**CHAPTER ONE**

**INTRODUCTION**

* 1. **INTRODUCTION**

Heart disease is a leading cause of death and disability worldwide, and early detection and prevention are crucial in reducing its impact. Machine learning has the potential to revolutionize healthcare by providing accurate and efficient predictions of disease risk. In this project, we propose the design and implementation of a web-based machine learning model for predicting heart disease. Our motivation is to provide a convenient and accessible tool for individuals to assess their risk of developing heart disease and to facilitate early intervention. We will utilize a variety of data sources and machine learning techniques to train and evaluate the performance of our model. We anticipate that the resulting model will be able to accurately predict heart disease risk and have the potential to be widely adopted in healthcare settings.

* 1. **BACKGROUND OF STUDY**

Of an estimated 58 million deaths from all causes worldwide in 2015, cardiovascular disease (CVD) accounted for 30%. This ratio is equal to infectious diseases, nutritional deficiencies and maternal and perinatal conditions combined. It is important to recall that a significant proportion of these deaths (46%) are attributable to people less than 70 years of age, in the most productive period of life. Furthermore, 79% of the burden of disease attributed to CVD is in this age group [11]. Between 2015 and 2021, deaths due to non-communicable diseases (half of which will be due to cardiovascular disease) are expected to increase by 17%, while deaths due to infectious diseases, nutritional deficiencies and maternal and perinatal conditions combined are expected to decrease by 3% [12]. Nearly half of the burden of disease in low- and middle-income countries is already due to non-communicable diseases.

* 1. **STATEMENT OF THE PROBLEM**.

Heart disease can be managed effectively with a combination of lifestyle changes, medicine and in some cases surgery. With the right treatment, the symptoms of heart disease can be reduced and the functioning of the heart improved. The predicted results can be used to prevent and thus reduce cost for surgical treatment and other expensive. The overall objective of my work will be to predict accurately with few tests and attributes the presence of heart disease. Attributes considered form the primary basis for tests and give accurate results more or less. Many more input attributes can be taken but our goal is to predict with few attributes and faster efficiency the risk of having heart disease. Decisions are often made based on doctors’ intuition and experience rather than on the knowledge rich data hidden in the data set and databases. .This practice leads to unwanted biases, errors and excessive medical cost which affect the quality of services provided to patients.

Data mining holds great potential for the healthcare industry to enable health systems to systematically use data and analytics to identify inefficiencies and best practices that improve care and reduce costs. According to (Wurz & Takala, 2006) ⁠the opportunities to improve care and reduce costs concurrently could apply to as much as 30% of overall healthcare spending. The successful application of data mining in highly visible fields like e-business, marketing and retail has led to its application in other industries and sectors. Among these sectors just discovering is healthcare. The healthcare environment is still „information rich‟ but „knowledge poor‟. There is a wealth of data available within the healthcare systems. However, there is a lack of effective analysis tools to discover hidden relationships and trends in the data for African genres.

* 1. **PURPOSE OF STUDY**

Here the scope of the project is that integration of clinical decision support with computer-based patient records could reduce medical errors, enhance patient safety, decrease unwanted practice variation, and improve patient outcome. This suggestion is promising as data modeling and analysis tools, e.g., data mining, have the potential to generate a knowledge-rich environment which can help to significantly improve the quality of clinical decisions

* 1. **LIMITATION OF STUDY**

Medical diagnosis is considered as a significant yet intricate task that needs to be carried out precisely and efficiently. The automation of the same would be highly beneficial. Clinical decisions are often made based on doctor’s intuition and experience rather than on the knowledge rich data hidden in the database. This practice leads to unwanted biases, errors and excessive medical costs which affects the quality of service provided to patients. Data mining have the potential to generate a knowledge-rich environment which can help to significantly improve the quality of clinical decisions.

A web-based HDPS application is reserved for the specific task of HD due to researched knowledge of the domain and technical. Considering the time to accomplish this project, it will conduct the following tasks only:

1. HDPS can only find the presence of HD of patients. In future, we will enhance the model for predicting specific type of HD.
2. HD prediction model can be trained only 303 data of HD patient due to difficult of collecting Nepalese heart patient data but in future, we will collect large data and train model with their high accuracy.
3. HDPS can be run with the internet and can be open in the only browser. In the future, we will develop this system as an offline based application.
4. HDPS can only reserve heat disease prediction. In the future, we will integrate a healthcare system.