IDENTIFYING PATTERNS AND TRENDS IN CAMPUS PLACEMENT DATA USING MEACHINE LEARNING

SUBMITTED BY,

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INTRODUCTION:

OVERVIEW

1. PURPOSE
2. ADVANTAGES
3. DISADVANTAGES
4. CONCLUSION
5. FUTURE SCOPE

- PROJECT OVERVIEW :

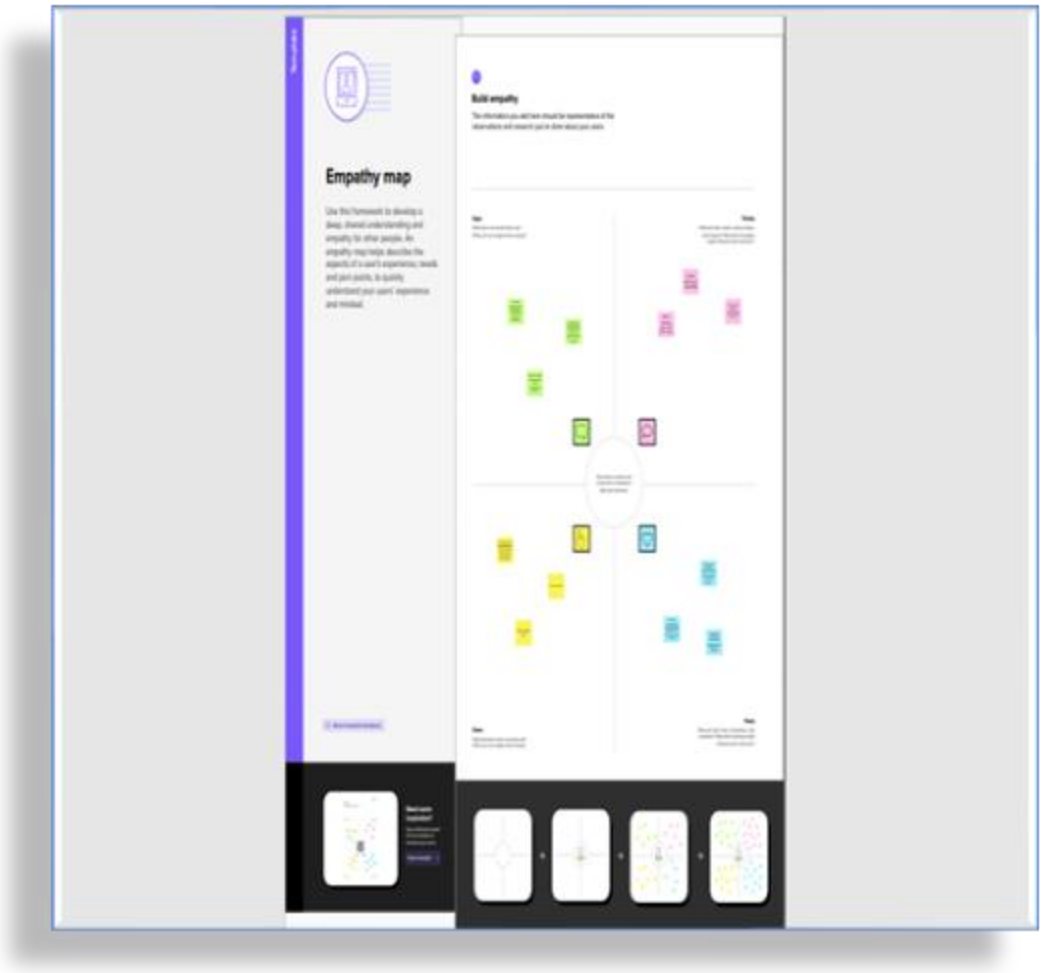
- Campus recruitment is a strategy for sourcing, engaging and hiring young talent for internship and entry level positions.
- College recruiting is typically a tactic for medium to large sized companies with high volume recruiting needs, but can range from small efforts to large scale operations.
- Campus recruitment often involves working with university career services centers and attending career fairs to meet in person with college students and recent graduates.
- It has various factors on candidates getting hired such as work experience, exam percentage etc.,
- Finally it contains the status of recruitment and remuneration details.
- We will be using algorithms such as KNN,SVM and ANN.
- Based on this a final data set is created and the interested candidates will be registered automatically by the system.

PURPOSE:

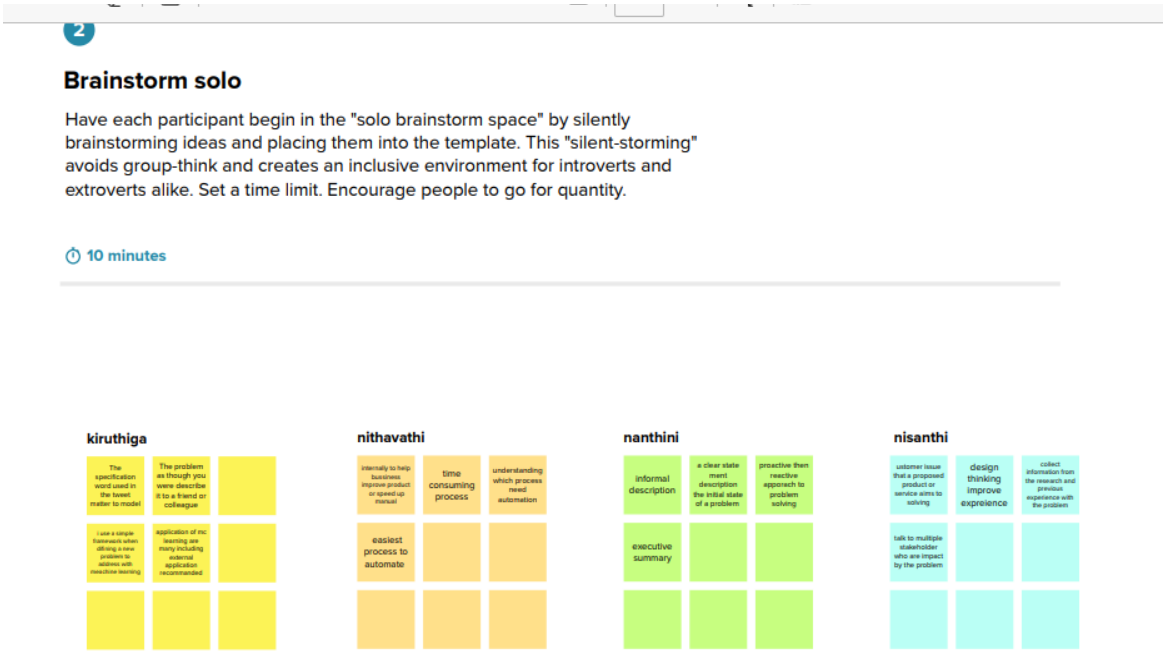
- Campus placement or campus recruiting is a program conducted within universities or other educational institutions to provide jobs to students nearing completion of their studies .
- In this type of program, the educational institutions partner with corporations who wish to recruit from the student population .
- Placement Management System manages student information in the college with regard to placement .
- It improves existing system .
- It has the facility of maintaining the details of the student , thereby reducing the manual work .
- It will save time and energy which are spending in making reports and collecting data.
- Placement Management System can be accessed throughout the college with proper login provided.

