BUILDING A MACHINE LEARNING MODEL

what is a machine learning model?

A machine learning model can be a mathematical representation of a real world processi steps to build a machine learning model:

- Gathering the data
- Data preprocessing
- Researching the model that will be best for type of data
- Training and testing the model
- Evaluation

DATA PRE-PROCESSING :

It is a process of cleaning the raw data i.e, the data collected in steps to be followed to process our data

- Import the libraries:

```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

- Import the data set:

WE WILL NEED TO LOACTE THE DIRECTORY OF CSV FILE AT FIRST AND READ IT USING A METHOD CALLED read__csv which can be found in the libraries called pandas

- Taking care of missing data:

SOME TIMES YOU MAY FIND DATA ARE MISSING IN THE DATA SET

WE WILL BE SUING dataset.isnull().any()method to see which column has missing values we can replace the missing values by mean,median,mode by using fillna

```
In [4]: dataset.isnull().any()

Out[4]: age         False
        sex         False
        bmi         False
        children    False
        smoker      False
        region      False
        charges     False
        dtype: bool
```

label encoding:

some times in dataset we will find textual data like names,countries,states then the machine cannot do mathematical operations or cannot understand textual data.so the textual data will be converted into numerical format called LABEL ENCODING

```
In [8]: from sklearn.preprocessing import LabelEncoder
        lb=LabelEncoder()
        dataset['sex']=lb.fit_transform(dataset['sex'])
        dataset
```

Out[8]:

	age	sex	bmi	children	smoker	region	charges
0	19	0	27.900	0	yes	southwest	16884.92400
1	18	1	33.770	1	no	southeast	1725.55230
2	28	1	33.000	3	no	southeast	4449.46200
3	33	1	22.705	0	no	northwest	21984.47061
4	32	1	28.880	0	no	northwest	3866.85520
...	...	...	...	...	...	...	...
1333	50	1	30.970	3	no	northwest	10600.54830
1334	18	0	31.920	0	no	northeast	2205.98080
1335	18	0	36.850	0	no	southeast	1629.83350
1336	21	0	25.800	0	no	southwest	2007.94500
1337	61	0	29.070	0	yes	northwest	29141.36030

1338 rows × 7 columns

● one hot enoding in the above figure extra three columns are created.Based on the catagories those many columns will be appended to x variable.to accomplish task we

will import another library called ONE HOT ENCODING ● feature scaling: THE FINAL STEP OF DATA PREPROCESSING IS TO APPLY A VERY IMPORTANT FEATURESCALING IT IS A METHOD USED TO STANDARDIZE THE RANGE OF INDEPENDENT VARIABLES OR FEATURES OF DATA ● splitting data into train and test ■ TO READ THE COLUMNS,WE WILL USE ILOC OF PANDAS(used to fix indexes for selection)

