# Chapter 55
# Predictive Analytics in Operations Management

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## ABSTRACT

*Operations management is a field of management which emphasizes on managing the day to day operations of business organizations. These organizations possess a huge amount of data which needs to be analysed for proper functioning of business. This large amount of data keeps some useful information hidden inside it, which needs to be uncovered. This information can be retrieved using predictive analytics techniques, which predict the patterns hidden inside the data. This data is heterogeneous, processing of such huge amount of data creates challenges for the existing technologies. MapReduce is very efficient in processing this huge amount of data. In the field of operation management, data needs to be processed efficiently, so it is highly required to process data using parallel computing framework due to its large size. This chapter covers different techniques of predictive analytics based on MapReduce framework which helps in implementing the techniques on a parallel framework.*

## PREDICTIVE ANALYTICS

Predictive Analytics comes under the field of data mining which attempts to analyse the data and extract information out of it ("Big data Analytics and Predictive Analytics", 2015). Predictive analytics is very helpful in the field of operations management as it helps in predicting the behaviour of certain operations. Information extracted out of raw form of data can be used to present trends and behaviours that are hidden inside the data. Predictive Analytics is applied to any event whether from present, past, or future. For example, identifying any fraudulent event in context of credit cards or identifying suspects

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involved in a crime. Predictive Analytics refer to applying several techniques on historical and past data to visualize future outcomes ("What is Predictive Analytics?", 2015).

Predictive Analytics compute probabilities for each and every possible outcome, and perform prediction at detailed level of granularity. Prediction differs from forecasting in a way that it is a technology which learns from experience to predict the future trends to deduce better conclusions.

Predictive Analytics is a technique which seeks to uncover hidden patterns and relationships in data. These techniques can be classified based on different parameters ("Predictive Analytics", 2015):

1. Based on underlying methodology:
   a. Regression technique
   b. Machine learning technique
2. Based on type of outcome variables:
   a. linear regression address continuous outcome variables
   b. others such as Random Forest

Predictive Analytics, a statistical and data mining technique that can be used on any kind of data, structured or unstructured, is certainly not a new technology (Halper, 2014). In fact, it is in use for decades. However, market adoption and visibility of the technology is increasing for a number of reasons:

1. **Computing Power Increases:** In past it used to take hours or days to get the output of a predictive model which now takes minutes. In early days, it was rather difficult to afford the computing power needed to analyse data that changes regularly in real time environment. With the rise in computing power it is now possible for the organizations to use predictive analytics to analyse data and predict future for their business (Halper, 2014).
2. **Value is Better Understood:** Almost every organization wants to take Business Intelligence to next level to unfold the regularities and irregularities hidden inside the data related to their business. These organizations are interested in knowing how their customers will react to the given scenario based on past experiences. They understood the value of predictive analytics (Halper, 2014).
3. **Economic Consideration:** The recession has affected every business to greater extent. Organizations have realized the importance of data, that it can be very useful to understand market and its trends. Adopters realize that it is very important to gain insight of every aspect related to data. To be successful in a competitive environment, companies must utilize data and analytics to its fullest advantage (Halper, 2014).

## TYPE

Generally, predictive modelling refers to "scoring" data with predictive analytics and forecasting techniques. However, the term "predictive analytics" is used to refer to various disciplines/models, such as descriptive models, predictive models or decision models ("Predictive Analytics", 2015).