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Driving Behaviour Prediction

A Report for the Evaluation 3 of Project 1

Submitted by –

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In partial fulfilment for the award of the degree
Of
BACHELOR OF COMPUTER APPLICATION

SCHOOL OF COMPUTING SCIENCE AND ENGINNERING

Under the Supervision of
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SCHOOL OF COMPUTING AND SCIENCE AND ENGINEERING

BONAFIDE CERTIFICATE

Certified that this project report **"Driving Behaviour Prediction"** is the Bonafide work of **"SYED ABBAS ALI" who** carried out the project work under my supervision.

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ACKNOWLEDGEMENT

This project bears the imprint of many persons who are either directly or indirectly involved in successful completion of this project report.

This project would remain incomplete without making acknowledgement to all those who gave us invaluable help and cooperation to hundreds of people whom we interacted during the project.

I am thankful to my project guide Dr. SAURABH KUMAR SRIVASTAVA for his support and cooperation. It is my pleasure to be indebted to various people, who directly or indirectly contributed in the development of this work and who influenced my thinking, behaviour and acts during the course of project.

Lastly, I would like to thank the almighty and my parents for their moral support and my friends with whom I shared my experience and received lot of suggestions that improved quality of work.

Thank You

ABSTRACT

The main objectives of this study are: to identify driving behaviours and mistakes that drivers make; based on a questionnaire, which may cause traffic accidents in World Wide and highlight their effect on traffic safety.

Develop traffic accidents regression prediction models. Also, to propose effective countermeasures to reduce the frequency and severity of traffic accidents.

The analysis is based on the questionnaire by using **Kaggle** "Data Science Company" to predict accident rates and compare the results with the model reports.

It was found that the drivers' behaviour is considered aggressive, according to the first part which represents the participant's opinion weather they listed the behaviour as aggressive or not, and the other part which represent weather the participants conducted this behaviour or not.

There was a strong direct relationship between the driver behaviours and their exposure to accidents.

In conclusion, the aggressive behaviour increases the chance of exposure to accidents. From this study, it was concluded the main causes of traffic accidents, injuries, and fatalities that are related to driver behaviour. Preventive countermeasures were recommended to enhance traffic safety.

TABLE OF CONTENT

LIST OF SOFTWARES, LIBRARIES

Requirement	Description
Jupyter Notebook	It is an Open Source Web Application that you can share documents that contain live code, equations, visualizations and text.
Python	Python is a interpreted, high level, general purpose programming language
Matplotlib	It is plotting library for the Python Programming Language.
NumPy	NumPy is a general purpose array processing package provides a high performance multidimensional array object.
Pandas	It is a software library written for a Python Programming Language for Data Manipulation and Analysis.

LIST OF FIGURES

INTRODUCTION

Vehicle accidents are a major cause of death among Globe.

Many factors contribute to traffic accidents. Some involve planning, design, construction, operation, surface condition, and policing the roadways condition; lack of driving skills, poor judgment, failure, of interact and adjust to prevailing roadways condition; and most importantly, aggressive driving.

To identify driving behaviours and mistakes that drivers make; based on a questionnaire, which may cause traffic accidents in world and highlight their effect on traffic safety.

To study the relationship between the driver behaviour and the probability to be exposed to accidents.

To increase drivers awareness of mistakes they might make on the road, and to point out the consequences associated with these actions

To develop traffic accidents regression prediction models. These models relate accident numbers, as a dependent variable, with possible causes of accidents that are related to driver behaviour, as independent variable.

IDENTIFICATION OF NEED

As increasing traffic violation, rules violation due to traffic and corruption problem and many other issues are created. On the basis of literature survey of all existing system, all system works manually and does not receive the fine automatically due to this corruption increases.

This project will reduce the traffic problems minimize the traffic rules violation on road.

It make fine collection easy due to automatic fine reduction from owners bank account according to rule broke by vehicle user or owner and the actual fine.

It maintains the transparency between peoples and government authority due to which there is reduction in corruption in the world.

