Diabetic Patient Monitoring and Management using Machine Learning

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Project Background

A continuous glucose monitoring (CGM) system is a device that logs glucose levels. Medtronic has provided CGM data for 93 patients along with FitBit activity metrics.

Overview

The scope of the project is to develop a back-end platform based on data analytics and data science algorithms for predicting the continuous glucose levels of diabetic patients, provide patients with insight and recommendations, and display to each patient in real time.

Real Time Data

➢ Microservices architecture provides scalability to allow for dynamic growth for accommodating higher throughput of incoming patient data.
➢ All modules run on cloud based virtual machines

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Insight Engine

➢ Takes in Sensor Glucose data, Fitbit data, and nutritional data as JSON objects
➢ Processes the data, creating insights and recommendations for each individual patient
➢ Insights are displayed as a suggestion, accompanied with a graph, helping each patient monitor sugar levels better.

Machine Learning Algorithm

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>MAPE</th>
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<tbody>
<tr>
<td>Random Forest Regressor</td>
<td>27.9%</td>
</tr>
<tr>
<td>MLPRegressor</td>
<td>29.6%</td>
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</tbody>
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Data preprocessing and missing value imputation, feature extraction, feature selection, and dimensionality reduction

Predictive analytics based on machine learning algorithms including: Random Forest and Neural Network.