A Project/Dissertation Review-1 Report

on

Meddify-an App for BP Patients

Submitted in partial fulfillment of the
requirement for the award ofthe degree of

B.Tech in Computer Science

GALGOTIAS UNIVERSITY
(Established under Galgotias University Uttar Pradesh Act No. 14 of 2011)

Under The Supervision of
Name of Supervisor :
Ms.Vaishali Gupta

Submitted By

Ghufran Ahmad

Khan
19021011427/19SCSE1010238

SCHOOL OF COMPUTING SCIENCE AND ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
GALGOTIAS UNIVERSITY, GREATER NOIDA
INDIA

MONTH, YEAR

Abstract

The use of machine learning techniques in medicine has increased in recent years due to a rise in publicly available datasets. These techniques have been applied in high blood pressure studies following two approaches: hypertension stage classification based on clinical data and blood pressure estimation based on related physiological signals.

This paper provides literature reviews on these subjects. We aimed to identify the best methods, challenges, and opportunities in building machine learning models to detect high blood pressure or to measure blood pressure using clinical data and physical symptoms.

Therefore, we identified and evaluated machine learning strategies, publicly available data sets, and predictions used in previous studies. Feature selection strategies used to reduce model weight are also being reviewed.

We found a lack of studies combining socio-demographic or clinical data with physiological signals, despite the correlation of blood pressure with photoplethysmography waveforms and variables such as age, gender, body mass index, and heart rate.

Therefore, there is an opportunity to increase model performance by using both types of data for hypertension detection or blood pressure monitoring and also on how can we can share location to someone using Google API Key.

List of Tables

Table No.	Table Name	Page Number
1.	Table for Student Data	3
2.	Table for Faculty Data	4

List of Figures

Figure No.	Table Name	Page Number
1.	UML Diagram	7
2.	Data Flow Diagram	6

Acronyms

B.Tech.	Bachelor of Technology
M.Tech.	Master of Technology
BCA	Bachelor of Computer Applications
MCA	Master of Computer Applications
B.Sc. (CS)	Bachelor of Science in Computer Science
M.Sc. (CS)	Master of Science in Computer Science
SCSE	School of Computing Science and Engineering

Table of Contents

Title		Page No.
Abstract		**I**
List of Table		**II**
List of Figures		**III**
Chapter 1	**Introduction**	**1**
	1.1 Introduction	**2**
	1.2 Formulation of Problem	**3**
	1.2.1 Tool and Technology Used	
Chapter 2	**Literature Survey/Project Design**	**5**

CHAPTER-1
Introduction

1.1 Introduction

According to the World Health Organization, hypertension or high blood pressure (BP) is a global public health issue. This health condition affects 1.1 billion people worldwide, with two-thirds living in low and middle-income countries . Moreover, hypertension(high blood pressure) increases the risk of heart attack , heart failure , kidney disease , coronary heart disease , diabetes , and strokes . In 2013, high BP accounted for at least 45% of deaths due to heart disease and 51% of deaths due to stroke . Moreover, managing this medical condition is challenging and costly.

The diagnosis of hypertension is based on arterial BP readings measured with a sphygmomanometer, the standard method for measuring BP, which has an inflatable cuff, a mechanism of inflation that can be manually or automatically operated, and a mercury manometer .

The amount of clinical data available in electronic health records (EHRs) has enabled machine learning (ML) techniques to detect and monitor different medical conditions or diseases, high blood pressure is no different. The ML used in the medical field ranges from traditional methods such as systematic and systematic planning to more complex techniques such as artificial neural networks (ANN) with a variety of structures and structures. The emerging forms of ML are designed to provide medical professionals with a tool to support clinical decision-making.

The detection of hypertension and the monitoring of BP have mainly been studied in two different approaches. The first approach addresses the problem of monitoring BP as a regression task (i.e., the model generates continuous values). Hence, the systolic and diastolic BP values are estimated from PPG or ECG signals. In some studies, both signals or features extracted from them are used as inputs for estimating BP values using different ML techniques (e.g., linear regression models or ANN for regression tasks). In some others, only the PPG signal is used . The second approach addresses the problem of detecting hypertension as a classification task (i.e., the model generates discrete values or labels). Here, the models try to estimate to which level of hypertension the patients belong to according to clinical and socio-demographic data .

