Name- Akash Kumar
Internship Program- Data Science With Machine Learning and Python
Batch- Jan 2022 – Mar 2022
Certificate Code- TCRIB2R43
Date of submission- 3 APRIL 2022


Technical Coding Research Innovation, Navi Mumbai,
Maharashtra, India-410206

# (HR Employee Attrition Data Analysis)

A Case-Study Submitted for the requirement of
**Technical Coding Research Innovation**

For the Internship Project work done during
**DATA SCIENCE WITH MACHINE LEARNING AND PYTHON INTERNSHIP PROGRAM**

by
AKASH KUMAR (TCRIB2R43)

Rutuja Doiphode
CO-FOUNDER &CEO
TCR innovation.

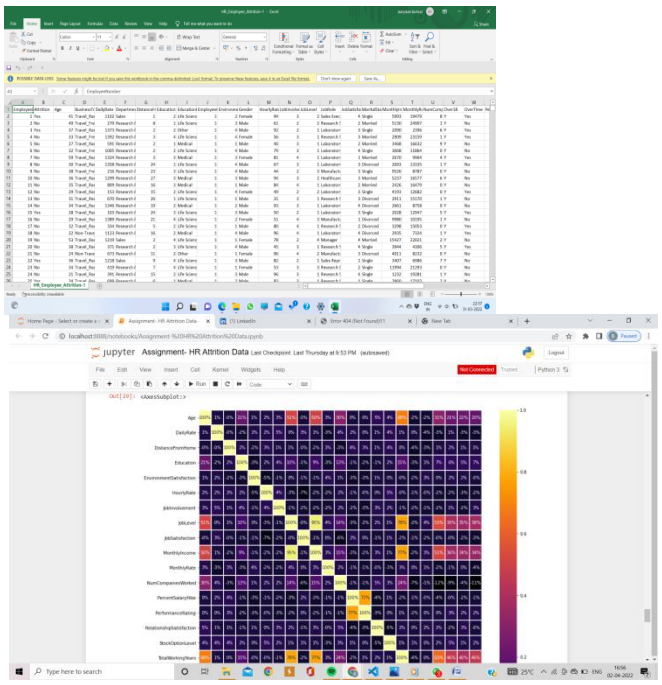
Name- Akash Kumar
Internship Program- Data Science With Machine Learning and Python
Batch- Jan 2022 – Mar 2022
Certificate Code- TCRIB2R43
Date of submission- 3 APRIL 2022

# Preparation of Papers in Two-Column Format for Conference Proceedings Published by IEEE[1]


Bart Simpson and Homer Simpson
*Department of Nuclear Power Engineering*
*University of Springfield*
*Springfield, Nostate 12345, USA*
{bart.simpson & homer.simpson}@uspringfield.edu

Monkey King, Bajie Zhu and Seng Tang
*Department of Intelligent Robotics*
*University of Huaguoshan*
*Huaguoshan, Jileshijie Province, China*
monkey.king@uhuaguoshan.edu.cn


