KIET Group of Institutions, Ghaziabad
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BEHAVIOURAL PATTERN ANALYSIS OF DRIVERS

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Problem Statement

- Existing driver monitoring systems often focus on basic parameters such as speed and location, providing limited insights into the actual driving behavior. The proposed system builds upon the advancements in telematics technology, data analytics, and machine learning algorithms to provide a more comprehensive and accurate assessment of driver behavior.

- The background of the project recognizes the need for an intelligent driver behavioral analysis system that goes beyond traditional monitoring solutions. By leveraging cutting-edge technology and analytics, the system aims to revolutionize road safety, mitigate accidents caused by reckless driving, and promote a culture of responsible and safe driving practices.

Objectives

- The main objective of the project is to improve road safety and reduce the number of accidents caused by unsafe driving behavior.
- It will also help fleets to improve their operational efficiency and reduce their costs.
- Some secondary objectives include:
    a. Reduce fuel consumption
    b. Enhance driver training
    c. Increase productivity
    d. Efficient monitoring

Technology Used

- Python (Programming Language)
- SVM / Random Forest(Machine learning algorithm)
- Data Analytics Tools
- Database System
- Camera

Literature Survey

Paper 1: Analyzing objective and subjective data in social sciences: Implications for Smart Cities

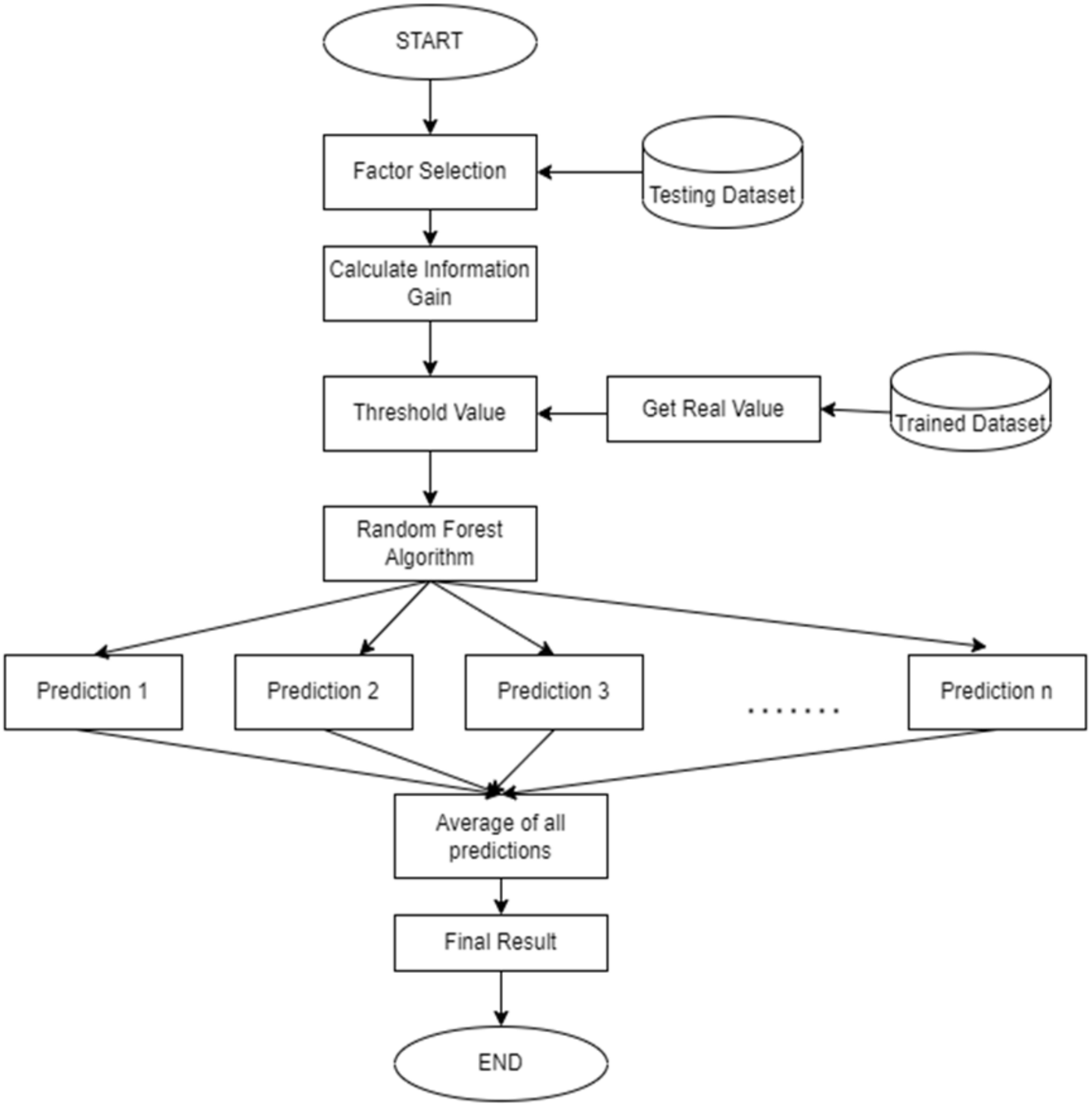
- The study involves a field experiment carried out in UK on around 1870 people for two different time periods. Data for analysis is collected with the help of a Smartphone app. It is used to collect location of the user.
- Also it is used to collect some pictorial data for better understanding. With all this data in hand, it is analysed through data science techniques and then machine learning algorithms are applied to analyse how people interact with their surrounding green spaces.