PROBLEM DEFINITION & DESIGN THINKING:

➢ EMPATHY MAP:



IDEATION & BRAINSTORMING MAP:



ADVANTAGES:

- **Work placement allows students to have a real time experience of the job at hand**
- **At times, what is taught in theory in a school or university may not be the same as a real time experience**
- **For example, a textbook may teach you theoretically,how to build a box**
- **Offering you an insight into the 'world of work' and allows you to get a feel for what you do and don't like doing**
- **Adds invaluable work expreience to your cv which is attractive to graduate empolyers**
- **Provides the opportunity to work with a more diverse group of pepole**

DISADVANTAGES:

- ❖ **Adapting to work placement might not be easy**
- ❖ **You'll have to communication ,get to know a new group of people and work under more pressure that you're used to**
- ❖ **As a result , work placements can be daunting and more stressful then your established student life**

APPLICATIONS:

- ✓ **Operating system: Windows 10**
- ✓ **Front end : html, python**
- ✓ **Software :anaconda, pycharm communication.**

CONCULISION:

- **Placement is understood as the allocation of people to jobs**
- **If the number of individuals is large in relation to available jobs, only the best qualified persons can be selected and placed**
- **Once we establish this unique profile for each individual, people and jobs can be matched optimally within the constraints set by available jobs and available people**

FUTURE SCOPE:

- **The project has a wide scope**
- **Our project mainly helps in improving productivity and makes use of utilization of resources**
- **Which provides the up to date information of all the students in the collage**

APPENDIX:

SOURCE CODE:

Open in Colab

```
import numpy as np
import pandas as pd
import os
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn import svm
from sklearn.metrics import accuracy_score
from sklearn.neighbors import KNeighborsClassifier
from sklearn import metrics
from sklearn.model_selection import cross_val_score
from sklearn import preprocessing
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
import joblib
from sklearn.metrics import accuracy_score
```

```
df=pd.read_csv(r"/content/collegePlace.csv")
df.head()
```

	Age	Gender	Stream	Internships	CGPA	Hostel	HistoryOfBacklogs	PlacedOrNot
0	22	Male	Electronics And Communication	1	8	1	1	1
1	21	Female	Computer Science	0	7	1	1	1
2	22	Female	Information Technology	1	6	0	0	1
3	21	Male	Information Technology	0	8	0	1	1
4	22	Male	Mechanical	0	8	1	0	1

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```
[ ] df=pd.read_csv(r"/content/collegePlace.csv")
    df.head()
```

	Age	Gender	Stream	Internships	CGPA	Hostel	HistoryOfBacklogs	PlacedOrNot
0	22	Male	Electronics And Communication	1	8	1	1	1
1	21	Female	Computer Science	0	7	1	1	1
2	22	Female	Information Technology	1	6	0	0	1
3	21	Male	Information Technology	0	8	0	1	1
4	22	Male	Mechanical	0	8	1	0	1

```
[ ] df.shape
```

```
(2966, 8)
```

```
[ ] df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2966 entries, 0 to 2965
Data columns (total 8 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   Age                2966 non-null   int64
 1   Gender             2966 non-null   object
 2   Stream             2966 non-null   object
 3   Internships        2966 non-null   int64
 4   CGPA               2966 non-null   int64
 5   Hostel             2966 non-null   int64
 6   HistoryOfBacklogs  2966 non-null   int64
```

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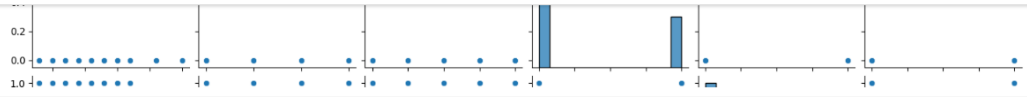


```
[ ] corr = df.corr()
```

```
[ ] ax=sns.heatmap(corr,vmin=-1,vmax=1,annot=True)
    bottom,top=ax.get_ylim()
    ax.set_ylim(bottom+0.5, top-0.5)
    plt.show()
    corr
```

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```
memory usage: 185.5+ KB
```

```
df.isnull().sum()
```

```
Age                0
Gender             0
Stream             0
Internships        0
CGPA               0
Hostel             0
HistoryOfBacklogs  0
PlacedOrNot        0
dtype: int64
```

```
sns.pairplot(df)
```

```
<seaborn.axisgrid.PairGrid at 0x7ff031523c10>
```

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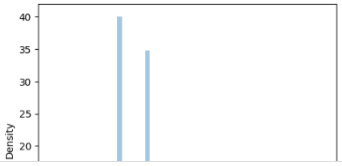
	Age	Internships	CGPA	Hostel	HistoryOfBacklogs	PlacedOrNot
Age	1.000000	0.006552	-0.119787	0.003042	-0.042586	0.046943
Internships	0.006552	1.000000	0.023496	0.004617	-0.015118	0.179334
CGPA	-0.119787	0.023496	1.000000	0.014991	0.002576	0.588648
Hostel	0.003042	0.004617	0.014991	1.000000	0.103506	-0.038182
HistoryOfBacklogs	-0.042586	-0.015118	0.002576	0.103506	1.000000	-0.022337
PlacedOrNot	0.046943	0.179334	0.588648	-0.038182	-0.022337	1.000000

```
def transformationplot(feature):
    plt.figure(figsize=(12,5))
    plt.subplot(1,2,1)
    sns.distplot(feature)
transformationplot(np.log(df['Age']))
```



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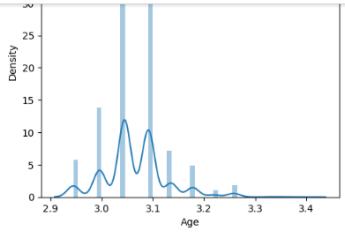


```
df=df.replace(['Male'],[0])
df=df.replace(['Female'],[1])

df=df.replace(['Computer Science'],[0])
df=df.replace(['Information Technology'],[1])
df=df.replace(['Electronics And Communication'],[2])
df=df.replace(['Mechanical'],[3])
df=df.replace(['Electrical'],[4])
df=df.replace(['Civil'],[5])
df
```

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	Age	Gender	Stream	Internships	CGPA	Hostel	HistoryOfBacklogs	PlacedOrNot
0	22	0	2	1	8	1	1	1
1	21	1	0	0	7	1	1	1
2	22	1	1	1	6	0	0	1
3	21	0	1	0	8	0	1	1
4	22	0	3	0	8	1	0	1
...	...	...	...	...	...	...	...	...
2961	23	0	1	0	7	0	0	0
2962	23	0	3	1	7	1	0	0
2963	22	0	1	1	7	0	0	0
2964	22	0	0	1	7	0	0	0
2965	23	0	5	0	8	0	0	1

2966 rows × 8 columns

```
plt.figure(figsize=(12,5))
plt.subplot(121)
sns.distplot(df['CGPA'],color='r')
```

```
<Axes: xlabel='CGPA', ylabel='Density'>
```

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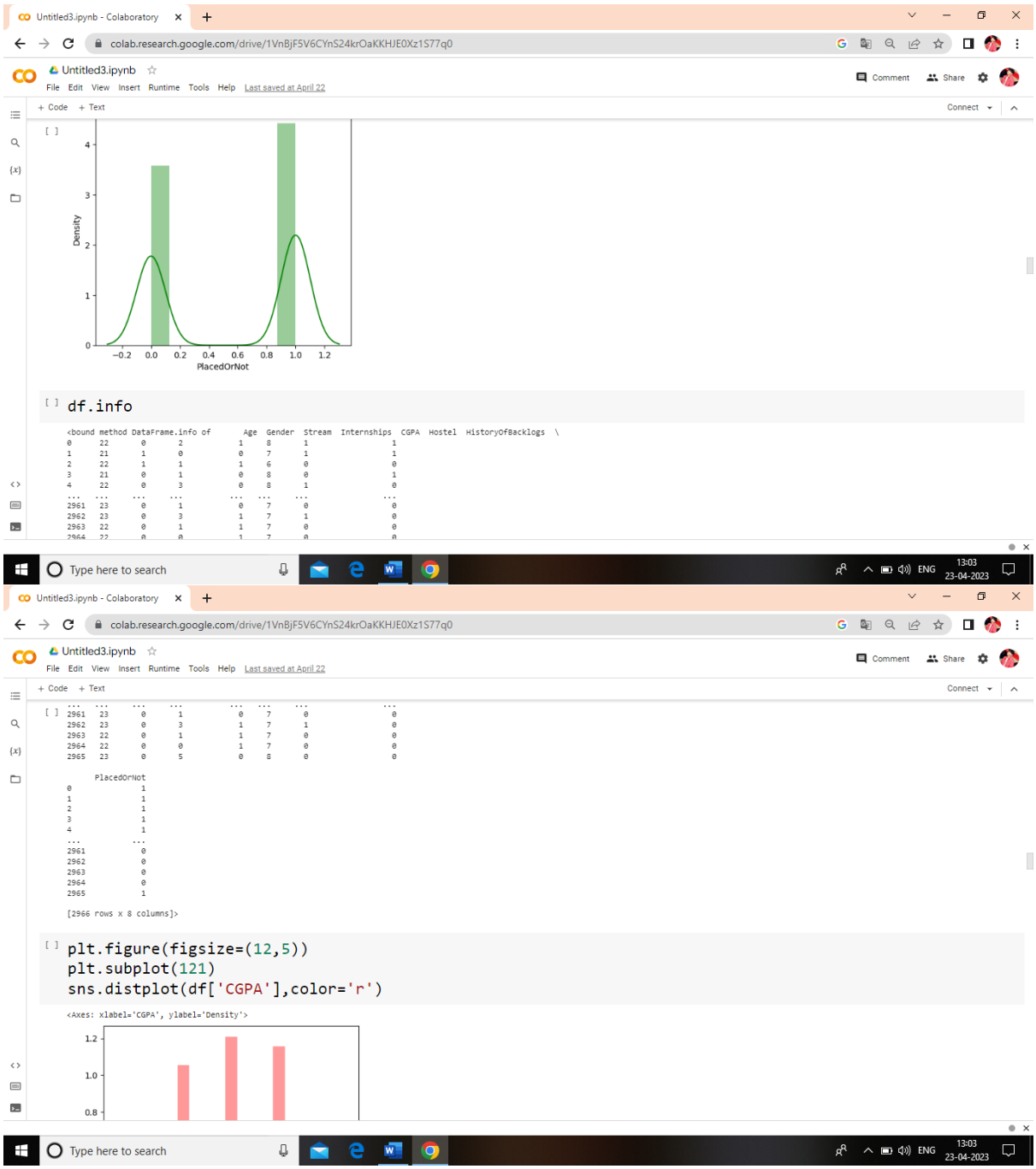
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Density
PlacedOrNot
df.info
<bound method DataFrame.info of Age Gender Stream Internships CGPA Hostel HistoryOfBacklogs \
PlacedOrNot
[2966 rows x 8 columns]>
plt.figure(figsize=(12,5))
plt.subplot(121)
sns.distplot(df['CGPA'],color='r')
<Axes: xlabel='CGPA', ylabel='Density'>
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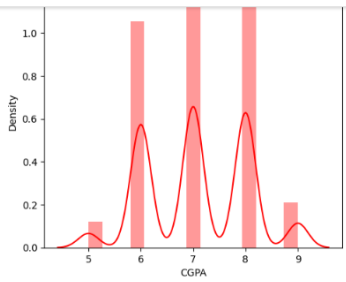


```
from matplotlib.offsetbox import martist
plt.figure(figsize=(30,5))
plt.subplot(1,4,1)
sns.countplot(x="PlacedOrNot",data=df, ec='black')
plt.subplot(1,4,2)
sns.countplot(y="Stream",data=df, ec='black')
plt.show()
```