LITERATURE SURVEY

There has been relatively little research on aggressive driving behaviour. Definitions of aggressive driving have been general and have tended to distinguish themselves from "road rage" (violent exchanges arising from traffic disputes where the intent is to harm another road user).

A more precise definition of aggressive driving would focus on deliberate and wilful driving behaviours that while not intended to physically harm another road user shows disregard for their safety and well-being.

This review suggests the following definition of aggressive driving: A driving behaviour is aggressive if it is deliberate, likely to increase the risk of collision and is motivated by impatience, annoyance, hostility and/or an attempt to save time".

Survey research indicates that most drivers report engaging in aggressive driving behaviours, but there is some evidence that survey responses reflect a tendency to provide socially desirable responses.

It is unclear if the lower incidence of certain behaviours associated with higher collision risks such as tailgating is due to this tendency rather than to an actual low incidence of such behaviours.

EXISTING SYSTEM

Different Traffic Rule Violation Detection Devices are Available in Market. They are as follows:

- Embedded System
- Traffic detection system using Android
- RFID Technology for smart Vehicle control using Traffic signal speed limit tag communication
- Violation Detection at Traffic Signals using RFID System

PROPOSED SYSTEM

Our current application is to detect the traffic rule violator on road by means of sensor, RFID reader and RFID tag technology and capture image by means of camera. The system will control the traffic density of the specified location. The project will also focus on mobile application which will help to know information about the vehicle tracked by sensor and camera on road.

This mobile application will maintain the database related to capture image through camera as proof and RFID Tag number such as name of owner, address of owner, license number, photo of vehicle user, mobile number, their bank account number and also the list of previous rules broken with image as proof, date and time and fine paid by vehicle owner. This all data about the vehicle will display on smart phone of traffic police.

This application will automatically receive the fine from the owner bank account and send the message to the user mobile application or about the number the rules and their fine. If same vehicle found to be encountered again and again then a specific action could be done.

- **First module:** Detect the vehicle at signal for breaking rules using sensor, RFID Reader and Tag and capture the image by using camera.

- **Second module:** Camera captures the image of vehicle, sensor sense the vehicle RFID tag no, RFID reader reads it and send that information to the server database.

- **Third module:** Implementation of Android application for both vehicle user and traffic police by doing the connectivity between the RFID readers, Server Android application.

- **Fourth module:** The fine of breaking rule will be received automatically by the owner bank account and also message will be send to vehicle owner and traffic police mobile application.

FEATURES OF PROPOSED SYSTEM

The different features in this proposed system are –

- Application Interface
- Corruption Avoidance
- Automatic fine collector
- Reduce workload of Traffic Police

REQUIREMENT ANALYSIS

Driving Behaviour Prediction is used to analyze the traffic rule violators which cause accidents and deaths. So that using this may increase the restrictions in traffic rules and make drivers aware. So that mentioned below are functional item which specifically required –

- Python environment setup on the work station.
- Availability of NumPy
- Anaconda Package with Jupyter Notebook

HARDWARE AND SOFTWARE SPECIFICATIONS

Software Requirement

- Python 3.8
- Anaconda 3.7.6
- NumPy 19.0

Hardware Requirement

- Processor: core i3 or above
- RAM: 4GB or above
- Hard disk: 5 GB or above

SNAPSHOTS

1. Tables

```
In [12]: person.head(11)
```

Out[12]:

	state	Number of drivers involved in fatal collisions per billion miles	Percentage Of Drivers Involved In Fatal Collisions Who Were Speeding	Percentage Of Drivers Involved In Fatal Collisions Who Were Alcohol-Impaired	Percentage Of Drivers Involved In Fatal Collisions Who Were Not Distracted	Percentage Of Drivers Involved In Fatal Collisions Who Had Not Been Involved In Any Previous Accidents	Car Insurance Premiums ($)	Losses incurred by insurance companies for collisions per insured driver ($)
0	Alabama	18.8	39	30	96	80	784.55	145.08
1	Alaska	18.1	41	25	90	94	1053.48	133.93
2	Arizona	18.6	35	28	84	96	899.47	110.35
3	Arkansas	22.4	18	26	94	95	827.34	142.39
4	California	12.0	35	28	91	89	878.41	165.63
5	Colorado	13.6	37	28	79	95	835.50	139.91
6	Connecticut	10.8	46	36	87	82	1068.73	167.02
7	Delaware	16.2	38	30	87	99	1137.87	151.48
8	District of Columbia	5.9	34	27	100	100	1273.89	136.05
9	Florida	17.9	21	29	92	94	1160.13	144.18
10	Georgia	15.6	19	25	95	93	913.15	142.80