Paper 2: Orderliness predicts academic performance: behavioural analysis on campus lifestyle

- The study tries to predict some qualitative data on campus lifestyle of students. A set of 18960 students are picked for the analysis. The data is collected through smart cards given to students for this purpose. This data basically includes their shower time and meal time to calculate their orderliness and their library in and out timings to calculate their diligence.
- Shower time and meal time help us in evaluating the student’s orderliness i.e. the quality of being well arranged or organized. Furthermore library in out timings help us to calculate diligence i.e. how persistent a student is towards their goal.

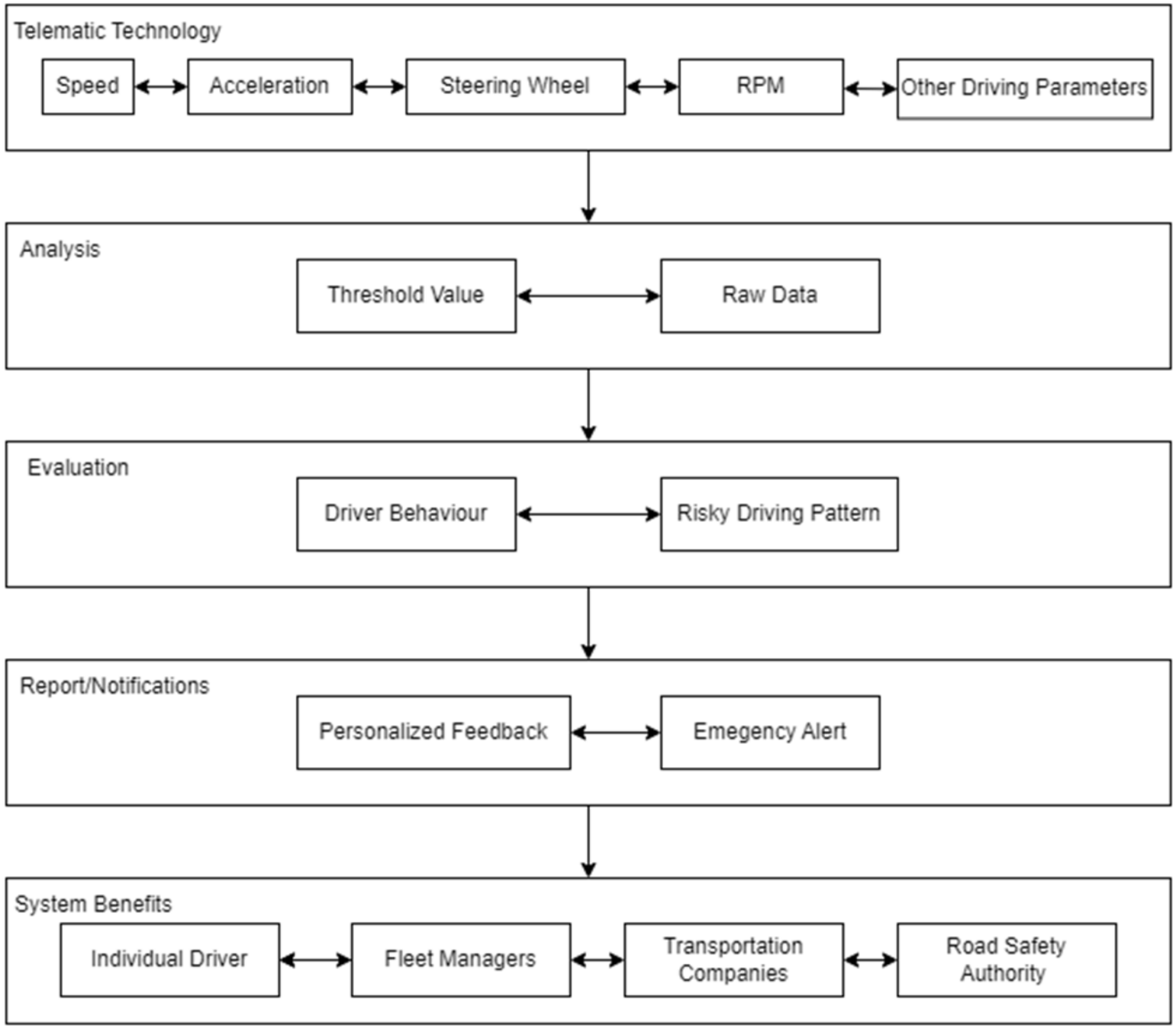
Paper 3: Analysis of Distracted Driver Behaviour Using Self-Organizing Maps