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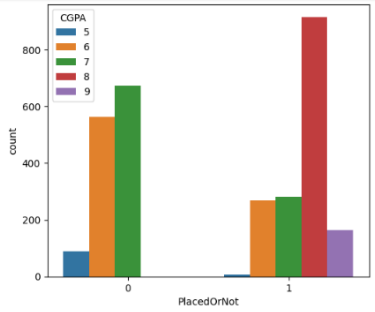


```
#sns.swarmplot(x='PlacedOrNot', y='CGPA', hue='Stream', data=df)
```

```
df.describe()
```

	Age	Gender	Stream	Internships	CGPA	Hostel	HistoryOfBacklogs	PlacedOrNot
count	2966.000000	2966.000000	2966.000000	2966.000000	2966.000000	2966.000000	2966.000000	2966.000000
mean	21.485840	0.165543	1.932569	0.703641	7.073837	0.269049	0.192178	0.552596

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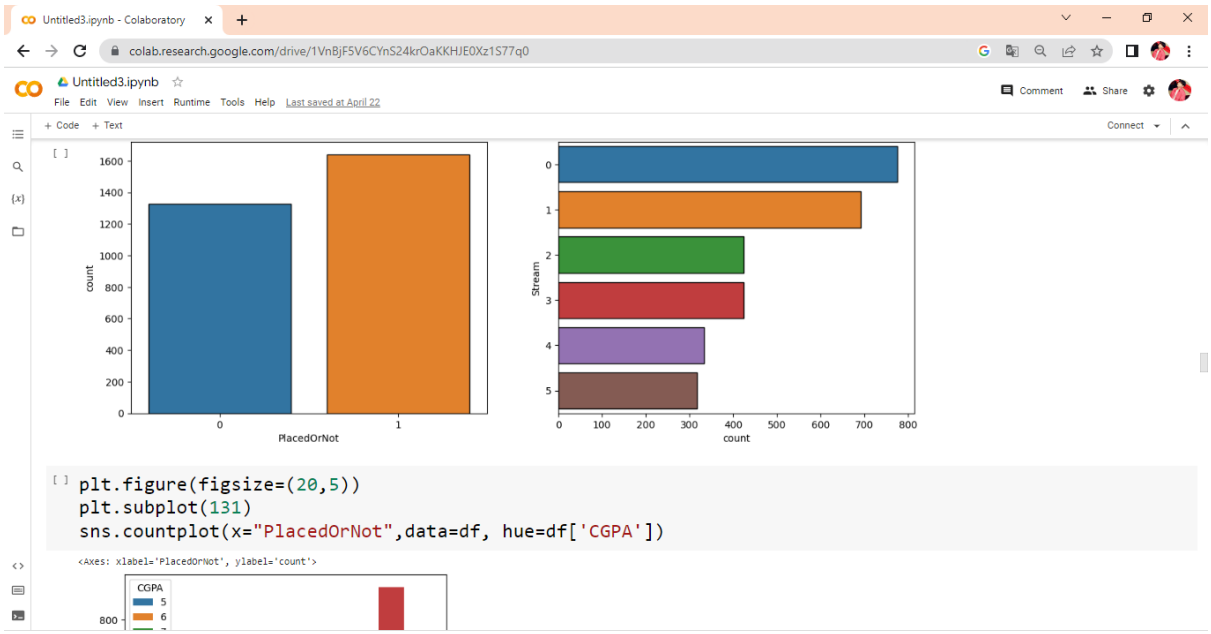
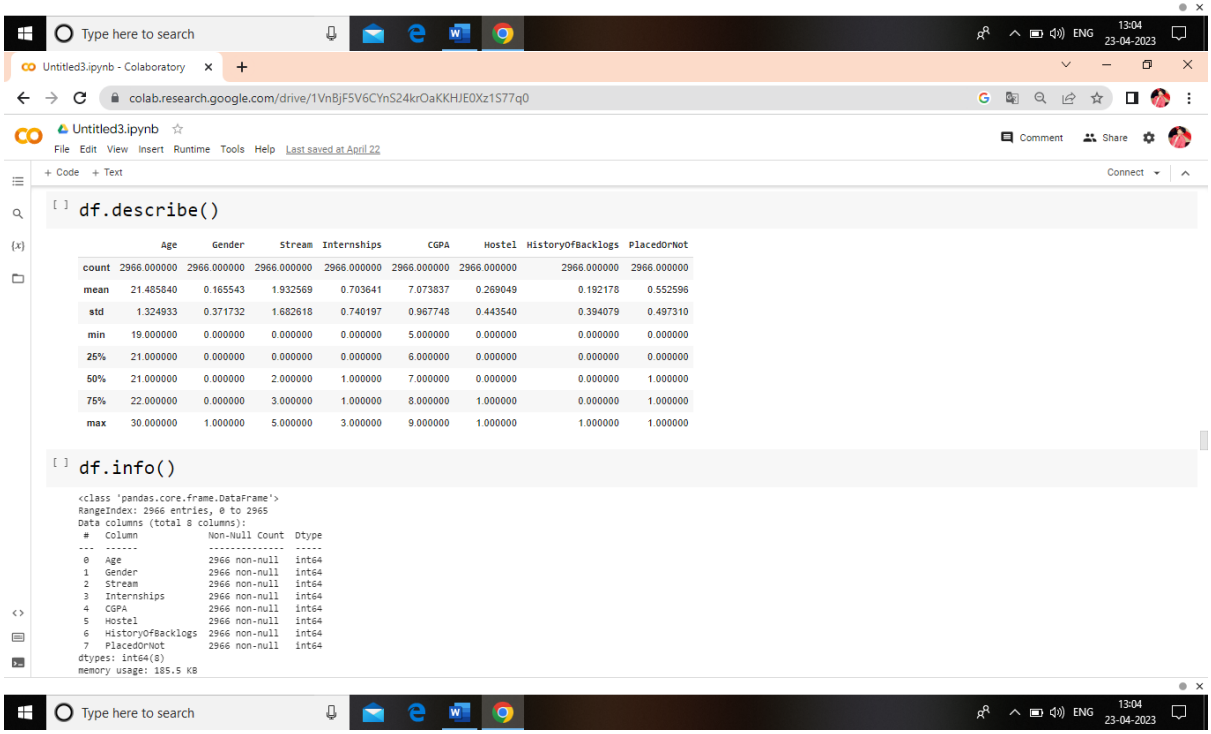



```
plt.figure(figsize=(20,5))
plt.subplot(131)
sns.countplot(x="PlacedOrNot",data=df, hue=df['CGPA'])
```

```
<Axes: xlabel='PlacedOrNot', ylabel='count'>
```