***Aim-we need to predict whether a given employe will leave the organization or not***



## INTRODUCTION:

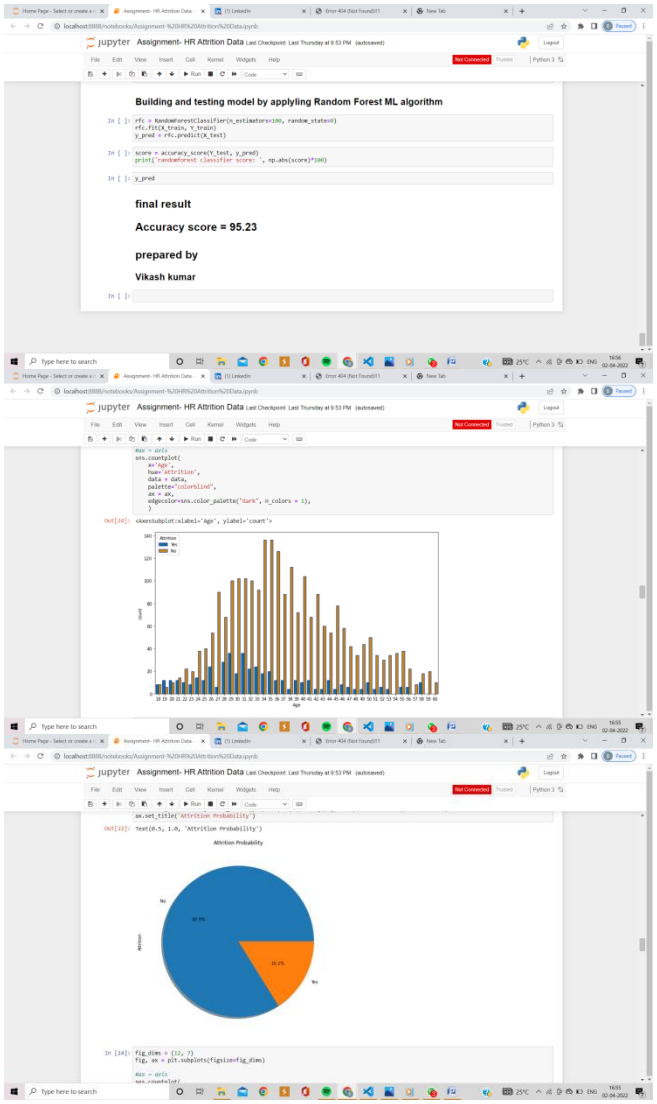
**we will be predicting whether an employee will leave the organization or not.our target column is attrition.**

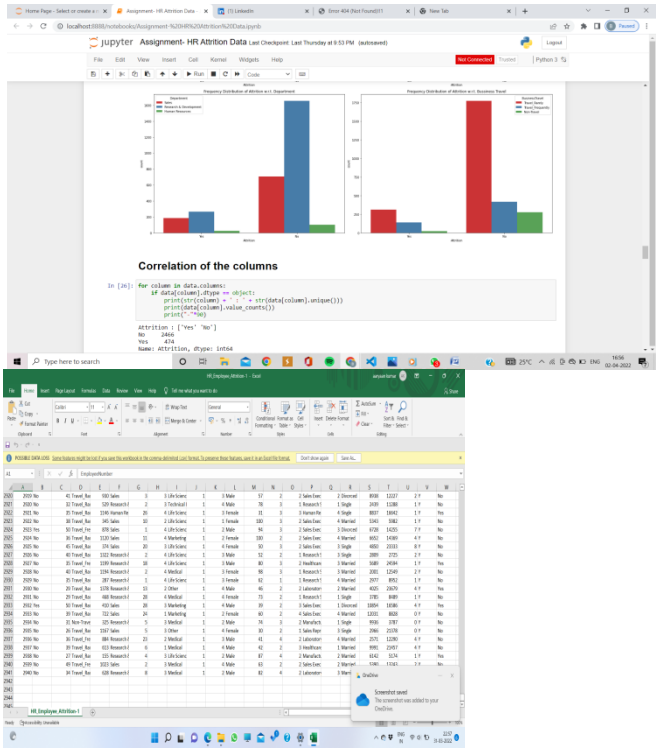
**1.Import the relevant packages**
**2.Download and explore the datasheet**
**3.Perform EDA,apply dataset the processing**
**4.Predict the target column.**

## HR DATASHEET


[1] This work is partially supported by NSF Grant #2003168 to H. Simpson and CNSF Grant #9972988 to M. King.

Name- Akash Kumar
Internship Program- Data Science With Machine Learning and Python
Batch- Jan 2022 – Mar 2022
Certificate Code- TCRIB2R43
Date of submission- 3 APRIL 2022













## SOURCE CODE:

```
import numpy as np
import pandas as pd
import seaborn as sns
import category_encoders as ce
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import RobustScaler
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score
import matplotlib.pyplot as plt
```

