RESEARCH PAPER SUMMARY
PROJECT ID- PCS24-59

Paper 1

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

Introduction

The research work done in this paper revolves around the integration of technology into the field of social studies. There are a lot of technologies available that help us collect data from the surroundings and later analyse the data to predict the behaviour. Several machine learning and data science techniques have been applied to perform the required task.

Summary

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.

Basically two types of data are collected: objective (sensor information) and subjective data (direct input from the users). Data is collected in different forms including location, text, image and time. Clustering is applied. With the help of different graphs and charts, the data is analysed.

Conclusion

Finally it concludes on how large scale social studies can be carried out and which type of techniques can be used for this purpose. With the help of this study, the behavioural pattern analysis of people visiting green spaces is done.

Paper 2

Orderliness predicts academic performance: behavioural analysis on campus lifestyle

Introduction

The paper basically tells us about behavioural analysis of students evaluated with the help of a study that determines the relationship between student's behaviour with their academic performance. In contrast to previous studies done through surveys and questionnaires, this study mainly focuses on collection of digital data and its analysis.

Summary

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.
With the help of machine learning algorithm like linear regression, orderliness and diligence are analysed to predict their overall academic performance in terms of their

GPA.

Conclusion

Based on this data and its analysis, educational institutions can evaluate good and poor performance of their students and work accordingly to improve the performance of those students which are not doing well. Moreover, they can encourage students to work on their weaker parts.

Paper 3

Analysis of Distracted Driver Behaviour Using Self-Organizing Maps

Introduction

In this paper, different types of distractions of a driver are discussed and also it tells the effect of a particular distraction in driver's behaviour. Like how these distraction can change the behaviour of drivers. So for this they have used Self Organizing Maps (SOM) technique which is used for clustering and mapping the data. Thus they can reduce the dimensionality of the sequence data and through this they can easily visualize the clustering of different behaviour of the drivers.

Summary

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.

Conclusion

The SOM is able to represent the structure of a time series dataset. For the above three types of distraction, it is observed that the "music" distraction was the most visible distraction. While listening to the music it changes the mood and behaviour of driver. It suggested which type of distractions had the largest impact on the driver.

Paper 4

Behavioural Classification of Drivers for Driving Efficiency Related ADAS Using Artificial Neural Network

Introduction

This paper presents that the aggressiveness and the driving style of driver are majorly influence to vehicle control. The driver handles the vehicle according to their experience, emotional states, and driving preferences. Thus we get different types of behaviour and patterns. Sometimes driver unknowingly waste their energy because they do not drive in a precise manner. Therefore for improving behaviour of driver it will analyse the driving characteristics to instruct the driver.

Summary

The driving skills of driver will be divided into these three categories aggressive, normal and calm states through these three different driving inputs which are vehicle acceleration, speed, and throttle pedal angle. If the collected data is effectively analysed the resulting classification can majorly improve the effectiveness of Advanced Driving Assistance System (ADAS).

Conclusion

For an efficiency oriented analysis, artificial neural network (ANN) is used to classify drivers into aggressive, normal, and calm. The resultant models have fairly accurate classification according to different driving scenarios, with overall accuracy of 90%. The classification can be a reminder for the drivers of their current behaviour, in-order for the drivers to take necessary actions to improve the driving condition.

Paper 5

Driver Evaluation Based on Classification of Rapid Decelerating Patterns

Introduction

In this paper, the risk level of driving behaviour is evaluated by acceleration patterns. The driving styles were investigated with a driving simulator. This paper is mainly focused on braking action (i.e. acceleration and deceleration). It uses clustering algorithms for classifying braking patterns into groups.

Summary

This paper has proposed a new method for evaluating risk factors based on braking pattern clustering. This take the record of the brake pressure like how brake pedals were depressed and released. These actions are also reflects the traffic situation. Through these data it can be calculated the level of risk of driving behaviour based on the brake pattern.

Conclusion

The clustering technique is used to classify braking patterns and other algorithms are also used for the calculation of these things. They also captured the video images of vehicle through which we can be easily analyze the factors of accidents and also we can evaluate the risk level of the accident of driver.