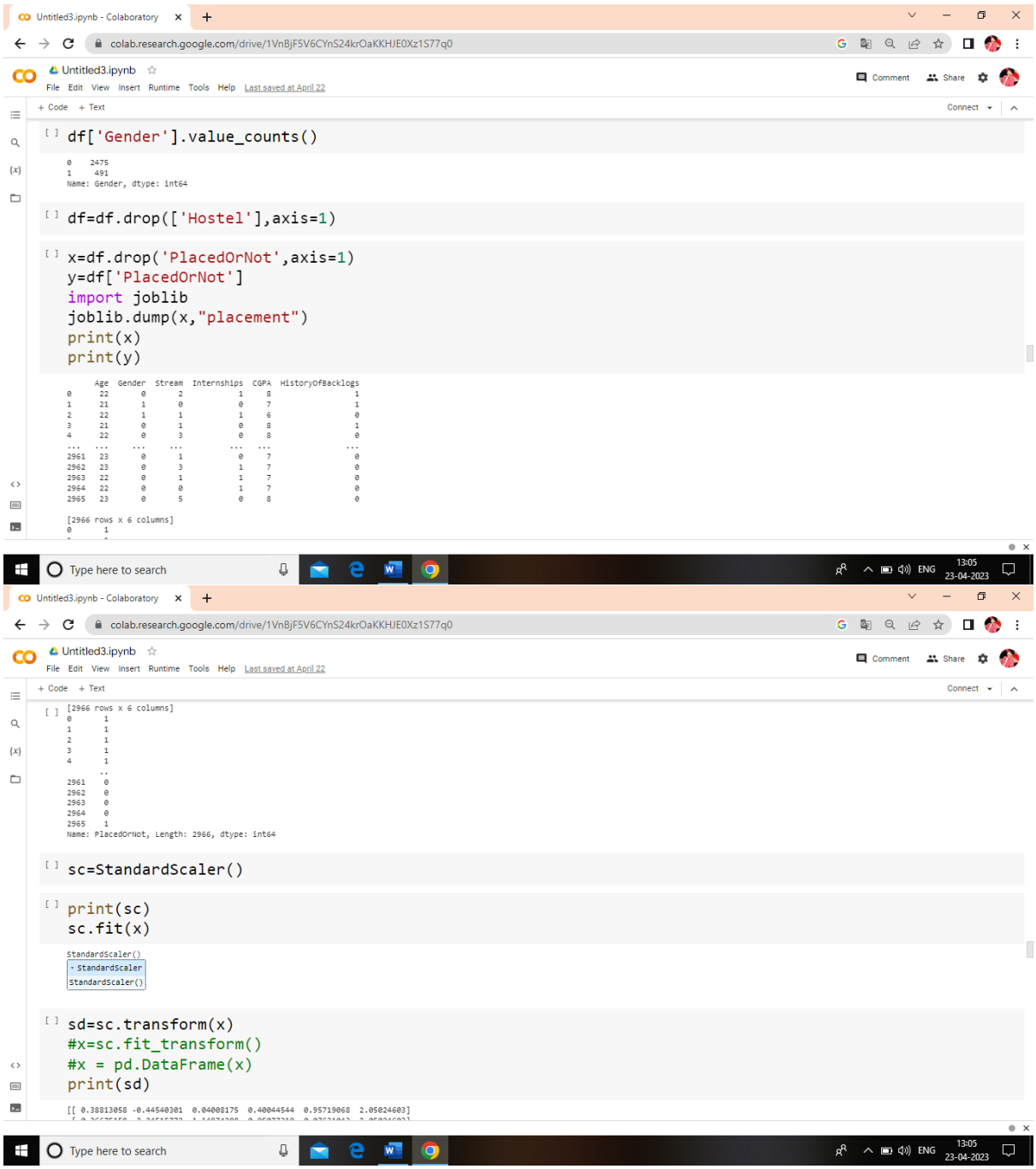




```
df.describe()
```

	Age	Gender	Stream	Internships	CGPA	Hostel	HistoryOfBacklogs	PlacedOrNot
count	2966.000000	2966.000000	2966.000000	2966.000000	2966.000000	2966.000000	2966.000000	2966.000000
mean	21.485840	0.165543	1.932569	0.703641	7.073837	0.269049	0.192178	0.552596
std	1.324933	0.371732	1.682618	0.740197	0.967748	0.443540	0.394079	0.497310
min	19.000000	0.000000	0.000000	0.000000	5.000000	0.000000	0.000000	0.000000
25%	21.000000	0.000000	0.000000	0.000000	6.000000	0.000000	0.000000	0.000000
50%	21.000000	0.000000	2.000000	1.000000	7.000000	0.000000	0.000000	1.000000
75%	22.000000	0.000000	3.000000	1.000000	8.000000	1.000000	0.000000	1.000000
max	30.000000	1.000000	5.000000	3.000000	9.000000	1.000000	1.000000	1.000000

