CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

Today, in Nigeria, medical diagnosis are carried out by doctors, specialized in their field of study. Through proper and thorough examination of patients and their organs, these doctors are able to identify symptoms of known diseases. Their findings, aids them in the diagnosis of a patient and further prescription of treatment for the diagnosis.

For most diseases, the symptoms are finite and consistent in all occurrence or instances. For example, Heart disease is characterized by chest pain along with other symptoms, therefore patients who complain of chest pain are likely to be diagnosed of heart disease.

“Machine learning is a type of artificial intelligence (AI) that provides computers with the ability to learn without being explicitly programmed. Machine learning focuses on the development of computer programs that can teach themselves to grow and change, when exposed to new data.” (whatis.techtarget.com, 2016).

Machine learning is basically algorithms that can learn from observational data and can make predictions based on it. The learning algorithms are fed these data and a model is inferred by mathematically determining the relationship between the data and the predicted values. This model in turn is used to predict new values from new data supplied to it.

“A machine learns with respect to a particular task T, performance metric P, and type of experience E, if the system reliably improves it’s performance P at task T, following experience E.” (Mitchell, 2006)

With the various advancements in machine learning algorithms, the task of learning from existing curated data has been made possible. This has given rise to various implementation of machine learning algorithms in different fields e.g. Medical Diagnosis, Natural language processing, Recommender systems e.t.c.

Machine learning algorithm are classified into three different categories based on their method of learning and output, they include the following:

1. Supervised Learning.

Supervised learning involves the provision of data attributes and already observed corresponding result of the data attributes as input or training data and the algorithm associates attributes to the result to form a model which will predict any other data attributes supplied to it.

2. Unsupervised Learning.

In unsupervised learning, the model is given raw observational data to make sense out of it. It groups the data into “clusters” or groups identified by similarity metric which might not conform to predisposed stereotypes. Example of this type of learning speech recognition

3. Reinforcement Learning.

Reinforcement Learning deals with dynamic data (data that changes). It tries to make decisions based on these data, it is provided with negative or positive feedback on every decision made. This feedback guides it’s subsequent decisions.

1.2 PROBLEM DEFINITION

Computers are made to ease and aid human daily activities, by automating tasks. These task varies in complexity, and since the invention of computers, great progress have been made in simplifying them. One of these tasks includes medical diagnosis. Diagnosis are carried out through thorough examination of patients by qualified medical staffs and Doctors, and their expert knowledge is used to prescribe possible solutions for the diagnosis.

This process of diagnosis i.e gathering data through examination, and using this data to proffer diagnosis, can be achieved by machine learning. There are various algorithms to choose from, to perform this diagnosis. Each one of the available algorithms have their strengths and limitations, which varies with their different implementations.

For a task as delicate and sensitive as medical diagnosis, there is little tolerance for errors and inefficiency, as the aim of using computers to aid human tasks is to increase efficiency and and minimize errors to its barest minimum.

The process of preparing a machine learning model for prediction, involves various steps which includes;

1. Collecting data.

2. Preparing the data.

3. Choosing the right algorithm.

4. Training the algorithm.

5. Testing the algorithm.

Of all the above mentioned steps, the first three are the most important, as they determine the outcome of the last two as well as the performance of the model. These steps are rigorous activities that takes a lot of time and difficulty to get right.

In Nigeria, due to little or no existing collection of data to carry out machine learning, the first three steps are made even more difficult. But with proper preparation of available data, an optimal machine learning model can be made for medical diagnosis.

1.3 AIM AND OBJECTIVES

The aim of this project was to go through the entire process involved in machine learning, to illustrate the thorough procedure in preparing available data and choosing the right algorithm. This process is a thorough process as there is little tolerance for errors.

Every machine learning algorithm and model is only as good as it’s data. Wrong data supplied to the algorithm for training, will definitely render it non-reliable.

The objective is to have a working model capable of predicting if a person has a heart disease or does not. // Explain the whole process

Aim

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SUMMARY

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