- The collected data, that was used for analyzing the driver's behaviour, included application of the brake(brake pressure) , velocity in three dimensions (X,Y,Z) , turning, lane gap, and above average velocity.
- These patterns are used to build a model for the behaviour of driver using the Self Organizing Maps (SOM). Each driver was subjected to three types of distraction which were music, hands-free verbal communication, and texting.
- For analyzing driver's behaviour the SOM is trained with all the 40 participants in the study and with the three types of distraction.



Process Flow

Algorithm


Telematic Technology
Speed
Acceleration
Steering Wheel
RPM
Other Driving Parameters
Analysis
Threshold Value
Raw Data
Evaluation
Driver Behaviour
Risky Driving Pattern
Report/Notifications
Personalized Feedback
Emegency Alert
System Benefits
Individual Driver
Fleet Managers
Transportation Companies
Road Safety Authority

Patent Status

Patent has been successfully filed and it will be published within a week.

Controller General of Patents, Designs & Trade Marks

सत्यमेव जयते

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
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G.A.R.6
[See Rule 22(1)]
RECEIPT

Docket No 100352

Date/Time 2023/08/26 15:30:29

To
VIKAS KAMRA

UserId: kamra1984

House No. 3, Behind Govt. School, Chawla Colony, Khairpur, Hisar Road, Sirsa, Haryana - 125055.

CBR Detail:

Sr. No.	App. Number	Ref. No./Application No.	Amount Paid	C.B.R. No.	Form Name	Remarks
1	202311057301	TEMP/E-1/66605/2023-DEL	1600	38641	FORM 1	ANALYSIS OF A VEHICLE DRIVER FOR ACCESSING THEIR DRIVING PERFORMANCE AND ENHANCING ROAD SAFETY
2	E-12/6022/2023/DEL	202311057301	2500	38641	FORM 9	----

TransactionID	Payment Mode	Challan Identification Number	Amount Paid	Head of A/C No
N-0001206749	Online Bank Transfer	2608230017725	4100.00	1475001020000001

Total Amount : ₹ 4100.00

Amount in Words: Rupees Four Thousand One Hundred Only

Received from VIKAS KAMRA the sum of ₹ 4100.00 on account of Payment of fee for above mentioned Application/Forms.