1.1 Content

```
In [13]: person.describe()
```

Out[13]:

	Number of drivers involved in fatal collisions per billion miles	Percentage Of Drivers Involved In Fatal Collisions Who Were Speeding	Percentage Of Drivers Involved In Fatal Collisions Who Were Alcohol-Impaired	Percentage Of Drivers Involved In Fatal Collisions Who Were Not Distracted	Percentage Of Drivers Involved In Fatal Collisions Who Had Not Been Involved In Any Previous Accidents	Car Insurance Premiums ($)	Losses incurred by insurance companies for collisions per insured driver ($)
count	51.000000	51.000000	51.000000	51.000000	51.00000	51.000000	51.000000
mean	15.790196	31.725490	30.686275	85.921569	88.72549	886.957647	134.493137
std	4.122002	9.633438	5.132213	15.158949	6.96011	178.296285	24.835922
min	5.900000	13.000000	16.000000	10.000000	76.00000	641.960000	82.750000
25%	12.750000	23.000000	28.000000	83.000000	83.50000	768.430000	114.645000
50%	15.600000	34.000000	30.000000	88.000000	88.00000	858.970000	136.050000
75%	18.500000	38.000000	33.000000	95.000000	95.00000	1007.945000	151.870000
max	23.900000	54.000000	44.000000	100.000000	100.00000	1301.520000	194.780000

1.2 Description

```
In [17]: person.sort_values(by=['Percentage Of Drivers Involved In Fatal Collisions Who Were Speeding'],inplace=True,ascending=False)
person.head(10)
```

Out[17]:

	state	Number of drivers involved in fatal collisions per billion miles	Percentage Of Drivers Involved In Fatal Collisions Who Were Speeding	Percentage Of Drivers Involved In Fatal Collisions Who Were Alcohol-Impaired	Percentage Of Drivers Involved In Fatal Collisions Who Were Not Distracted	Percentage Of Drivers Involved In Fatal Collisions Who Had Not Been Involved In Any Previous Accidents	Car Insurance Premiums ($)	Losses incurred by insurance companies for collisions per insured driver ($)
11	Hawaii	17.5	54	41	82	87	861.18	120.92
38	Pennsylvania	18.2	50	31	96	88	905.99	153.86
6	Connecticut	10.8	46	36	87	82	1068.73	167.02
25	Missouri	16.1	43	34	92	84	790.32	144.45
44	Utah	11.3	43	16	88	96	809.38	109.48
47	Washington	10.6	42	33	82	86	890.03	111.62
50	Wyoming	17.4	42	32	81	90	791.14	122.04
1	Alaska	18.1	41	25	90	94	1053.48	133.93
43	Texas	19.4	40	38	91	87	1004.75	156.83
0	Alabama	18.8	39	30	96	80	784.55	145.08

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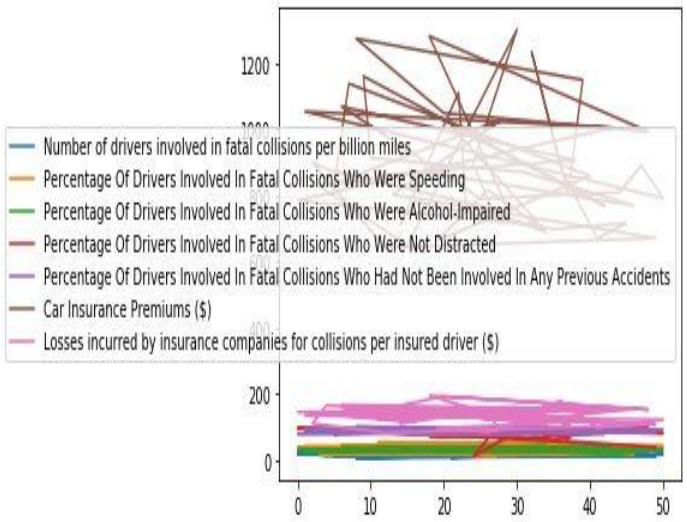
1.3 Fatal Collision due to Over Speeding