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2966 entries, 0 to 2965
Data columns (total 8 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   Age                 2966 non-null   int64
 1   Gender              2966 non-null   int64
 2   Stream              2966 non-null   int64
 3   Internships         2966 non-null   int64
 4   CGPA                2966 non-null   int64
 5   Hostel              2966 non-null   int64
 6   HistoryOfBacklogs   2966 non-null   int64
 7   PlacedOrNot         2966 non-null   int64
dtypes: int64(8)
memory usage: 185.5 KB
```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df['Gender'].value_counts()
0 2475
1 491
Name: Gender, dtype: int64
df=df.drop(['Hostel'],axis=1)
x=df.drop('PlacedOrNot',axis=1)
y=df['PlacedOrNot']
import joblib
joblib.dump(x,"placement")
print(x)
print(y)
Age Gender Stream Internships CGPA HistoryOfBacklogs
0 22 0 2 1 8 1
1 21 1 0 0 7 1
2 22 1 1 1 6 0
3 21 0 1 0 8 1
4 22 0 3 0 8 0
... ...
2961 23 0 1 0 7 0
2962 23 0 3 1 7 0
2963 22 0 1 1 7 0
2964 22 0 0 1 7 0
2965 23 0 5 0 8 0
[2966 rows x 6 columns]
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[2966 rows x 6 columns]
0 1
1 1
2 1
3 1
4 1
..
2961 0
2962 0
2963 0
2964 0
2965 1
Name: PlacedOrNot, Length: 2966, dtype: int64
sc=StandardScaler()
print(sc)
sc.fit(x)
StandardScaler()
StandardScaler
StandardScaler()
sd=sc.transform(x)
#x=sc.fit_transform()
#x = pd.DataFrame(x)
print(sd)
[[0.38813058 -0.44540301 0.04008175 0.40044544 0.95719068 2.05024603]
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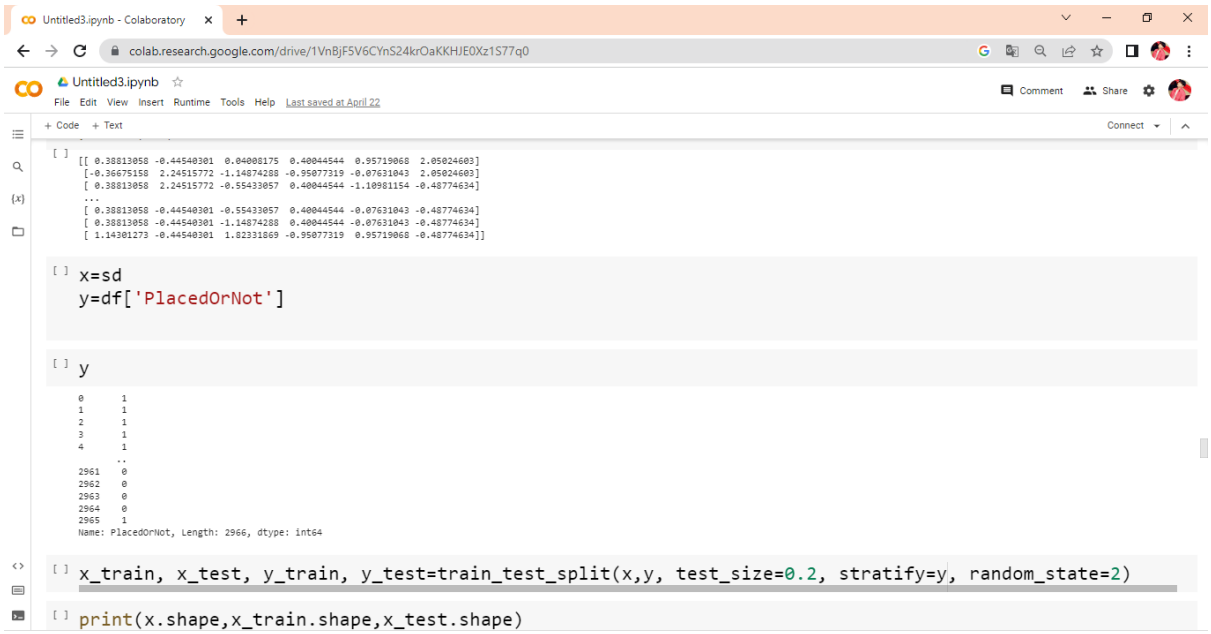
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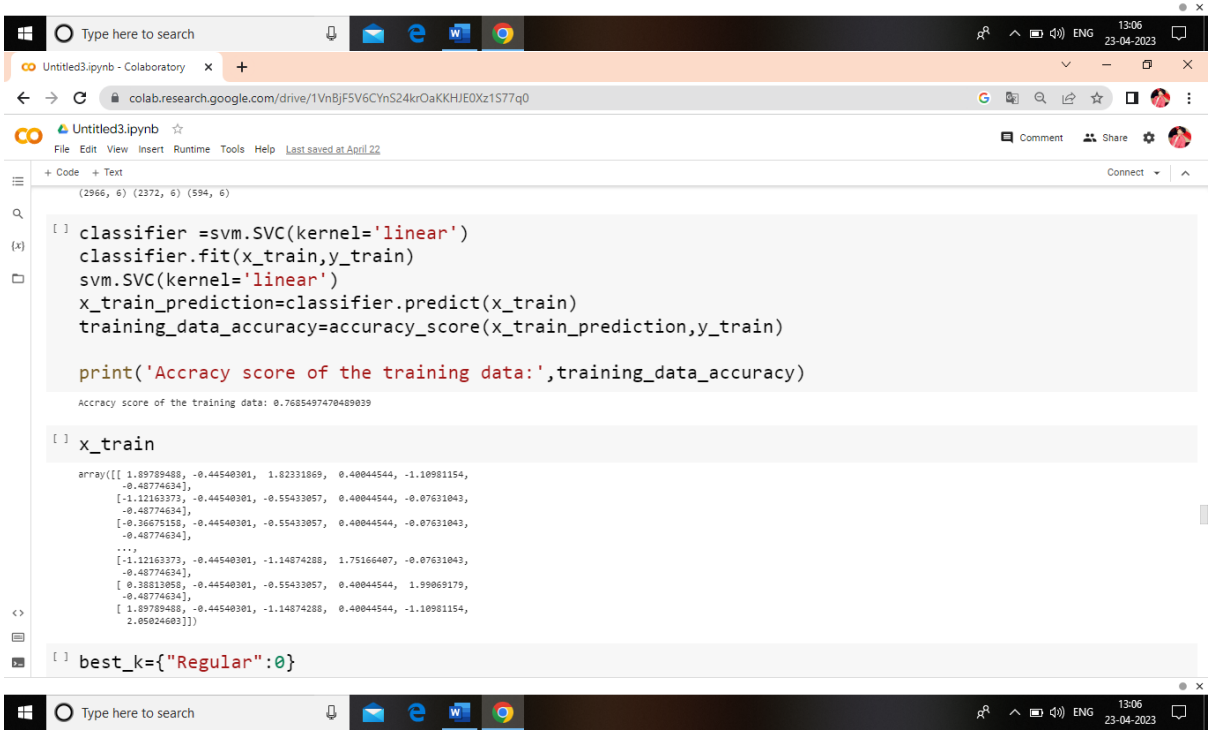
[ ]
[[0.38813058 -0.44540301 0.04008175 0.40044544 0.95719068 2.05024603]
[-0.36675158 2.24515772 -1.14874288 -0.95077319 -0.07631043 2.05024603]
