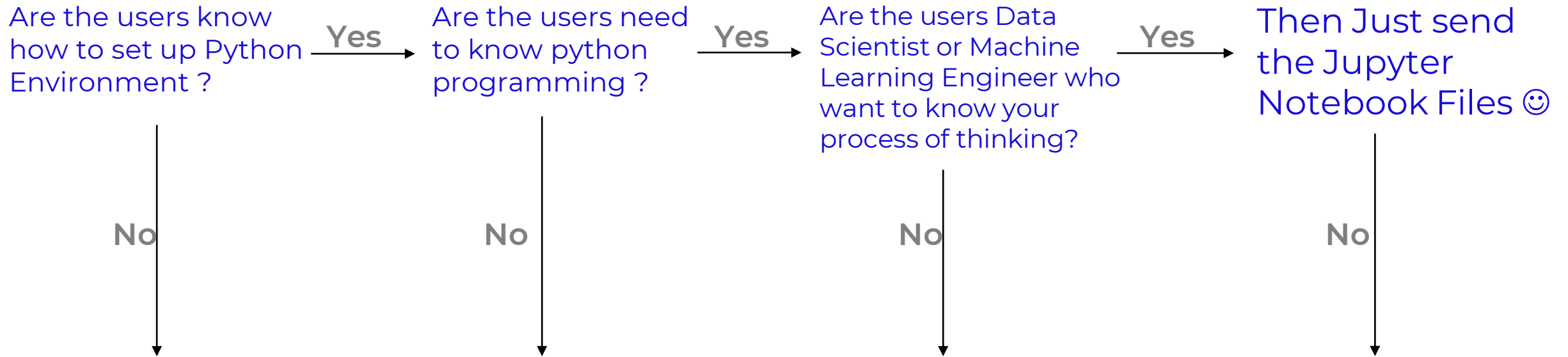
Based on Scatterplot, **Setosa** is Linear separable, but **Versicolor** and **Virginica** is seems uns sepal features, but in petal features seems it have separation in terms of petal length and pe

The background of the slide is decorated with various abstract geometric shapes. In the top left, there is a blue circle and a green triangle. Below the triangle is a large orange semi-circle. To the left of the semi-circle are two vertical yellow bars. In the center, there is a blue circle. At the bottom, there is a large orange circle surrounded by several yellow curved lines. On the left side, there is a green square outline.

Can we just send
them the Jupyter
notebook files and
let them run it ?

They should have Anaconda or
Jupyter Notebook / Lab installed
right ?

Depends on..



Then we need to make something else

Questions to help us consider

What are the machine learning solution purposes?

Who are the users?

