Chapter 13
Application of Machine Learning In Forensic Science

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ABSTRACT

In this chapter, the authors explore the use of machine learning methodology for cyber forensics as machine learning has proven its importance and efficiency. For classification and identification purposes in forensic science, pattern recognition algorithms can be very helpful.

INTRODUCTION

Machine learning is the application of artificial intelligence, and it’s a very important area of computer science, in which a computer can learn from raw data and machine draw its conclusion. The machine can decide by own experience, it cannot be programmed. Machine learning technologies are used in different fields across the world in these days. In these days a large amount of data is created day by day and with the help of machine learning technology, machine analyses the data and infer the conclusion. In context of data analysis, this technique i.e. gathering of data, analyzing of data and generating information from that is commonly known as data mining. Developing machine learning algorithms is a complex task. The application
of machine learning to find pattern and interpret data without involvement of human, is very efficient and powerful technique. The use of machine learning is increasing in the last couple of years. In forensic science, machine learning techniques are playing a significant role. Crime detection, pattern recognition and similar tasks can easily performed by machine learning.

Data is created day by day with rapid rate. Now massive data is available these days. But most of the data are noisy. By applying machine learning and signal processing techniques, we can get quality data for processing. With the advent of the IoT system, many types of medical data are sampled by machine learning methods and signal processing techniques (M. F. S. Ana Azevedo. Kdd, semma and crisp-dm, 2008).

Machine learning helped several data scientists across the world to perform various studies on such kind of huge data; every data analyst has come across very noisy data. Hence to properly feed the data in a processing model, data preprocessing must be performed.

Machine learning is the field of artificial intelligence, in which machines can take decision without any specific programming. All programs can learn from its own experiences when machine solved a problem, its knowledge base gets updated and hence its performance. Machine learning is broadly categorized into two different parts; one is supervised learning another is unsupervised learning (P. J. S. W. Anne H. Milley James D, 1998).

**MACHINE LEARNING**

Machine learning is the application of artificial intelligence. Arthur Samuel describes machine learning as a field where the computer learns without any explicit program. A more formal definition of machine learning can be given as: computer trying to learn from its input and output pattern. In general, the machine automatically designs an algorithm with the help of input and output data. Traditionally we design the algorithm then we submit the input data then after we get the result, but in machine learning, first, we trained the machine by submitting input as well as output then machine design the algorithm. Tom Michel provides a more modern definition of machine learning, a computer program is said to learn from own experience during the solving of any task, and the performance of the computer program must be improved with respect to experience like in checker playing game.

\[ E = \text{the experience of playing such game} \]
\[ T= \text{the task of playing game} \]
\[ P= \text{the probability that the program will win the game.} \]
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