CHAPTER-1
Introduction

1.2 Formulation of Problem

The detection of hypertension and the monitoring of BP have mainly been studied in two different approaches. The first approach addresses the problem of monitoring BP as a regression task (i.e., the model generates continuous values). Hence, the systolic and diastolic BP values are estimated from PPG or ECG signals. And hence here arises the first major problem that the data can be wrong or totally unrelatable sometimes.

The second approach uses PPG values and it addresses the problem of detecting hypertension as a classification task (i.e., the model generates discrete values or labels). Here, the models try to estimate to which level of hypertension the patients belong to according to clinical and socio-demographic data and hence , here arises second Problem that it can show relatively high or low values for the input data.

CHAPTER-1
Introduction

1.3 Tools and Technology Used

The Tools and Technologies that will be used for proposed system is as follows:-

1.We will use different Machine Learning Algorithm for detection of estimated values according to the input PPG and ECG values.

2.Linear Regression , Logistic Regression and many such techniques will be used for detection of the estimated correct value of based on The input records of the Systolic and Diastolic Phases of PPG and ECG machines.

3.We also will use the Google API Key to share the location of the user to someone in case of any Emergency and such Conditions.

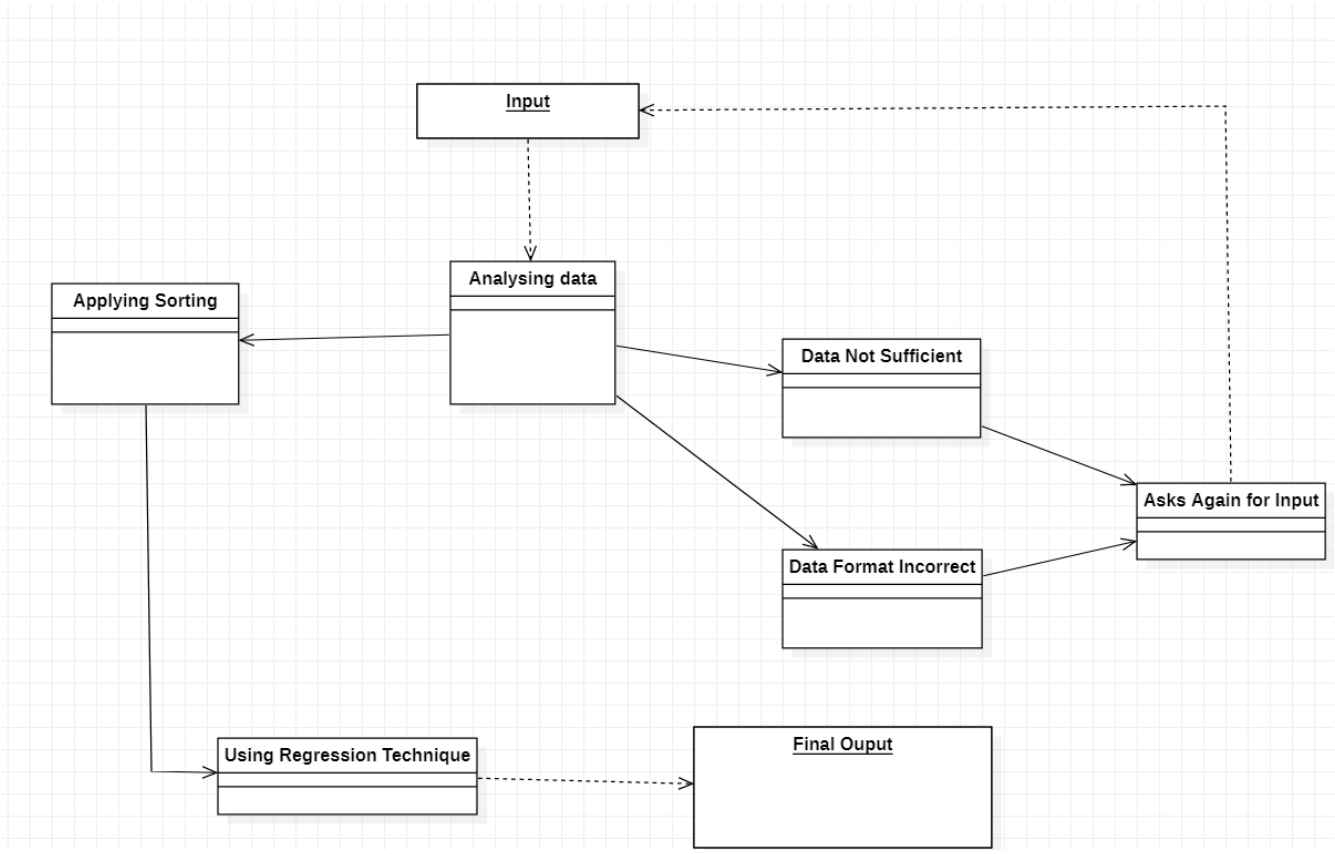
CHAPTER-2
Literature Survey

Medical evidence suggests that early detection of hypertension, correction of life habits, and tight control could reduce its further development and consequences. Nevertheless, most people with hypertension have no signs or symptoms, which is the reason it is often referred to as a “silent killer” . A few people with hypertension could suffer dizziness, chest pain, headaches, breathing difficulties, nosebleeds, or heart palpitations. However, these signs and symptoms are not specific to this condition and usually do not occur until hypertension has reached a severe stage . Therefore, the detection and monitoring of hypertension is still an open research topic, especially in lower-income countries with less pervasive and proactive healthcare services.
