# Chapter 9
# Sentiment Analysis: Using Artificial Neural Fuzzy Inference System

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## ABSTRACT

*E-commerce has become a daily activity in human life. In it, the opinion and past experience related to particular product of others is playing a prominent role in selecting the product from the online market. In this chapter, the authors consider Tweets as a point of source to express users' emotions on particular subjects. This is scored with different sentiment scoring techniques. Since the patterns used in social media are relatively short, exact matches are uncommon, and taking advantage of partial matches allows one to significantly improve the accuracy of analysis on sentiments. The authors also focus on applying artificial neural fuzzy inference system (ANFIS) to train the model for better opinion mining. The scored sentiments are then classified using machine learning algorithms like support vector machine (SVM), decision tree, and naive Bayes.*

## INTRODUCTION

This chapter aims to make the readers understand the theoretical foundations, algorithms, methodologies for analyzing data in various domains such Retail, Finance, Risk and Healthcare. To define the core objectives of any above mentioned businesses, one should first give an attempt to understand the customer profitable attributes in order to maintain successful customer relationship. In Understanding Customers - Profiling And Segmentation, our focus is to show on how importance is understanding customer, and discussed different techniques and applications, (Basha SM et al. 2017). Among them churn prediction in the mobile Telecommunication industry is one, in which the Life Time Value (LTV) of a customer is derived using Survival Analysis, model with their limitations are discussed in detail in section Churn

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Prediction in the Mobile Telecommunications Industries (Priss et al. 2006). The other real time application is Market Basket Analysis for a super market based on frequent item-set mining, in which data mining techniques are implemented to define new pattern by extracting associations from stores transactional data. Techniques like Apriori, K-Apriori and their detailed procedures are explained in Market Basket Analysis for a super market based on Frequent Item-set Mining. Where as in section Bankruptcy prediction for credit risk and different approaches like early Empirical Neural Network, Bayesian Network are discussed in detail, and also steps to be followed to design a model for supply chain risk propagation. In all the above application the domain and type of data varies. So, one should have good domain knowledge to perform prediction. Where as in section Text Categorization we continued our discussion on how to categorize text and the approaches to perform prediction on text data. In section Sentiment Analysis our discussion is on how to perform sentiment analysis on customers reviews and different classifier used like probabilistic, Naive Bayes, Maximum Entropy and Linear classifier like support vector machine, Neural Network, the decision tree. In addition to that other related fields where sentiment analysis is performed like Emotion detection, and prediction model for sentiment classification also discussed (Basha SM et al. 2017). With all the knowledge gained from the above sections, we identified few open problems in area of prediction which is domain specific and data centric like: Data problem, language problem. In section Open problems listed the open problems in Artificial Neural Fuzzy Inference system applied to the field of sentiment analysis on Text data. In section Artificial Neuro-fuzzy inference system (ANFIS) is a fuzzy system. In which, membership function parameters have been adjusted using Neuro-adaptive learning methods similar to those used in training neural networks, and also listed out steps to create, train, and test Sugeno-type fuzzy systems using the Neuro-Fuzzy Designer (Basha SM et al. 2017).

## BACKGROUND AND MAIN FOCUS

Forensic In any industry, the first step to finding and creating profitable customers is determining what drives profitability and more successful customer relationship management. Predicting the customer attributes and behaviors, which drives companies in to profit, this information can be used to direct their Marketing efforts as well. In this context (Scridon et al. 2008) have discussed several techniques and applications for understanding customers. Defining the objective is as critical as the objective can be elaborated by evaluating the terms of profiling and segmentation. Profiling is defined as an act of making use of data to describe as group of people. It is performed on complete database or different parts of it. The different parts are termed as segments, which are mutually exclusive in nature. Segmentation is the process of splitting a database into different distinct segments. The basic approaches for segmentation are: First, Market driven approach, which allow managers to make use of user characteristics that they determine to be important drivers of their business. On the other hand, data-driven approach. Which make use of cluster analysis in order to find homogeneous groups from complete database. If the company makes an attempt to understand the customer behavior, it will find different levels of customers with their associated profit to company using the existing database. This is the advantage of both segmentation and profiling.