[0.38813058 2.24515772 -0.55433057 0.40044544 -1.10981154 -0.48774634]
...
[0.38813058 -0.44540301 -0.55433057 0.40044544 -0.07631043 -0.48774634]
[0.38813058 -0.44540301 -1.14874288 0.40044544 -0.07631043 -0.48774634]
[1.14301273 -0.44540301 1.82331869 -0.95077319 0.95719068 -0.48774634]]
[ ]
x=sd
y=df['PlacedOrNot']
[ ]
y
0 1
1 1
2 1
3 1
4 1
..
2961 0
2962 0
2963 0
2964 0
2965 1
Name: PlacedOrNot, Length: 2966, dtype: int64
[ ]
x_train, x_test, y_train, y_test=train_test_split(x,y, test_size=0.2, stratify=y, random_state=2)
[ ]
print(x.shape,x_train.shape,x_test.shape)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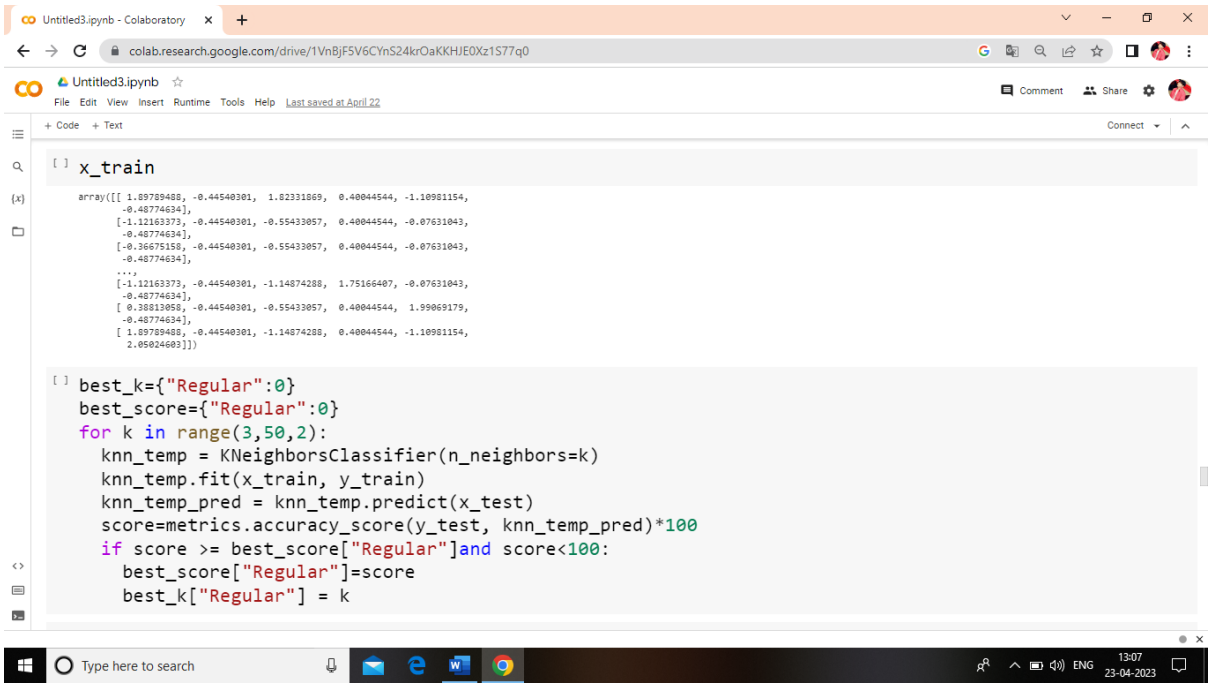
(2966, 6) (2372, 6) (594, 6)
[ ]
classifier =svm.SVC(kernel='linear')
classifier.fit(x_train,y_train)
svm.SVC(kernel='linear')
x_train_prediction=classifier.predict(x_train)
training_data_accuracy=accuracy_score(x_train_prediction,y_train)
print('Accracy score of the training data:',training_data_accuracy)
Accracy score of the training data: 0.7685497470489039
[ ]
x_train
array([[1.89789488, -0.44540301, 1.82331869, 0.40044544, -1.10981154,
-0.48774634],
[-1.12163373, -0.44540301, -0.55433057, 0.40044544, -0.07631043,
-0.48774634],
[-0.36675158, -0.44540301, -0.55433057, 0.40044544, -0.07631043,
-0.48774634],
...,
[-1.12163373, -0.44540301, -1.14874288, 1.75166407, -0.07631043,
-0.48774634],
[0.38813058, -0.44540301, -0.55433057, 0.40044544, 1.99069179,
-0.48774634],
[1.89789488, -0.44540301, -1.14874288, 0.40044544, -1.10981154,
2.05024603]])
[ ]
best_k={"Regular":0}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[ ] x_train
array([[1.89789488, -0.44540301, 1.82331869, 0.40044544, -1.10981154,
-0.48774634],
[-1.12163373, -0.44540301, -0.55433057, 0.40044544, -0.07631043,
-0.48774634],
