# Main Points and Structure (around 2000 words)

*Dissertation Title for Reference - Blood Glucose Levels Analysis and Predictions Using Data Mining Techniques*

* Data mining
  + What is it?
  + What are its uses?
  + Different types of data mining techniques
* Data mining in the medical field especially diabetes
  + Mining techniques most used in medical data mining *(paper 2)*
  + Short overview of diabetes (what it is, its symptoms and effects …)
  + Briefly explain CGMs (and their use for diabetic people) and how data can be mined and used to make predictions
* Prediction Algorithms and their uses
  + Classification Algorithms *(paper 1)*
  + Results obtained by some papers using specific algorithms
* Best algorithms chosen for scenario

# Literature Review

Section 1 – Introduction

Data mining is the process of analysing pieces of data and processing it into useful information. It is the process of exploring hidden knowledge from large amounts of data in search of consistent patterns and meaningful relationships between variables.

Data mining is part of the Knowledge Discovery Process (KDP). Before data mining algorithms can be applied, data from varies sources gets integrated into a single data store called target data, it is them pre-processed and transformed into standard format. At this point data mining algorithms can be used to process the data and produce patterns or rules. The output can now be interpreted into useful knowledge or information. Data mining is a central and very valuable part of the KDP.

Over the past years several data mining techniques have been developed the most commonly used ones being Association, Classification, Clustering, Prediction and Sequential Patterns. Many techniques have been developed for these techniques. Some techniques are better suited for specific situations then other and many times it is interesting to use multiple techniques for the same problem and compare the results to find the technique best suited for that specific scenario.

Data mining is being used in many industries from finance to retail, telecommunication, education, to the science and medical fields. These industries are using this tool to extract recurring tendencies in order to predict behaviours and future trends, allowing businesses to make intelligent and productive decisions. For some business data mining helps in pointing out sales trends, develop smarter marketing campaigns, and accurately predict customer loyalty, thus helping companies to gain a competitive advantage. In less business-related areas such as health and medicine data mining can be used to make predictions on patients based on their records to be able to predict conditions and symptoms related to some conditions in advance therefore, thanks to an early diagnosis, precautions can be taken to prevent future complications.

Section 2 - Data mining in the medical field especially diabetes

A field that has enormous amounts of data is the Medical field. Recently, due to this large amount of information, medical data mining has grown in its popularity over the past years.

Classification is a data mining task generally used in medical data mining. Some other techniques that have proven useful in finding patterns in medical data are clustering, association and outlier.

In the health care sector data mining is especially useful as it uses medical data for analysis to offer improved healthcare at reduced cost. Data mining in health care plays a significant role in prediction and diagnosis of several health problems such as heart disease, diabetes, cancer, skin disease among many others. This is important since early diagnoses of diseases and medical conditions are vital in order to prevent future complications.

1. *Diabetes*

The main focus of this paper is medical data mining with regards to diabetes. This has also become quite a researched subject as diabetes is a chronic disease that affects millions of people worldwide. In fact, it has become of the leading causes of death worldwide. Statistics show that in 2017 it caused around 4 million deaths and affected about 1 in every 7 births. It is also a leading cause of obesity and it has a significant impact on the quality of life of people suffering from diabetes and their families, especially when complications arise.

Diabetes, otherwise known as Diabetes Mellitus occurs when the pancreas is unable to produce enough insulin, or when the body cells cannot make proper use of the insulin produced, due to reduced sensitivity.