Prediction of Crime rate Using Machine Learning Techniques

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Abstract

Crime is the socio-economical problem effecting life quality and economic growth. Crime is one the most predominant and alarming aspects in our society and its prevention is a vital task. Crime analysis is systematic way of detecting and investigating patterns and trends in crime. Thus it become necessary to study various reason, factors and relationship between the different crime that are occurring and finding the most appropriate method to control and avoid more crimes.

Data mining is used broadly in terms of analysis, investigation, and discovery of patterns for the occurrence of different crimes.

It consists of crime information like Location description, type of crime, date, latitude, longitude. The classification method and various other algorithms will be tested for crime prediction and one with better accuracy will be used. Visualization of a dataset will be done in terms of graphical representation of many cases for example at which month the criminal rate is high or at which month activities are high. The sole purpose of the project is to give a jest idea of how machine learning can be used by the law of enforcement agencies to detect, predict and solve the crime at a much faster rate and thus reduces the crime rate.

Key Word: Crime rate, Data Forming, Data base.

1.Introduction

Machine learning enables analysis of massive quantities of data. While it generally delivers faster, more accurate results in order to identify profitable opportunities or dangerous risks, it may also require additional time and resources to train it properly. Combining machine learning with AI and cognitive technologies can make it even more effective in processing large volumes of information.

Machine learning is the scientific study of algorithms and statistical models that computer systems use in order to perform a specific task effectively without using explicit instructions, relying on patterns and inference instead. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to perform the task.

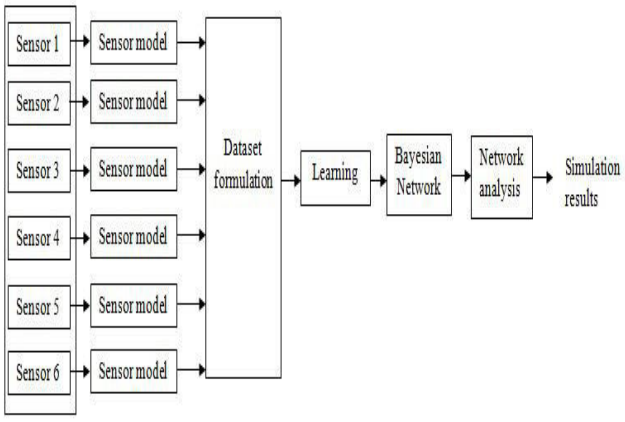
Machine learning algorithms are used in a wide variety of applications, such as email filtering, and computer vision, where it is infeasible to develop an algorithm of specific instructions for performing the task. Machine learning is closely related to computational statistics, which focuses on making predictions using computers. The study of mathematical optimization delivers methods, theory and application domains to the field of machine learning. Data mining is a field of study within machine learning, and focuses on exploratory data analysis through unsupervised learning.In its application across business problems, machine learning is also referred to as predictive analytics.

2.Machine Learning Methods

Supervised machine learning algorithms can apply what has been learned in the past to new data using labeled examples to predict future events. Starting from the analysis of a known training dataset, the learning algorithm produces an inferred function to make predictions about the output values. The system is, able to provide targets for any new input after sufficient training. The learning algorithm can also compare its output with the correct, intended output and find errors in order to modify the model accordingly.

Semi-supervised machine learning algorithms fall somewhere in between supervised and unsupervised learning, since they use both labeled and unlabeled data for training – typically a small amount of labeled data and a large amount of unlabeled data. The systems that use this method are able to considerably improve learning accuracy.

Reinforcement machine learning algorithms is a learning method that interacts with its environment by producing actions and discovers errors or rewards. Trial and error search and delayed reward are the most relevant characteristics of reinforcement learning. This method allows machines and software agents to automatically determine the ideal behavior within a specific context in order to maximize its performance.



Block diagram of Machine Learning

3.Literature survey

In supervised learning, the class labels in the dataset, Which is used to build the classification model, are known. In a supervised learning problem, we would know which training dataset has the particular output which will be used to train so that prediction can be made for unseen data.

Data Pre-processing: For mining it is required to improve actual quality of data. The time required for mining the preprocessed data is reduced and is also increases mining efficiency. In proposal focus on data preprocessing to involve data cleaning and treating missing value.

Machine Learning: Machine learning enables analysis of massive quantities of data. While it generally delivers faster, more accurate results in order to identify profitable opportunities or dangerous risks, it may also require additional time and resources to train it properly. Combining machine learning with AI and cognitive technologies can make it even more effective in processing large volumes of information

Data Mining: To introduce correlated patterns AR is Applied on each dimension dataset among the three dimensions to advance the crime analysis(Crime Rate Prediction

Analysis and prediction of crime is an important activity that can be optimized using various techniques and processes. Lot of research work is done by various researchers in this domain. The existing work is limited to use the datasets to identify locations of crime. But none of them considered that the type of crime, date of crime as the factor. provides the static maps with no interactive feature

METHODOLOGY:For optimum analysis and prediction of crime incidents, a Crime Prediction & Monitoring Framework Based on Spatial Analysis is introduced. In this framework, various visualization techniques are used to analyze the data in a better way. This framework is implemented in a GUI based tool using R programming and its various libraries. The methodology and various

DATA VISUALIZATION:Data visualization is an art and science. It is a form of visual communication. It involves creation and study of the visual representation of data. The primary goal of data visualization is to communicate data clearly and effectively via statistical graphics and plots. The effective visualization helps us to analyze and reason about data and evidence. The work provides the generation of crime density maps which helps the crime analysts to analyze the crime patterns. Understanding patterns of criminal activities are important for law enforcement and intelligence agencies to investigate and prevent crimes as are described as follows

Communication design has gained a more important position in our age and the responsibilities of the communication designers increased proportionately. Among these responsibilities, important role is played by the capacity of data visualization and info graphics to make information comprehensible and to use the power of persuasion and direction.

The purpose of data visualization and infographics is to provide visual presentation of complex and irregular information in a planned and comprehensible manner. Both terms have different meanings despite this joint purpose. Infographics involve visual and story like presentation of a certain subject which provides various data in a simultaneous manner and which sometimes include processes. This visual story like presentation can be used various elements like image, illustration, typography, map and visualization. “In this use of the word, data visualizations by themselves are no longer considered to be complete info graphics.

4.Conclusion

This Prediction of crime rate using machine learningtechniques project focuses on crime analysis by implementing clustering algorithm on crime dataset using rapid miner tool and here we do crime analysis by considering crime homicide and plotting it with respect to year and got into conclusion that homicide is decreasing from the clustered results it is easy to identify crime trend over years and can be used to design precaution methods for future. With the help of machine learning technology, it has become easy to find out relation and patterns among various data’s.

The work in this project mainly revolves around predicting the type of crime which may happen if we know the location of where it has occurred. Using the concept of machine learning we have built a model using training data set that have undergone data cleaning and data transformation. Data visualization helps in analysis of data set. The graphs include bar, pie, line and scatter graphs each having its own characteristics. We generated many graphs and found interesting statistics that helped in understanding crimes datasets that can help in capturing the factors that can help in keeping society safe.

5.References

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