Chapter 2

A Classification Framework for Data Mining Applications in Criminal Science and Investigations

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ABSTRACT

The importance of data analysis across different domains is growing day by day. This is evident in the fact that crucial information is retrieved through data analysis, using different available tools. The usage of data mining as a tool to uncover the nuggets of critical and crucial information is evident in modern day scenarios. This chapter presents a discussion on the usage of data mining tools and techniques in the area of criminal science and investigations. The application of data mining techniques in criminal science help in understanding the criminal psychology and consequently provides insight into effective measures to curb crime. This chapter provides a state-of-the-art report on the research conducted in this domain of interest by using a classification scheme and providing a road map on the usage of various data mining tools and techniques. Furthermore, the challenges and opportunities in the application of data mining techniques in criminal investigation is explored and detailed in this chapter.

INTRODUCTION

In recent years, there has been an alarming increase in the volume of crimes in different applications like finance, credit card fraud, theft, violent crime, cybercrime, intrusion detection, and online fraud. It is a challenge for researchers to develop a crime analysis tool that can identify crime patterns accurately and efficiently. Thus crime science and investigation plays an important role in accounting such challenges of crime control and maintenance of public order.

Data mining is a field of extracting knowledge from huge amounts of data stored in Data warehouse and repositories. It is often used to uncover the latent truths behind huge volumes of data. It extracts interesting patterns which helps in detecting crimes and decision making. Thus, various advancements in crime data applications adopt data mining techniques to follow the task of crime investigation.

This chapter has three targets to achieve. The first target presents a framework which classifies the applications of data mining to Criminal Science and Investigations (CSI). The second is to provide a rigorous and extensive review of existing work on the applications of data mining to CSI. The third is to develop a road map for the researchers in this field. The major applications of CSI include financial frauds like credit card and money laundering, violent crime like sex and drug offense, theft and intrusion detection. Crime detection uses data mining techniques like classification, clustering, prediction, association, neural networks and genetic
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