

Survey on Predictive Analysis: Applications in Different domains

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Abstract

Predictive analysis is advancement in data engineering employing data mining, statistical algorithms and machine learning techniques, which mainly serves to forecast future events and make recommendations on it based on historical data. This is achieved by analyzing thousands of pieces of information and co relating them with each other, which is enabled by predictive analysis modeling techniques.

Keywords: *Predictive Analytics, Machine Learning, Data Mining, Prediction*

I. INTRODUCTION

Predictive analytics is “what is the future?” .To find this answer machine learning algorithms are used. Classification and Regression are the two main objectives of Predictive analytics. Predictive models use recognized outcomes to direct a model that can be used to anticipate values for different or new data resulting in predictions that represent a probability of the target variable which are based on estimated significance from a set of input variables. Prediction process can be divided into four steps: (1) Collect raw data and pre-process it. (2) Use appropriate machine learning technique to transform the pre-processed data into a form that can be easily handled. (3) Create a learning/training model. (4) Visualize and generate predictions based on leaning model.

II. PREDICTIVE ANALYTICS AND DATA MINING

Data mining is simply, the technique to find useful knowledge or pattern from the data. Predictive analytics is an area that has been growing in popularity in recent years. However, data mining, of which predictive analytics is a subset, has already reached a steady state in its popularity [2]. Depending on the kinds of data to be mined or on the given data mining application, the data mining system may also integrate techniques from spatial data analysis, information retrieval, pattern recognition, image analysis, signal processing, computer graphics, Web technology, economics, business, bioinformatics, or psychology. Fig 1 is showing data mining in different domains.

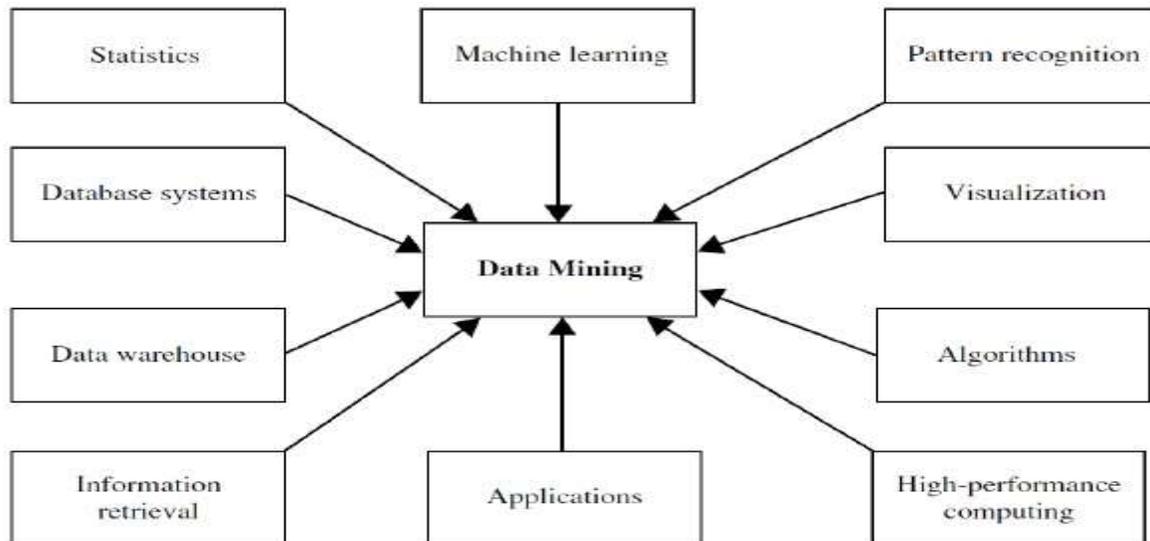


Figure 1: Data mining adopts techniques from many domains (Han, Kamber, & Pei, Data Mining: Concepts and Techniques, Third Edition, 2011)