The ML used in the medical field goes from traditional methods such as logistic and linear regression to more complex techniques such as artificial neural networks (ANN) with their diverse architectures and characteristics. The resulting ML models are meant to provide medical experts with a tool to support clinical decision-making .
Physiological signals, either raw or some features extracted from them, are also as frequently used as input data to produce ML models in medicine .

In the current literature, some works have reviewed and evaluated the possibility of analyzing hypertension and blood pressure with the use of ML techniques. For example, Elgendi et al. analyze the potential use of the PPG waveform to assess hypertension. A similar study of the PPG signal for cuff-less blood pressure estimation was later presented by Hajj et al. with special attention to ML techniques. Besides, a review of blood pressure monitoring techniques and the possible use of developing a cuff-less method was presented in the work of Pandit et al. . Finally, Koshimizu et al. presented a study where the future possibilities of applying artificial intelligence in the management of high blood pressure are presented, and the importance of developing interpretable models based on ML that can be applied in a medical context is studied. Generally, most of those reviews present a deep analysis of the PPG waveform analysis techniques used to make a cuffless monitoring system of blood pressure. Nevertheless, there has not been work that discussed the potential use of socio-demographic or clinical data in a combination of signal processing techniques applied to physiological signals to develop models that could enhance the detection of hypertension or blood pressure estimation models trained with ML algorithms. Additionally, an extended analysis of the type of samples and variables used in the assessment models for high blood pressure is lacking.