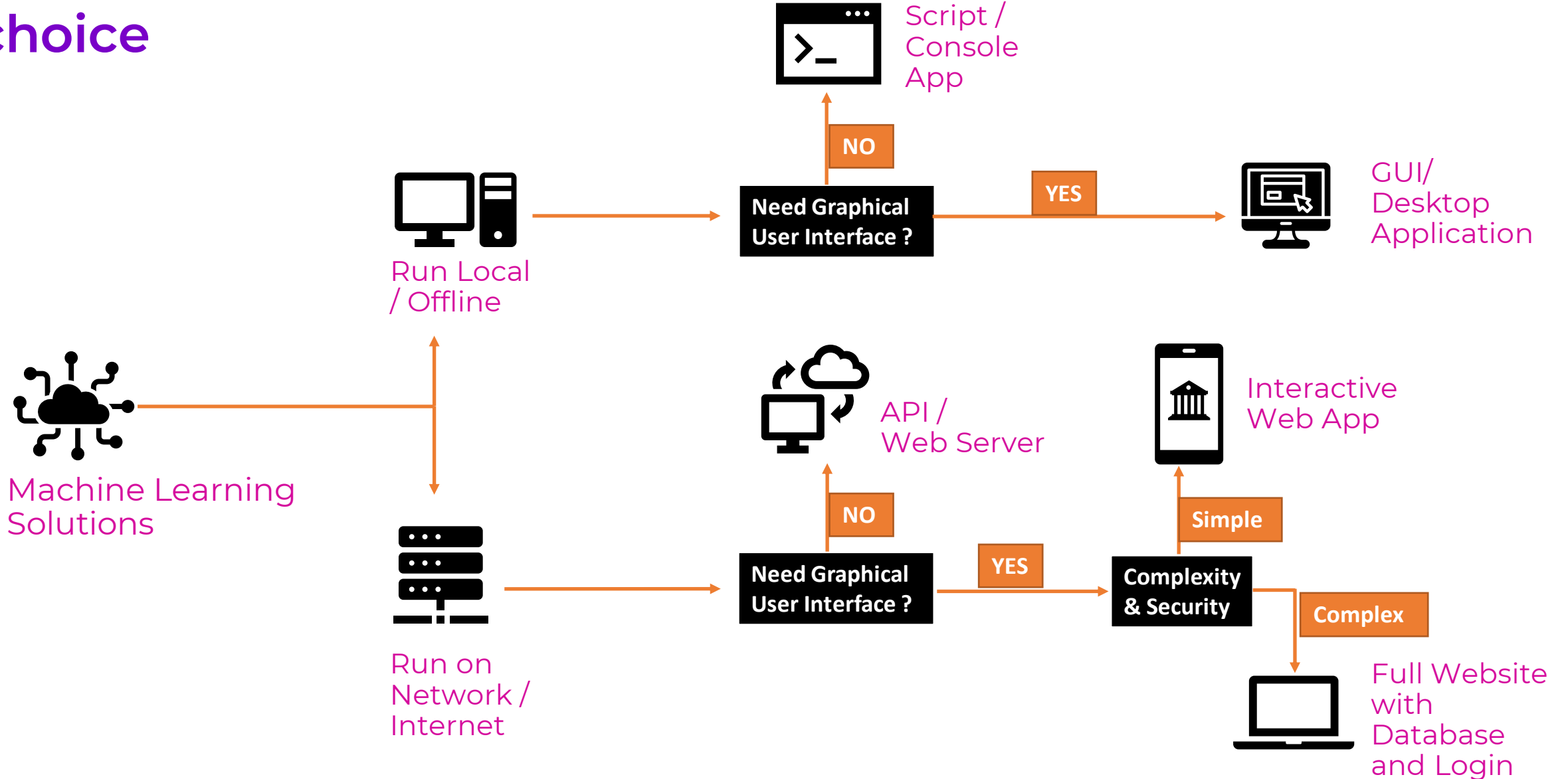
What is their level of knowledge?

Where the solution will be run ?

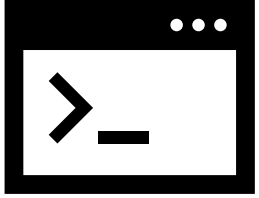
What is the requirement ?



Then We can make a choice



Run on Local / Offline App



Python Script

Model Deployment using Console Script is the most easiest and common method to serve the functionality of the program.

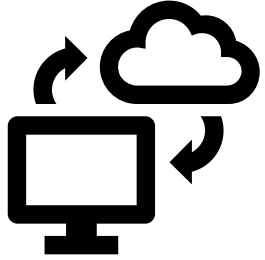
Script usually purposed to do **automation** or **scheduling** which doesn't need UI Interface.



Desktop GUI using DearPyGUI

Model Deployment using Desktop GUI using python can become an options if we want to make a Desktop GUI Application so that user can **interact** with the application interface such as slider and button.

Run on Network / Internet



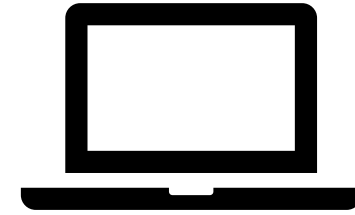
Web API using Flask

In some cases we may need more powerful hardware to do computation so by providing **Web Service/API**, existing user application like android app can just send REST Request for machine learning prediction



Interactive Web App using Streamlit

If we want to serve the Prediction application in the server as a web application so that it will be accessible through the network/internet and **also user can freely access and interact to the machine learning interface directly**, we can make Interactive web application.



Full Website with Database & Login

If we want to make our web app can store data in database format and also make access restriction to only some user that allowed to use the machine learning app, we can create Full Website that allow us to utilize **database** and **manage user access**.