III. PREDICTIVE ANALYTICS IN DIFFERENT DOMAIN

Predictive analytics is applied in many ways to help businesses make well-informed decisions at a micro level. Talking out the versatility of this technology, it has started replacing quant in financial services sector for generating creditworthiness of a particular stock, it can also stop losses due to fraudulent activity by deploying business rules anomaly detection and link analytics before they even occur. High-performance behavioral analytics examines all actions on a network in real time to spot abnormalities that may indicate occupational fraud making it favorable for security and fraud detection. Health care providers can benefit from it by predicting the effectiveness of new procedures, medical tests and medications, and improve services or outcomes by providing safe and effective patient care. Most modern organizations use predictive analytics to determine customer responses or purchases, as well as promote cross-sell opportunities. Predictive models help businesses attract, retain and grow the most profitable customers and maximize their marketing spending. It can analyze and generate an anticipated flow of air traffic on an airport and manage it too making it suitable for aviation. And not forgetting its broad spectrum of uses in the field of manufacturing, insurance, retail, sports, media and entertainment and many more, one can definitely say that predictive analysis is the next big thing.

1. PREDICTIVE ANALYTICS IN SALES AND MARKETING

Most modern organizations use predictive analytics to determine customer responses or purchases, as well as promote cross-sell opportunities. Predictive models help businesses attract, retain and grow the most profitable customers and maximize their marketing spending. A study conducted by Forrester Research highlights that predictive analytics users are twice as likely to perform well in key business metrics compared to those who use traditional analytics. Specifically, 83% of B2B companies leveraging predictive analytics see "considerable or very high" business impact — noting a higher likelihood to exceed marketing goals, have a higher market share and see annual revenue growth steadily increase [5].

2. PREDICTIVE ANALYTICS IN HEALTHCARE

Health care providers can benefit from it by predicting the effectiveness of new procedures, medical tests and medications, and improve services or outcomes by providing safe and effective patient care. Problems such as inaccurate diagnoses and poor drug-adherence pose challenges to individual health and safety. Predictive analytics will have a big impact in the field of healthcare, especially where there are large sets of cumbersome and unconnected data. New methods being developed through predictive analytics will allow those including hospitals, medical centers and drug companies to examine this data to see how it can best guide medical decision

making[6]. These challenges are now being alleviated, if not completely eradicated, with big data analytics using personalized drug regimes, follow-up alerts and real-time diagnosis monitoring. Pervasive and context-aware monitoring solutions are improving the quality of life for both patients suffering from chronic conditions and their relatives, as well as reducing long-term health care costs and improving the quality of care. This paper discusses some of the initiatives in the healthcare industry getting implemented in the present day.

3. PREDICTIVE ANALYTICS IN FINANCE

Taking out the versatility of this technology, it has started replacing quant in financial services sector for generating creditworthiness of a particular stock, it can also stop losses due to fraudulent activity by deploying business rules anomaly detection and link analytics before they even occur. High-performance behavioral analytics examines all actions on a network in real time to spot abnormalities that may indicate occupational fraud making it favorable for security and fraud detection. Predictive analytics in finance is the art and science of using massive amounts of data to find patterns. These insights can reveal what will happen next: what a customer will buy or how long an employee might last. Predictive analytics involve everything from sophisticated statistical modeling to relatively simple data mining, and the practice is transforming virtually every industry, as it provides the ultimate competitive advantage.[7]

4. PREDICTIVE ANALYTICS IN AVIATION

Predictive analytics in the aviation is the key to becoming customer-centric. It can analyze and generate an anticipated flow of air traffic on an airport and manage it too making it suitable for aviation. Airlines can improve the loyalty of their customers by knowing who they are and what they want. Customers want loyalty to be their choice based on each and every interaction, and they want to be recognized and rewarded for their loyalty. This recognition can take the form of deals and preferential treatment [8].

IV. CONCLUSION

Predictive models provide a significant way to get maximum value from data. And they have a wide range of applications that have not come even close to being fully exploited yet. There are various machine learning algorithms that can be used in achieving the desired results through data analysis. However, it is important to choose the correct data algorithm for achieving the desired results.

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