[-0.36675158, -0.44540301, -0.55433057, 0.40044544, -0.07631043,
-0.48774634],
...,
[-1.12163373, -0.44540301, -1.14874288, 1.75166407, -0.07631043,
-0.48774634],
[0.38813058, -0.44540301, -0.55433057, 0.40044544, 1.99069179,
-0.48774634],
[1.89789488, -0.44540301, -1.14874288, 0.40044544, -1.10981154,
2.05024603]])
[ ] best_k={"Regular":0}
best_score={"Regular":0}
for k in range(3,50,2):
knn_temp = KNeighborsClassifier(n_neighbors=k)
knn_temp.fit(x_train, y_train)
knn_temp_pred = knn_temp.predict(x_test)
score=metrics.accuracy_score(y_test, knn_temp_pred)*100
if score >= best_score["Regular"]and score<100:
best_score["Regular"]=score
best_k["Regular"] = k
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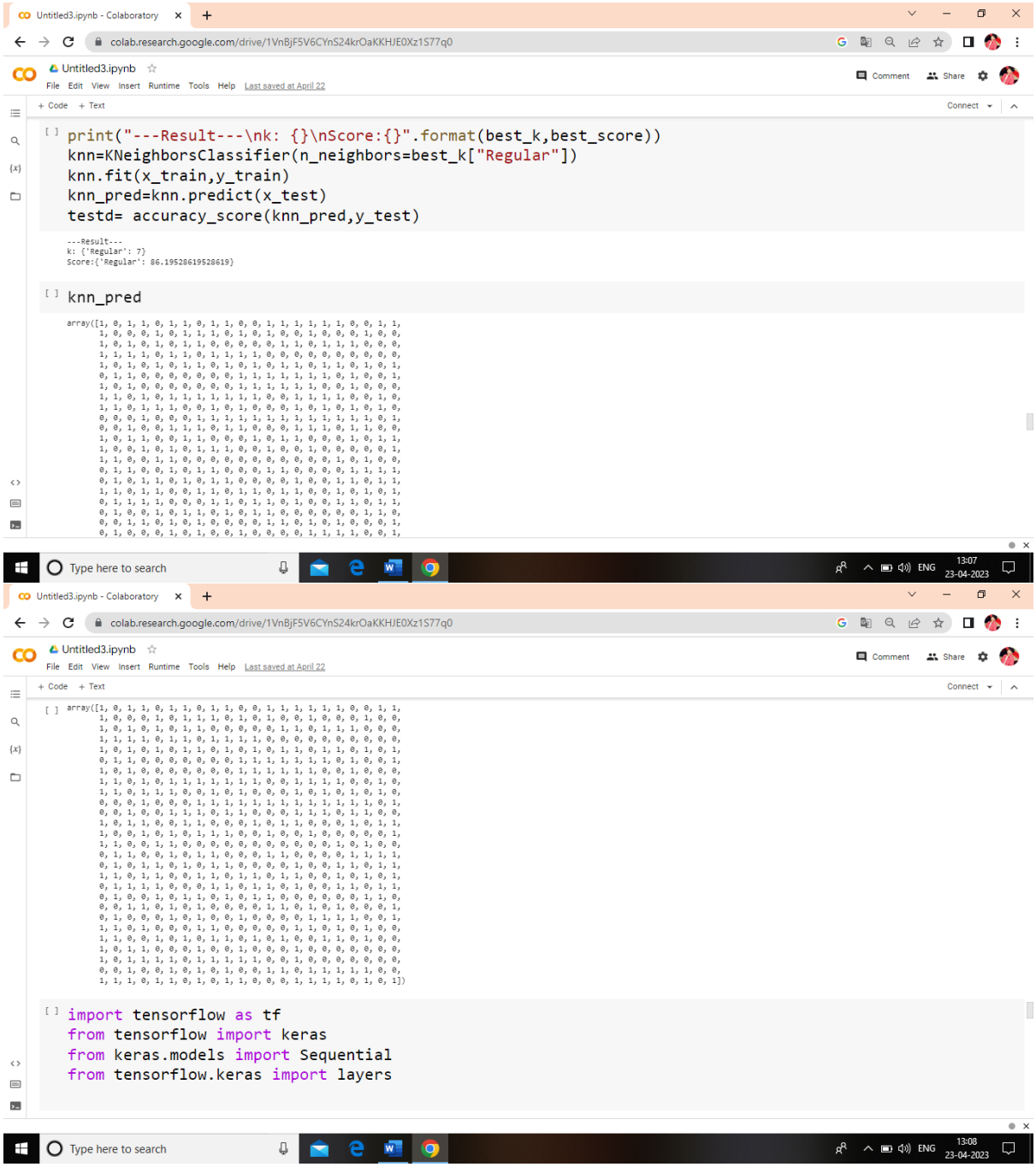
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[ ] print("---Result---\nk: {}\nScore:{}".format(best_k,best_score))
knn=KNeighborsClassifier(n_neighbors=best_k["Regular"])
knn.fit(x_train,y_train)
knn_pred=knn.predict(x_test)
testd= accuracy_score(knn_pred,y_test)
---Result---
k: {'Regular': 7}
Score:{'Regular': 86.19528619528619}
[ ] knn_pred
array([1, 0, 1, 1, 0, 1, 1, 0, 1, 1, 0, 0, 1, 1, 1, 1, 1, 1, 0, 0, 1, 1,
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1, 1, 1, 0, 1, 1, 0, 1, 0, 1, 1, 0, 0, 0, 1, 1, 1, 1, 0, 1, 1])
[ ] import tensorflow as tf
from tensorflow import keras
from keras.models import Sequential
from tensorflow.keras import layers
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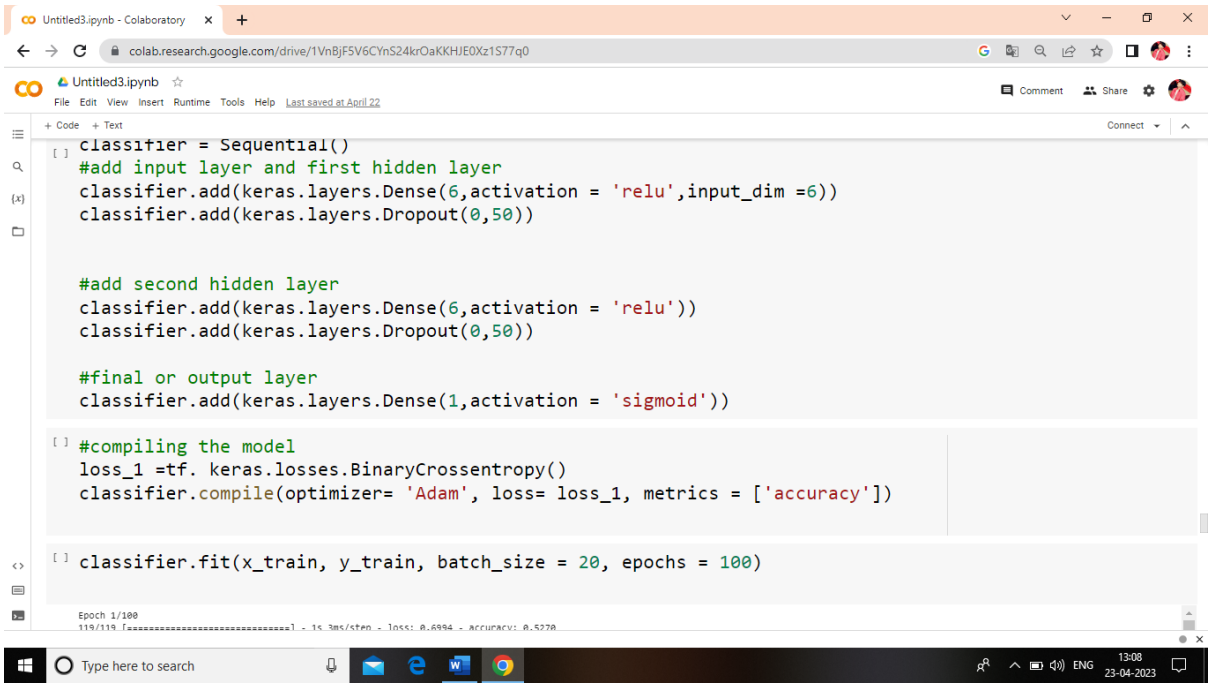
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[ ]
classifier = Sequential()
#add input layer and first hidden layer
classifier.add(keras.layers.Dense(6,activation = 'relu',input_dim =6))
classifier.add(keras.layers.Dropout(0,50))
#add second hidden layer
classifier.add(keras.layers.Dense(6,activation = 'relu'))
