# Chapter 31
# Network Support Data Analysis for Fault Identification Using Machine Learning

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## ABSTRACT

*Machine learning has gained immense popularity in a variety of fields as it has the ability to change the conventional workflow of a process. The abundance of data available serves as the motivation for this. This data can be exploited for a good deal of knowledge. In this article, we focus on operational data of networking devices that are deployed in different locations. This data can be used to predict faults in the devices. Usually, after the deployment of networking devices in customer site, troubleshooting these devices is difficult. Operational data of these devices is needed for this process. Manually analysing the machined produced operational data is tedious and complex due to enormity of data. Using machine learning techniques will be of greater help here as this will help automate the troubleshooting process, avoid human errors and save time for the technical solutions engineers.*

## 1. INTRODUCTION

Text Mining is widely used nowadays to mine useful patterns from text. Text mining has a found its use in business, medicine, education, drug discovery, etc. As an effect of this, there is a lot of research going on to analyse natural language (i.e. human produced data). But, nowadays machines also produce enormous amount of operational data which are semi-structured (e.g. system logs, usage logs, error logs etc.). The data produced by machines is the main source of identifying faults in machines. So, it is crucial to analyse machine produced data.

The machine produced data that we are considering for our course of research is 'Show Tech Support'. These are referred as Network Support data files. These files contain operational data of networking devices that are deployed at different sites. The Network Support data are the source of many useful information about the device. It contains information about the software and features that are configured in the device. The contents of support data files vary from time to time as it is a device's operational data. When there is a malfunction or fault in a device, support data files are of use. They are used to trouble shoot the faults in the networking devices. These files are unique to their make and device configuration set up. Support data files are difficult to analyse manually because of the complex nature and enormity data. Also, manual analysis is always prone to errors. So, the need for a more systematic and automated analysis arises.

This paper has outlined ongoing research work in Machine Learning and its relevance to our problem in section 2. In section 3, we have discussed about the methodology used. In section 4, a comprehensive comparison between ID3 algorithm and Rule Based induction is done.

## 2. LITERATURE SURVEY

### 2.1. Introduction to Machine Learning

In an attempt to analyse the industrial data/machine produced data research fraternity has done a significant contribution. For industrial data analysis, a strong subject expertise is needed. But, the huge result sets and internal relationships between the workflow is sometimes beyond our subjective knowledge. To overcome this, a more generic framework for processing industrial data is needed. Mr. Mariusz Kamola, in his work (2015) has comes up with a defined set of rules for choosing the most required features for predictive analysis on industrial data. Clearly, the processing framework will differ depending on the use case and type of analysis. So, choice of a suitable Machine Learning algorithm is necessary.

Surya, Nithin, Prasanna, and Venkatesan (2016), gives a brief introduction to machine learning and discusses about various machine learning techniques and pre-processing techniques. The paper discusses about three main topics. They are:

- Types of machine learning
- Machine learning techniques
- Linguistic pre-processing

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