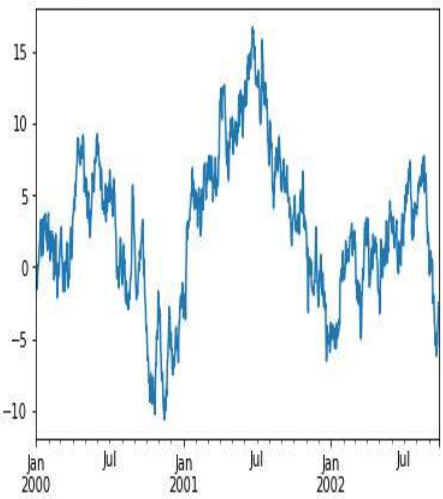
2. Basic Plotting

```
In [20]: person.plot()
         plt.show()
```



2.1

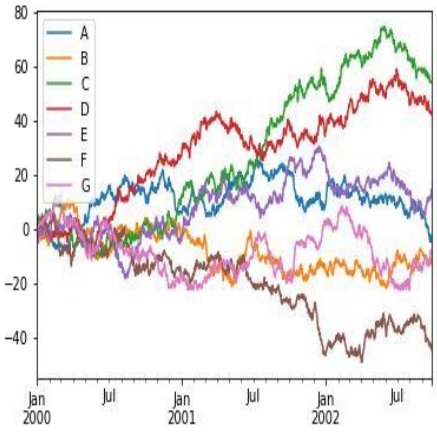
In [21]:
```
person=pd.Series(np.random.randn(1000), index=pd.date_range('1/1/2000', periods=1000))
person=person.cumsum()
person.plot()
plt.show()
```



2.2

In [22]:
```
person=pd.DataFrame(np.random.randn(1000, 7), index=person.index, columns=list('ABCDEFG'))
person=person.cumsum()
plt.figure();
person.plot();
```

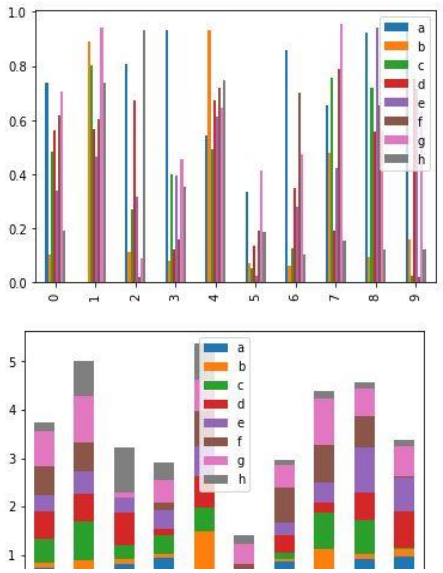
```
<Figure size 432x288 with 0 Axes>
```



2.3

3. Bar Plot

```
In [30]: person=pd.DataFrame(np.random.rand(10 ,8) ,columns=['a','b','c','d','e','f','g','h'])
         person.plot.bar()
         person.plot.bar(stacked=True);
```



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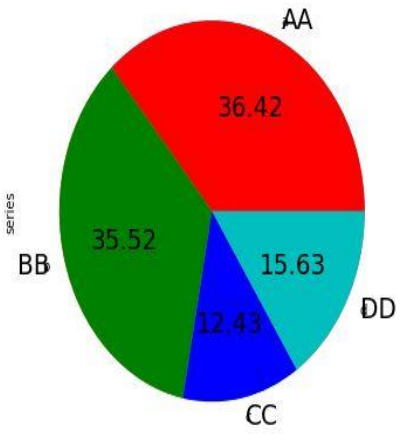
4. Pie Plot

```
In [35]: person=pd.Series(3 * np.random.rand(4) , index=['a','b','c','d'], name='series')
         person.plot.pie(figsize=(6,6));
         person.plot.pie(labels=['AA','BB','CC','DD'],  colors=['r','g','b','c'],
                         autopct='%.2f', fontsize=20, figsize=(6,6))
```

```
Out[35]: <matplotlib.axes._subplots.AxesSubplot at 0x164ea44b748>
```