classifier.add(keras.layers.Dropout(0,50))
#final or output layer
classifier.add(keras.layers.Dense(1,activation = 'sigmoid'))
[ ]
#compiling the model
loss_1 =tf. keras.losses.BinaryCrossentropy()
classifier.compile(optimizer= 'Adam', loss= loss_1, metrics = ['accuracy'])
[ ]
classifier.fit(x_train, y_train, batch_size = 20, epochs = 100)
Epoch 1/100
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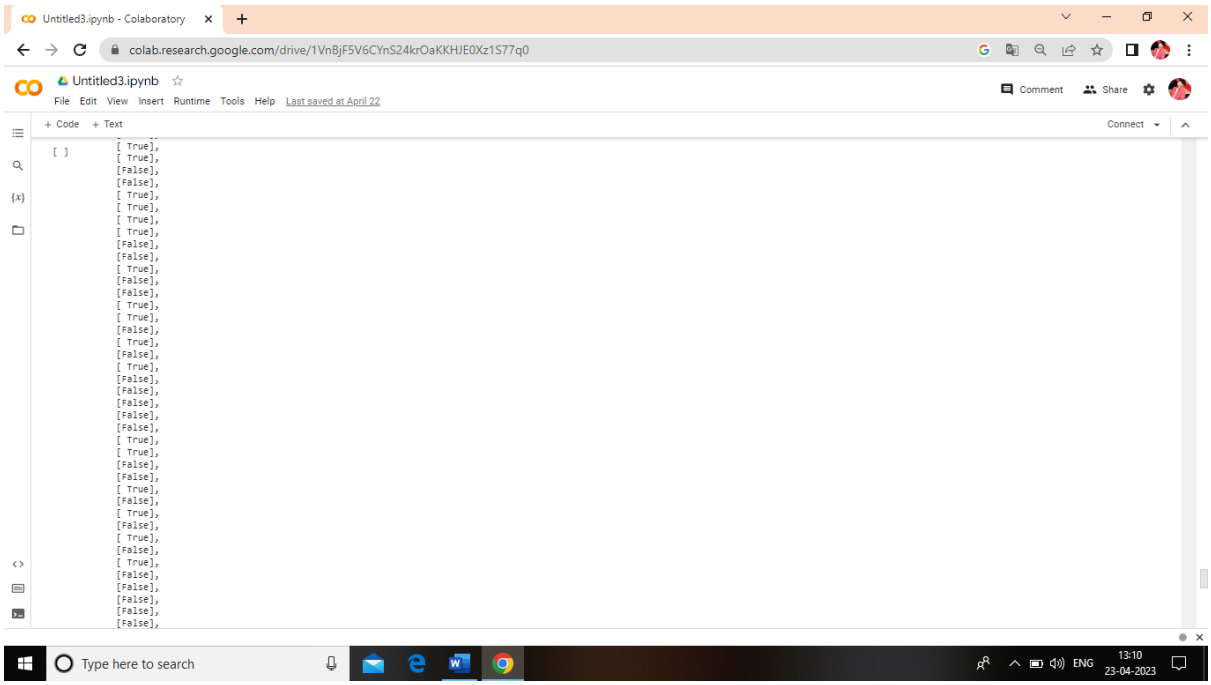
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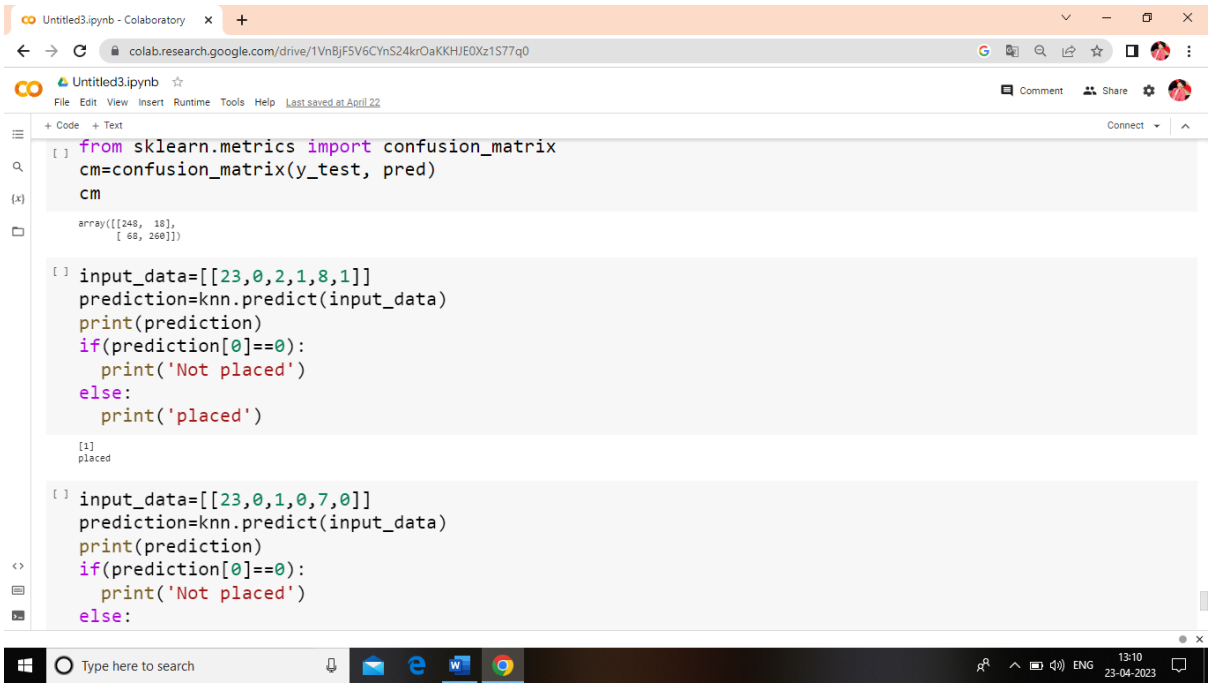
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from sklearn.metrics import confusion_matrix
cm=confusion_matrix(y_test, pred)
cm
array([[248, 18],
[68, 260]])
input_data=[[23,0,2,1,8,1]]
prediction=knn.predict(input_data)
print(prediction)
if(prediction[0]==0):
print('Not placed')
else:
print('placed')
[1]
placed
input_data=[[23,0,1,0,7,0]]
prediction=knn.predict(input_data)
print(prediction)
if(prediction[0]==0):
print('Not placed')
else:
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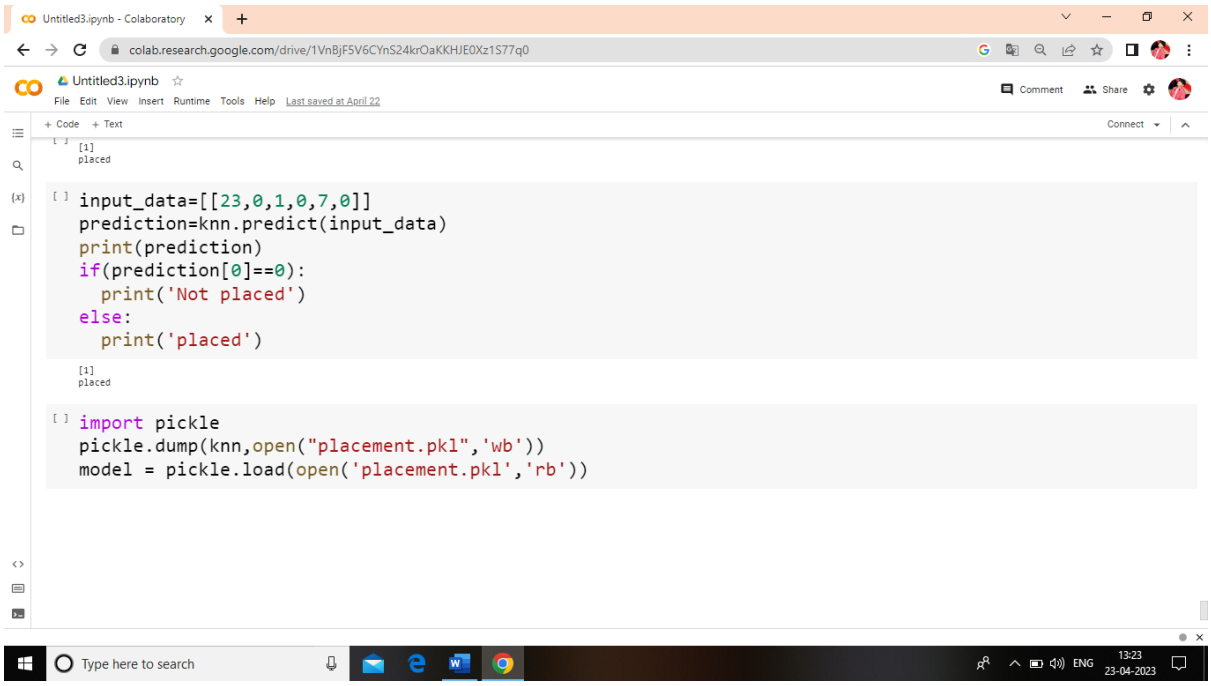
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placed
input_data=[[23,0,1,0,7,0]]
prediction=knn.predict(input_data)
print(prediction)
if(prediction[0]==0):
print('Not placed')
else:
print('placed')
[1]
placed
import pickle
pickle.dump(knn,open("placement.pkl",'wb'))
model = pickle.load(open('placement.pkl','rb'))
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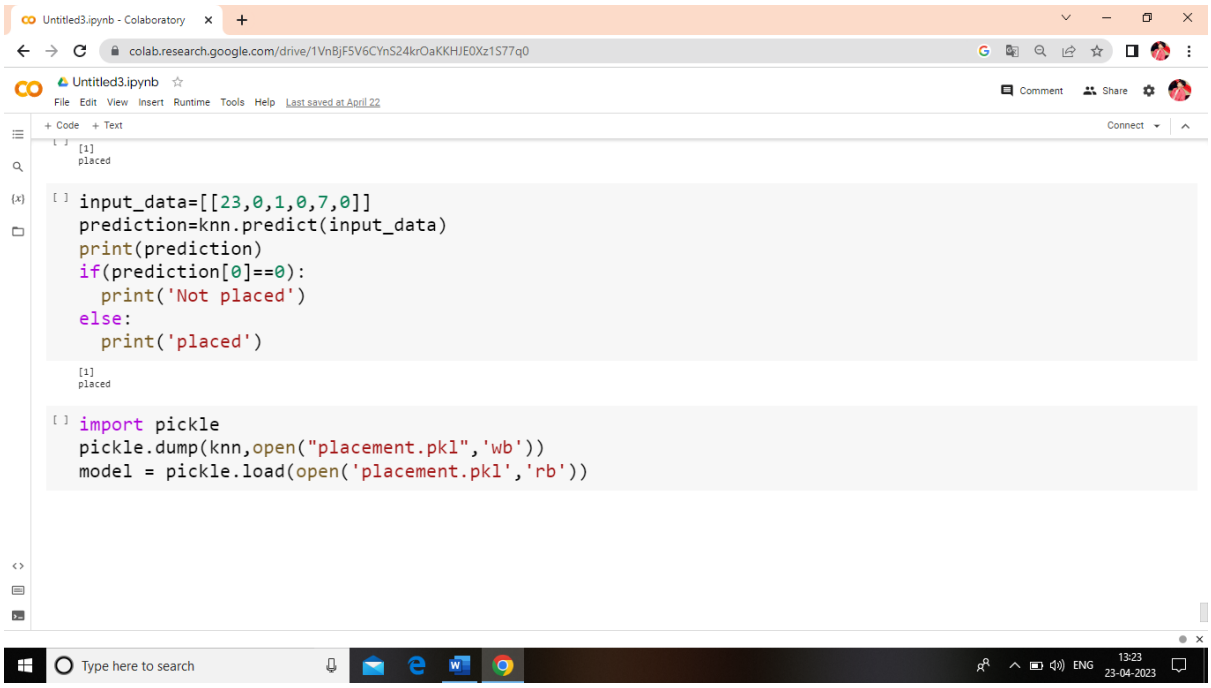
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[1]
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model = pickle.load(open('placement.pkl','rb'))
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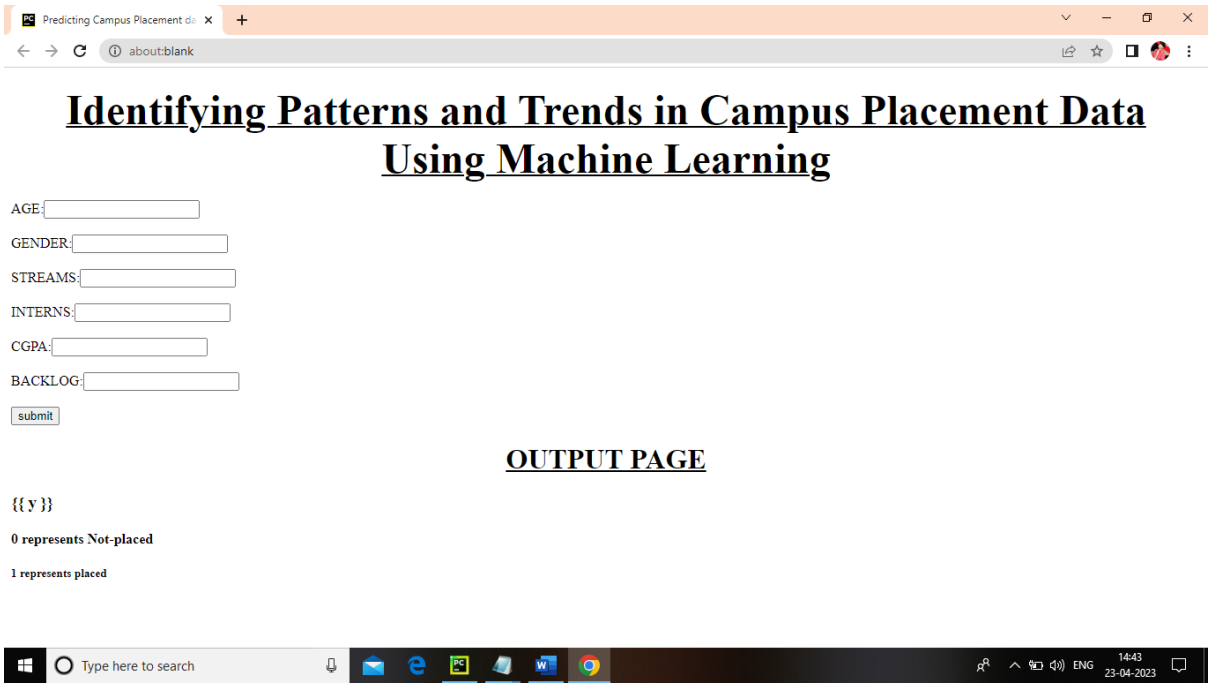
OUTPUT: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