* This is a computer generated receipt, hecnce no signature required.

Research Paper Status

Title: Driver Behaviour Analysis to Improve Road Safety: A Comprehensive Study.

Status: Done 20%

Project Status

The project has been done and implemented about 70%. Currently we're working on improving the efficiency of the project and developing a prototype.

```
In [16]: #Added ignore_index to correct the indexing
         df = pd.concat([df_train,df_test], axis=0, ignore_index=True)
```

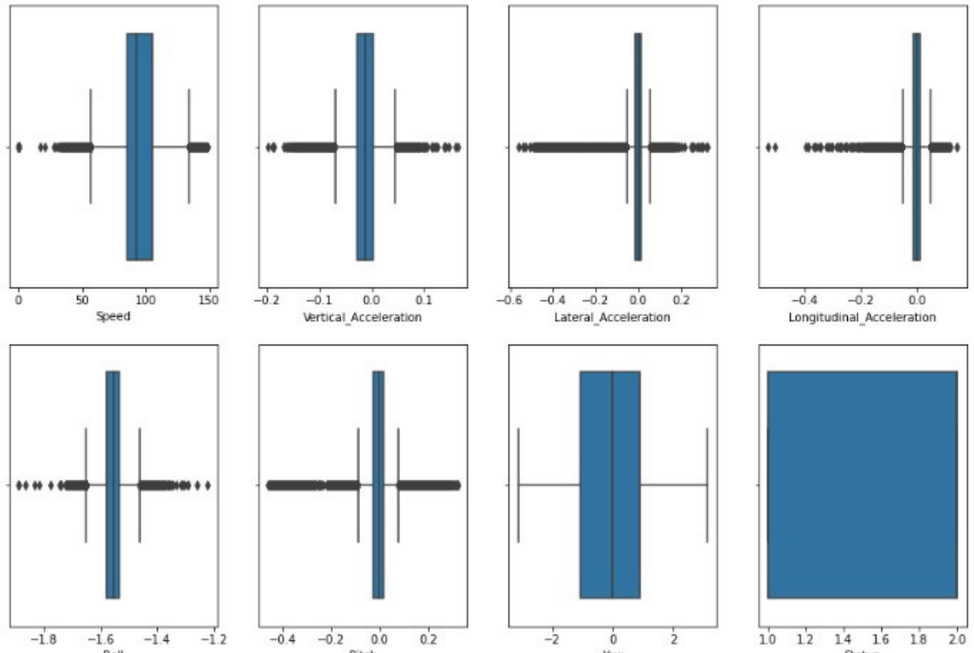
```
In [17]: df
```

Out[17]:

	Speed	Vertical_Acceleration	Lateral_Acceleration	Longitudinal_Acceleration	Roll	Pitch	Yaw	Status
0	130.1	-0.007	-0.006	-0.016	-1.576	-0.071	-2.981	2
1	90.7	-0.022	0.001	0.011	-1.520	-0.011	0.561	2
2	90.1	-0.001	-0.007	-0.027	-1.527	-0.034	1.834	1
3	140.1	0.017	-0.019	0.018	-1.576	0.018	-2.444	2
4	89.4	0.000	-0.011	-0.010	-1.602	0.012	-1.249	1
...	...	...	...	...	...	...	...	...
26435	80.6	-0.031	-0.009	-0.014	-1.537	-0.024	0.909	2
26436	87.6	-0.013	0.035	0.008	-1.641	-0.014	0.494	1
26437	83.7	-0.096	-0.035	-0.023	-1.602	-0.055	2.523	1
26438	92.6	-0.020	0.003	-0.001	-1.544	-0.043	0.928	2
26439	136.5	-0.099	-0.006	-0.029	-1.541	-0.039	0.243	2

26440 rows × 8 columns

```
In [20]: plt.figure(figsize=(15,10))
         for i,j in enumerate(df.columns):
             plt.subplot(2,4,i+1)
             sns.boxplot(x=df[j])
```



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THANK YOU!