Chapter 12
Data Analytics to Predict, Detect, and Monitor Chronic Autoimmune Diseases Using Machine Learning Algorithms:
Preventing Diseases With the Power of Machine Learning

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ABSTRACT

Developments in machine learning techniques for classification and regression exposed the access of detecting sophisticated patterns from various domain-penetrating data. In biomedical applications, enormous amounts of medical data are produced and collected to predict disease type and stage of the disease. Detection and prediction of diseases, such as diabetes, lung cancer, brain cancer, heart disease, and liver diseases, requires huge tests and that increases the size of patient medical data. Robust prediction of a patient's disease from the huge data set is an important agenda in in this chapter. The challenge of applying a machine learning method is to select the best algorithm within the disease prediction framework. This chapter opts for robust machine learning algorithms for various diseases by using case studies. This usually analyzes each dimension of disease, independently checking the identified value between the limits to monitor the condition of the disease.

INTRODUCTION

Over the past few decades Machine Learning has grown into one of the supports of information technology, a rather central, albeit usually hidden, part of our life. With the ever increasing amounts of data becoming available there is good reason to believe that smart data analysis will become even more pervasive as a necessary ingredient for technological progress. (2020, Infographics)

One of the main ambitions why we develop (computer) programs to computerize various kinds of processes. Originally developed as a subfield of Artificial Intelligence (AI), one of the goals behind machine learning was to replace the need for developing computer programs "manually." Considering that programs are being developed to automate processes, we can think of machine learning as the process of "automating automation." In other words, machine learning lets computers "create" programs (often, the intent for developing these programs is making predictions) themselves. In other words, machine learning is the process of turning data into programs. It is said that the term machine learning was first coined by Arthur Lee Samuel, a pioneer in the AI field, in 19591. (Mike Thomas, 2020) says the quote that almost every introductory machine learning resource cites is the following, which summarizes the concept behind machine learning nicely and concisely:

In the last decade, machine learning techniques have been used comprehensively for a varied range of tasks comprising of various algorithms. These algorithms used in a variety of application areas such as bioinformatics, speech recognition, spam detection, computer vision and fraud detection, health care to detect disease and managing disease. The algorithms and techniques usage come from many various domains including statistics, mathematics, neuroscience, and computer science.

This chapter deals with the Machine learning algorithm for prediction of disease, diagnostics of disease, and monitoring disease by using suitable case study. This chapter is to opt for robust machine learning algorithms for various diseases by using case studies. This chapter is to monitoring disease, this usually analyzes each dimension of disease independently checking the identified value between the limits to monitor the condition of the disease.

BACKGROUND

What is Learning?

"Learning makes someone Intelligent and perform a task better"

- Learning is the process of acquiring new understanding, knowledge, behaviors, or skills through study, experience or being taught.
- The ability to learn is possessed by humans, birds and animals, even certain plants – Natural Learning.
- Now, computers/ machines are able to learn- Artificial Learning/ Machine Learning.
- Computers can learn and act like humans do, and improve their learning over time in autonomous fashion, by taking input data in the form of observations and real-world interactions.

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