Decision Support System for Dengue Management Based on Vital Signs and Blood Profile

S.H.U.Briyatis

169303J

Faculty of Information Technology

University of Moratuwa

March 2019

Decision Support System for Dengue Management Based on Vital Signs and Blood Profile

S.H.U.Briyatis
169303J

Dissertation submitted to the Faculty of Information Technology, University of Moratuwa, Sri Lanka for the fulfillment of the requirements of Degree of Master of Science in Information Technology.

March 2019

Declaration

I declare that this thesis is my own work and has not submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from published or unpublished work of others has been acknowledged in the text and a list of lists of references is given.

Name of Student
S.H.U.Briyatis

Signature of student
……..
Date: ……

Supervised by
Name of Supervisor
Mr.S.C. Premaratne
Senior Lecture
Faculty of Information Technology
University of Moratuwa

Signature of Supervisor
……
Date: ……..

Acknowledgements

First and foremost, I would like to convey my utmost gratitude to my project supervisor Mr. S.C Premaratne, Senior Lecturer in University of Moratuwa, whose expertise, understanding added considerably to my research experience and Professor Harendra de Silva, Senior Professor of Paediatrics, Colombo, for their guidance, encouragement and inspiration throughout my research work. Without the precise guidance I had from them I could not have succeeded anyway.

In addition to those, I would like to offer my sincere appreciation to all the lectures of M.Sc. in Information technology degree program the of Faculty of IT, who sharpens our knowledge and ideas throughout this M.Sc. Program and all the batch mates of the M.Sc. in IT degree program who gave their valuable feedback to improve the result of research and my family for the support they provided me.

Abstract

Dengue is a mosquito-borne viral disease which has become a major health issue in Sri Lanka during the past few years. Based on the symptoms and their severity dengue can be classified as Dengue Fever (DF), Dengue Haemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS). Being a viral disease, it cannot be cured with drugs and attempts to develop a vaccine have not been successful yet. Therefore, proper care and management have become very critical to reduce the number of dengue deaths. Plasma leakage is the major reason which causes death from dengue virus and correct identification of plasma leakage is a challenging task for medical doctors. Since there is not specific available treatment for dengue, early detection of the suspected case and give proper medical care can help to prevent dengue shock or severe involvement.

This research based on research paradigm, Cased-Based Reasoning (CBR) to develop a web application to manage dengue illness. Identified most important cases related Dengue and identified rules which are related to those rules. Clinical parameters and values or ranges of those parameters are used for this research with the guidance of the Physicians. Based on these cases and rules, the system is developed. The system will predict the current situation of the patient by analyzing his/her past vital signs and blood profiles. Normally Dengue Patients are monitored hour by hour and some of those important monitoring parameters will be entered to the system. Then the system will display the current stage of the Dengue and some suggestions. And using this system doctors can see how is the Pulse Pressure, Urine Output, Packed Cell Volume (PCV), Platelet Count and White Cell Count (WCC) varying according to the time of the particular patient.

The system generated details will help doctors to identify the current situation of the patient and do proper treatment to the dengue patient. This will help to reduce the number of Dengue death in Sri Lanka.

Table of Contents

List of Figures

List of Tables

Abbreviations

WHO	Word Health Organization
DF	Dengue Fever
DHF	Dengue Haemorrhagic Fever
DSS	Dengue Shock Syndrome
HR	Heart Rate
PP	Pulse Pressure
HCT	Haematocrit
UOP	Urine Output
WCC	White Cell Count
CBR	Cased Based Reasoning
PCV	Packed Cell Volume
IV	Intravenous