Name- Akash Kumar
Internship Program- Data Science With Machine Learning and Python
Batch- Jan 2022 – Mar 2022
Certificate Code- TCRIB2R43
Date of submission- 3 APRIL 2022

```
data = pd.read_csv(r'C:\Users\HP\Downloads\HR_Employee_Attrition-1\HR_Employee_Attrition-1.csv')
data.head()

data.tail()


data.shape

data.columns

data.isnull().sum()

data.nunique()

data.describe().T


data.dtypes.sort_index()


duplicate_data = data[data.duplicated()]
duplicate_data

data.describe()

categorical = [i for i in data.columns if data[i].dtype =='O']
print(categorical)

data[categorical].head()

attrition_count = pd.DataFrame(data['Attrition'].value_counts())
attrition_count

f, ax = plt.subplots(figsize=(8,10))
ax = data['Attrition'].value_counts().plot.pie(explode=[0,0], autopct = '%1.1f%%', shadow=True)
ax.set_title('Attrition Probability')

fig_dims = (12, 7)
fig, ax = plt.subplots(figsize=fig_dims)

#ax = axis
sns.countplot(
    x='Age',
    hue='Attrition',
    data = data,
    palette="colorblind",
    ax = ax,
    edgecolor=sns.color_palette("dark", n_colors = 1),
    )
```

Name- Akash Kumar
Internship Program- Data Science With Machine Learning and Python
Batch- Jan 2022 – Mar 2022
Certificate Code- TCRIB2R43
Date of submission- 3 APRIL 2022

```
f, ax = plt.subplots(2,2, figsize=(20,15))

ax[0,0] = sns.countplot(x='Attrition', hue= 'EducationField', data=data, ax = ax[0,0], palette='Set1' )
ax[0,0].set_title("Frequency Distribution of Attrition w.r.t. Education Field")

ax[1,0] = sns.countplot(x='Attrition', hue= 'Department', data=data, ax = ax[1,0], palette='Set1' )
ax[1,0].set_title("Frequency Distribution of Attrition w.r.t. Department")

ax[0,1] = sns.countplot(x='Attrition', hue= 'Education', data=data, ax = ax[0,1], palette='Set1' )
ax[0,1].set_title("Frequency Distribution of Attrition w.r.t. Education")

ax[1,1] = sns.countplot(x='Attrition', hue= 'BusinessTravel', data=data, ax = ax[1,1], palette='Set1' )
ax[1,1].set_title("Frequency Distribution of Attrition w.r.t. Bussiness Travel")


f.tight_layout()

for column in data.columns:
    if data[column].dtype == object:
        print(str(column) + ' : ' + str(data[column].unique()))
        print(data[column].value_counts())
        print("-"*90)

#Remove unneeded columns

#Remove the column EmployeeNumber
data = data.drop('EmployeeNumber', axis = 1) # A number assignment
#Remove the column StandardHours
data = data.drop('StandardHours', axis = 1) #Contains only value 80
#Remove the column EmployeeCount
data = data.drop('EmployeeCount', axis = 1) #Contains only the value 1
#Remove the column EmployeeCount
data = data.drop('Over18', axis = 1) #Contains only the value 'Yes'
```

```
plt.figure(figsize=(15,15))
sns.heatmap(
   data.corr(),
   annot=True,
   fmt='.0%',
   linewidths=1,
   cmap='inferno'
)

X_train, X_test, Y_train, Y_test = train_test_split(x, y, test_size=0.2,random_state=42 )

print(X_train.shape, X_test.shape)

encoder = ce.OrdinalEncoder(cols = ['BusinessTravel', 'Department', 'EducationField', 'Gender', 'JobRole', 'MaritalStatus', 'OverTime'])
X_train = encoder.fit_transform(X_train)
X_test = encoder.fit_transform(X_test)

cols = X_train.columns

scaler = RobustScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.fit_transform(X_test)
X_train = pd.DataFrame(X_train, columns= [cols])
X_test = pd.DataFrame(X_test, columns=[cols])


rfc = RandomForestClassifier(n_estimators=100, random_state=0)
rfc.fit(X_train, Y_train)
y_pred = rfc.predict(X_test)
```

```
score = accuracy_score(Y_test, y_pred)
print('randomforest classifier score: ',
np.abs(score)*100)

y_pred
```

**final result**
**Accuracy score = 95.23**