GLUCOFRIEND:

GLYCEMIC VARIABILITY PREDICTION FOR DIABETES PATIENTS

Shehan Vishwajith Galappaththi Guruge

A dissertation submitted in partial fulfilment of the requirement for

Bachelor of Engineering (Honours) degree in Software Engineering

Department of Computing

Informatics Institue of Technology, Sri Lanka

In collaboration with

University of Westminster, UK

2020

Abstract

Glycemic Variability is one of the main complication diabetes patients face in their day to day lives. Even though smart equipment (CGM devices) was invented for blood glucose levels management, majority of the diabetes patients rely on Glucometer to measure their blood glucose levels in Sri Lanka. This research focuses on providing a solution for those potential users (T1DM), for predicting their blood glucose levels to benefit them in managing their glycemic levels. This study further focuses on the prediction ability of a sparser dataset (only 3 recordings per day) and proposes a novel methodology for predicting the blood glucose values for new patients. Based on the implementation and testing phases conducted the entire study is divided in to 4 broader categories as, personalized prediction with carb, personalized prediction without carb, non-personalized prediction with carb, and non-personalized prediction without carb. Out of the above four modules personalized prediction with carb obtained the maximum prediction accuracy of mean rate of 85.3% for 8 patients. When considering the non-personalized prediction module, non-personalized prediction with carb obtained the maximum Glycemic prediction accuracy mean rate of 79% with the proposed approach surpassing the supervised machine learning algorithms.

Keywords:

Glycemic Variability, Personalized prediction, Hypoglycemia, Hyperglycemia, Non personalized prediction