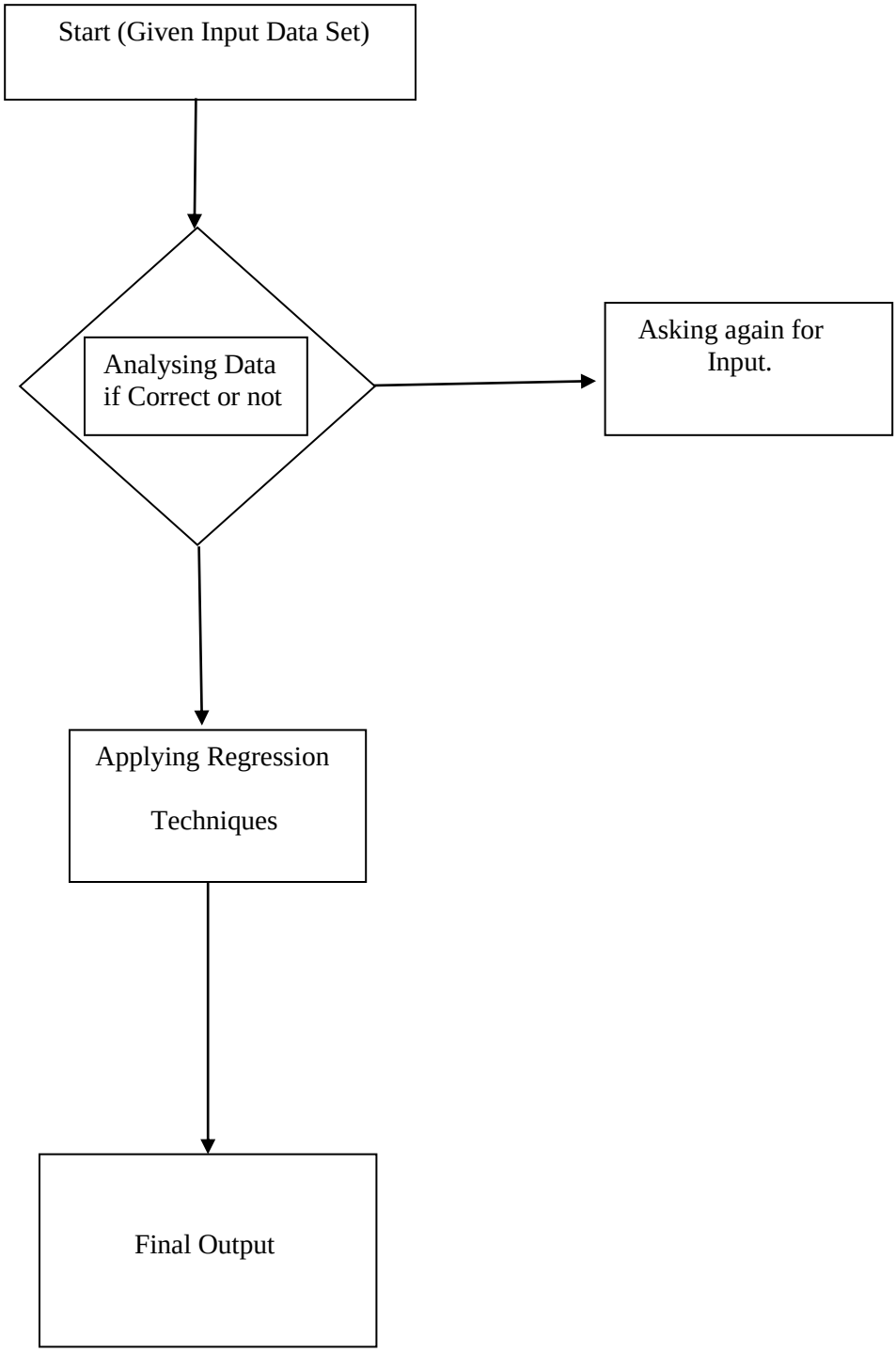
CHAPTER-2
Literature Survey

Data Flow Diagram(For Proposed System)-



CHAPTER-2
Literature Survey

Flow Chart (For Proposed System)-



REFERENCES:

1.W.H. Organization, *et al.*
A Global Brief on Hypertension: Silent Killer, Global Public Health Crisis: World health day 2013, Tech. rep.
World Health Organization (2013)

2.F.D. Fuchs, P.K. Whelton

High blood pressure and cardiovascular disease
Hypertension, 75 (2) (2020), pp. 285-292

3.A. Kannan, R. Janardhanan

Hypertension as a risk factor for heart failure
Current Hypertension Rep., 16 (7) (2014), p. 447

4.H. Sternlicht, G.L. Bakris

The kidney in hypertension
Medical Clinics, 101 (1) (2017), pp. 207-217

5.E. Escobar

Hypertension and coronary heart disease
J. Human Hypertension, 16 (1) (2002), pp. S61-S63

6.D. Sun, T. Zhou, Y. Heianza, X. Li, M. Fan, V.A. Fonseca, L. Qi

Type 2 diabetes and hypertension: a study on bidirectional causality
Circul. Res., 124 (6) (2019), pp. 930-937

7.B.B. Johansson

Hypertension mechanisms causing stroke
Clin. Exp. Pharmacol. Physiol., 26 (7) (1999), pp. 563-565

8.G. Ogedegbe, T. Pickering

Principles and techniques of blood pressure measurement
Cardiol. Clin., 28 (2010), pp. 571-586, 10.1016/j.ccl.2010.07.006

9.A.V. Chobanian, G.L. Bakris, H.R. Black, W.C. Cushman, L.A. Green, J.L. Izzo Jr., D.W. Jones, B.J. Materson, S. Oparil, J.T. Wright Jr., *et al.*
Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure
Hypertension, 42 (6) (2003), pp. 1206-1252

10.R. Rapport

Hypertension. Silent killer
N. J. Med., 96 (3) (1999), p. 41

11.C. Ye, T. Fu, S. Hao, Y. Zhang, O. Wang, B. Jin, M. Xia, M. Liu, X. Zhou, Q. Wu, *et al.*
Prediction of incident hypertension within the next year: prospective study using statewide electronic health records and machine learning
J. Med. Internet Res., 20 (1) (2018), p. e22

12.H. Koshimizu, R. Kojima, Y. Okuno

Future possibilities for artificial intelligence in the practical management of hypertension
Hypertens. Res. (2020), pp. 1-11

13.D.E. Adkins

Machine learning and electronic health records: a paradigm shift
(2017)