**A REPORT**

**ON**

**Quality of Care for Chronic Disease management**

**BY**

Vaibhav Gaikwad

2018HT12597

**AT**

**Philips VitalHealth Pvt. Ltd, Mumbai**

**BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE**

**PILANI (RAJASTHAN)**

April 2020

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Masters in Software Systems

Prepared in partial fulfilment of the

WILP Dissertation Work

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Abstract

Philips VitalHealth develops a variety of off-the-shelf products and ad-hoc solutions, which helps in managing the care of chronic diseases like Diabetes, COPD, Asthma, etc. It has developed a platform which helps in rapid application development for any healthcare solution as required, within a short time. The diabetes solution is widely adopted many parts of the world by different organizations. The applications cover most of the medical workflows and integration that is required for developing the care protocol. The data stored in these applications is valuable from an analysis point of view.

A thoughtful review on the good-to-have features for the applications brought forward the topic of data analytics. It can be very useful and could be one of the key USP for the business and the stakeholders. There various aspects that could be developed in the domain of analytics, one of such aspect is Quality of Care (QoC) which is the primary focus of this dissertation work. Many countries, mostly the developed nations, have started to understand the importance of measuring the Quality of Care. A perfect example to support this statement is the adoption was the Meaningful Use certification in United States of America. The certification policy is well documented on the (CDC Meaningful Use, n.d.). Addition of the component which helps to understand the Quality of Care is key to keep the application in use.

The current dissertation work uses the application which is used for Diabetes Type 2 management was a good candidate for this work as it is used by many customers.

Two aspects of the QoC analysis for Diabetes solution:

Understanding the risk-based group in the population. The first part is the identify the various aspects of the Diabetic population. This is where we need the data mining approach to find interesting characteristics from the data. The categorization of population in the low-risk, moderate-risk and high-risk is very essential. The high-risk population needs a greater focus compared to other two. Keeping track of high-risk population over time and to reduce the number of high-risk patients is one of the goals.

Understanding the improvement in health. One of the key factors in Diabetes management is maintain the stable level of Blood Glucose levels. The QoC can then be decide on the number of patients with improved health compared to number of patients who health deteriorated over time. Higher the percentage of patients with improved or stable health conditions indicate a good Quality of Care.

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# Introduction

Healthcare Analytics is the buzz word. The area of work in the dissertation will try to deal with simple yet challenging topic related to healthcare applications, which will explore the topic of Quality of Care. Generally, the applications that are built around the protocol to manage chronic diseases fall short to demonstrate the effectiveness of it. Quality of Care basically portrays how meaningful the application is when it comes to the disease management and care. The analytics behind Quality of Care tries to justify how the application is useful and what can be made better in terms of the healthcare protocol that it is built on.

**Data Mining:** will help to identify the attributes related to patient that can be used to learn about the Quality of Care in any chronic disease application. It can also be helpful to compare attributes between to chronic diseases and also to find some co-relations across different chronic diseases. The goal in the current scope will be to identify the attributes for Diabetes Type 2 and the learn about the co-relations between these attributes. It will also try to identify the risk categories in a given population (i.e. high, moderate and low risk categories)

**Machine learning:** helps us to build a model which can then be helpful in predicting the meaningful use of an application which is built for Diabetes Type 2. The scope in this dissertation work will be limited to making a model to estimate the Quality of Care percentage for some new application

## Problem statement

Currently the Diabetes application lacks the data analytics capability. There are existing integrations possibilities to extract the correct set of data into other analytics applications. The existing way of performing analytics is not reusable and also not economical. Customers do not have a way to easily measure the Quality of Care in their installations.

This paper provides an idea on analysing the quality of care for chronic diseases. The work focuses on Diabetes Type 2 disease because it is one of the major concerns in the country and all over the world. Diabetes Type 2 is a chronic problem and

# Work Summary

**Clustering for risk categorization**

Clustering is an unsupervised learning technique which is used to categorise data such that similar data elements are grouped together. These are also called classes. This helps to generate groups based on similarities which are intrinsic to the data attributes and are not known to the person analysing the data.

# Conclusion and Recommendations

# Appendices

# References

*CDC Meaningful Use*. (n.d.). Retrieved from CDC Meaningful Use: https://www.cdc.gov/ehrmeaningfuluse/index.html

The references that were used during this project work are listed below:

* Books

Automated Career Guidance Expert System Using Case-Based Reasoning

Technique

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Mobile: +2348138204517 Machine Learning – by Tom M Mitchell

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Again, in case you have referred to a book on An Introduction to Linear Algebra by Dr. V. Krishnamurthy and others which was published by Affiliated East-West Press, New Delhi in the year 1976, the reference should be cited as given below:

2. Krishnamurthy, V. et al, "*An Introduction to Linear Algebra*," 1st edition, New Delhi; Affiliated East-West Press, 1976, p.25.

The serial number of the reference should correspond to the number of citations in the text of the report.

**Glossary**

Cases

COPD: Chronic obstructive pulmonary disease 4

QoC : Quality of Care 4

USP : Unique Selling Point 4