```
x = dataset.iloc[:, 0:3].values
y = dataset.iloc[:, 3].values
```

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:
```
dataset=pd.read_csv('datasets_15919_21036_insurance.csv')
```

In [3]:
```
dataset
```

Out[3]:

	age	sex	bmi	children	smoker	region	charges
0	19	female	27.900	0	yes	southwest	16884.92400
1	18	male	33.770	1	no	southeast	1725.55230
2	28	male	33.000	3	no	southeast	4449.46200
3	33	male	22.705	0	no	northwest	21984.47061
4	32	male	28.880	0	no	northwest	3866.85520
...	...	...	...	...	...	...	...
1333	50	male	30.970	3	no	northwest	10600.54830
1334	18	female	31.920	0	no	northeast	2205.98080
1335	18	female	36.850	0	no	southeast	1629.83350
1336	21	female	25.800	0	no	southwest	2007.94500
1337	61	female	29.070	0	yes	northwest	29141.36030

1338 rows × 7 columns

THE DATA IS PRE-PROCESSED BY USING JUPYTOR NOTE BOOK

FLASK FRAME WORK WITH MACHINE LEARNING MODEL in these section we will be

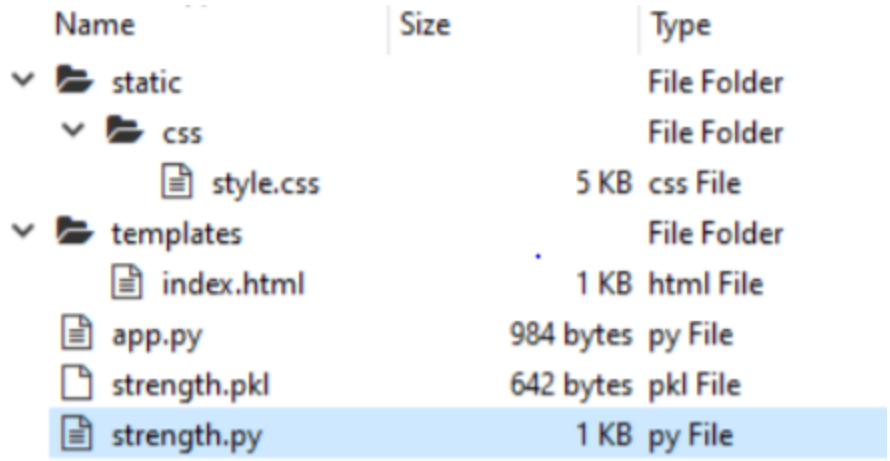
building a web application that is to be integrated with model we built we are using a machine learning model which is built for predicting the health insurance premiums and saved these

file as insurance.pkl To build these you should know basics of html,css boot strap,flask frame work and python TO BUILD A PYTHON CODE

●IMPORTING LIBRARIES
●ROUTING TO HTML PAGE
●SHOW CASING PREDICTION ON UI
● RUN THE APP IN LOCAL BROWSER

CREATE A PROJECT FOLDER WHICH SHOULD CONTAIN

● AN PYTHON FILL CALLED APP.Y
● YOUR MACHINE LEARNING ALGORITHM FILE
● MODEL FILE
● TEMPLATES FOLDER WHICH SHOULD CONTAIN INDEX.HTML FILE
● STATIC FOLDER WHICH CONTAINS CSS FOLDER WHICH CONTAINS STYLES.CSS



IMPORTING LIBRARIES:

IMPORTING FLASK MODULE IN THE PROJECT IS MANDATORY.AN OBJECT OF FLASK CLASS IS OUR WSGI APPLICATION.FLASK CONSTRUCTOR TAKES THE NAME OF CURRENT MODULE(__name__)as ARGUMENT.PICK LIBRARY TO LOAD THE MODEL FILE

```
import numpy as np
from flask import flask,request,jsonify,render_template
import pickle
```

app=FLASK(__NAME__)
model=pickle.load(open('strength.pkl','rb'))
@app.route('/')
def home():

return render__template('index.html')

MAIN FUNCTION

THIS IS USED TO RUN THE APPLICATION IN LOCAL HOST
if__name__=="__main__":
app.run(debug==true)

BUILDING AN INDEX.HTML FILE

```
<style>
.login{
top: 20%;
}
</style>
</head>

<body>
 <div class="login">
        <h1>Health Insurance Charges</h1>

     <!-- Main Input For Receiving Query to our ML -->
    <form action="{{ url_for('y_predict')}}"method="post">
        <input type="text" name="age" placeholder="age" required="required" />
        <input type="text" name="sex" placeholder="sex" required="required" />
        <input type="text" name="bmi" placeholder="bmi" required="required" />
        <input type="text" name="children" placeholder="children" required="required" />
        <input type="text" name="smoker" placeholder="smoker" required="required" />
        <input type="text" name="region" placeholder="region" required="required" />
        <button type="submit" class="btn btn-primary btn-block btn-large">Predict</button>

    </form>

   <br>
   <br>
   {{ prediction_text }}

 </div>


</body>
</html>
```

OUTPUT LOOKS LIKE

THE OUTPUT IS LIKE WHATEVER WE ARE GIVING TO THE MODEL SHOULD BE SAME AS HOW THE MODEL ACCEPTS FOR ANY KIND OF DATA TYPE LIKE INT,FLOAT ,CHAR & EVEN STRINGS