Department of Electrical and Computer Engineering
North South University

Senior Design Project

Development of IoT-Based Real-Time Patients Vital Physiological Parameters Monitoring System Using Smart Wearable Sensors

Ajan Ahmed	**ID 1811222043**
Shefat Ara Moon	**ID 1620561042**
A.S.M. Sabbir Hassan	**ID 1620182643**
Nusrat Jahan Fatima	**ID 1612202643**

Faculty Advisor:

Dr. Mohammad Monirujjaman Khan

Associate Professor

ECE Department

Spring, 2022

LETTER OF TRANSMITTAL

June 1, 2022

To

Dr. Mohammad Rezaul Bari

Chairman,

Department of Electrical and Computer Engineering

North South University, Dhaka

Subject: **Submission of Capstone Project Report on "Development of IoT-Based Real-Time Patients Vital Physiological Parameters Monitoring System Using Smart Wearable Sensor"**

Dear Sir,

With due respect, we would like to submit our **Capstone Project Report** on **"Development of IoT-Based Real-Time Patients Vital Physiological Parameters Monitoring System Using Smart Wearable Sensors"** as a part of our BSc program. The report deals with development of an Iot based health monitoring system. This project was very much valuable to us as it helped us gain experience from practical fields and apply in real life. We tried to the maximum competence to meet all the dimensions required from this report.

We will be highly obliged if you kindly receive this report and provide your valuable judgment. It would be our immense pleasure if you find this report useful and informative to have an apparent perspective on the issue.

Sincerely Yours,

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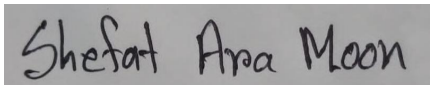
Ajan Ahmed
ECE Department
North South University, Bangladesh



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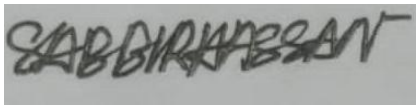
Shefat Ara Moon
ECE Department
North South University, Bangladesh



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A.S.M. Sabbir Hassan
ECE Department
North South University, Bangladesh

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Nusrat Jahan Fatima
ECE Department
North South University, Bangladesh

APPROVAL

Ajan Ahmed (ID # **1811222043**), **Shefat Ara Moon** (ID # **1620561042**), **A.S.M. Sabbir Hassan** (ID # **1620182643**) and **Nusrat Jahan Fatima** (ID #**1612202643**) from Electrical and Computer Engineering Department of North South University, have worked on the Senior Design Project titled "**Development of IoT-Based Real-Time Patients Vital Physiological Parameters Monitoring System Using Smart Wearable Sensors**" under the supervision of Dr. Mohammad Monirujjaman Khan partial fulfillment of the requirement for the degree of Bachelors of Science in Engineering and has been accepted as satisfactory.

Supervisor's Signature

…….

Dr. Mohammad Monirujjaman Khan
Associate Professor
Department of Electrical Engineering & Computer Science
North South University
Dhaka, Bangladesh.

Chairman's Signature

…….

Dr. Mohammad Rezaul Bari
Associate Professor
Department of Electrical Engineering & Computer Science
North South University
Dhaka, Bangladesh.

DECLARATION

This is to certify that this Project is our original work. No part of this work has been submitted elsewhere partially or fully for the award of any other degree or diploma. Any material reproduced in this project has been properly acknowledged.

Students' names & Signatures

1. Ajan Ahmed

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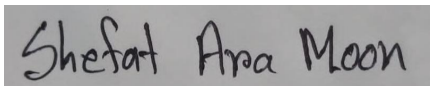
2. Shefat Ara Moon



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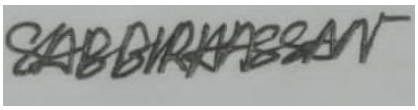
3. A.S.M. Sabbir Hassan



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4. Nusrat Jahan Fatima

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ACKNOWLEDGEMENTS

By kindness of the Almighty we have successfully completed our capstone senior design project entitled “Development of IoT-Based Real-Time Patients Vital Physiological Parameters Monitoring System Using Smart Wearable Sensors”

Our deep gratitude goes first to my faculty advisor Dr. Monirujjaman Khan, who expertly guided us in our senior design project throughout the whole CSE/EEE499A Fall2020 and CSE/EEE499B Spring2021. His guidance helped us in all types of research, writings and completing the project.

Our sincere thanks also goes to North South University, Dhaka, Bangladesh for giving us such a platform where we can have an industrial level experience as a part of our academics.

We would also like to thank my friends Mahmudul Rume & Sarowar Alam for helping us in this project.

Last but not the least, we would like to thank our family as their inspiration and guidance kept us focused and motivated.

ABSTRACT

IoT-Based Real-Time Patients Vital Physiological Parameters Monitoring System Using Smart Wearable Sensors

Healthcare is one of the least funded sectors in Bangladesh and many other similar developing countries. There is no health coverage and health insurance is almost non-existent. Thus, people living in rural and remote areas do not have access to proper healthcare and when they do, it is too expensive. The aim of this research was to develop a real-time health monitoring system that is cheap, easy to use and accessible by both doctors and patients. The system consists of several Internet of Things (IoT) based sensors connected to an Arduino microprocessor, which thus measures the body vital signs of the patients. The measured readings are then transmitted to an android application on a smartphone via a Bluetooth module. The sensors are connected to analog inputs. These sensors measure analog data which is amplified by the microprocessor after being sorted. Doctors can also carry out the diagnosis of ailments using the data collected remotely from the patient. An Android based mobile application that interfaces with a web-based application is implemented for efficient patients-doctors dual real-time communication. The android application, which is connected to a mySQL database, updates the said database, which in turn updates and displays the readings on a website accessible by both doctors and patients. The health monitor was initially tested using an Arduino Integrated Development Environment (IDE) monitor and one single user. Once initial simulations were successful, it was tested on a sample size of 5 more patients. In the end, the testing of the wireless health monitor produced successful results that measured patient vitals with a high level of accuracy.