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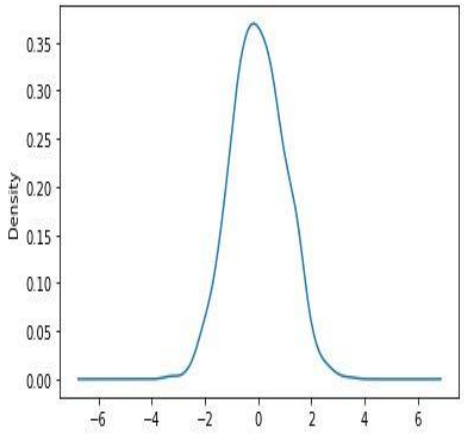
5. Density Plot

```
In [37]: person=pd.Series(np.random.randn(1000))
         person.plot.kde()
```

```
Out[37]: <matplotlib.axes._subplots.AxesSubplot at 0x164ea4bd988>
```



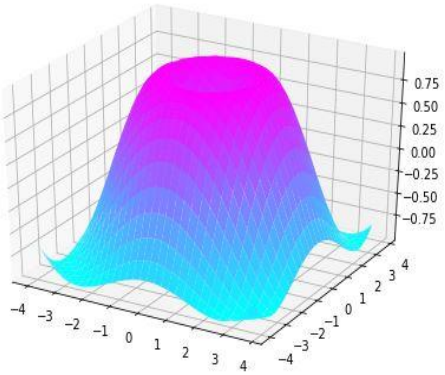
5.1

-

```
In [41]: from mpl_toolkits.mplot3d import Axes3D

         person=plt.figure()
         ax=Axes3D(person)
         x=np.arange(-4,4,0.25)
         y=np.arange(-4,4,0.25)
         x,y=np.meshgrid(x,y)
         r=np.sqrt(x**2+y**2)
         z=np.sin(r)
         ax.plot_surface(x,y,z,rstride=1,cstride=1,cmap='cool')
```

```
Out[41]: <mpl_toolkits.mplot3d.art3d.Poly3DCollection at 0x164eb2bbbc8>
```



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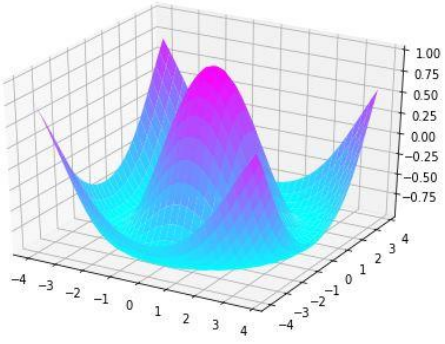
5.2

In [42]:
```
from mpl_toolkits.mplot3d import Axes3D

person=plt.figure()
ax=Axes3D(person)
x=np.arange(-4,4,0.25)
y=np.arange(-4,4,0.25)
x,y=np.meshgrid(x,y)
r=np.sqrt(x**2+y**2)
z=np.cos(r)
ax.plot_surface(x,y,z,rstride=1,cstride=1,cmap='cool')
```

Out[42]: <mpl_toolkits.mplot3d.art3d.Poly3DCollection at 0x164eb4ae8c8>



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5.3

CONCLUSION

Introduction to this chapter contains the overall description of the project. The terms included in this chapter are elaborated in the further chapter of conclusion.

Literature Survey This chapter consists of the disadvantages of already existing systems with a table to distinguish among all the available applications. It also consists of the advantages and features to be added in current system.

Traffic Management System is a complex task. Traffic Management System will help us to reduce the headache of Traffic Policeman. We have seen all existing systems with their characteristics in preliminary survey. This project will greatly reduce the drawbacks of existing system. It provides the necessary security and protection.

References

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