

**Department of Electrical and Computer Engineering
North South University**



Senior Design Project

**Blockchain, IPFS, and Encryption based framework for
disease diagnosis on smartphones**

Member

Hasib Mahmud

1621065042

**Faculty Advisor:
Dr. Tanzilur Rahman
Assistant Professor
ECE Department
Summer 2020**

LETTER OF TRANSMITTAL

September, 2020

To

Dr. Mohammad Rezaul Bari

Associate Professor and Chairman,

Department of Electrical and Computer Engineering

North South University, Dhaka

Subject: Submission of Capstone Project on “Blockchain, IPFS, and Encryption based framework for disease diagnosis on smartphones”.

Dear Sir,

With due respect, we would like to submit our **Capstone Project Report** on “Blockchain, IPFS, and Encryption based framework for disease diagnosis on smartphones” as a part of our BSC program. The report deals with a Blockchain based Heart disease detection system which enables users to get reports based on their heart beat sound which is recorded using a smartphone’s microphone. We tried our level best to make the report meaningful and informative.

The Capstone project was very much valuable to us as it helped us to gain experience from practical fields. It was a great learning experience for us. We tried to the maximum competence to meet all the dimensions required from this report.

We will be highly obliged if you are kind enough to 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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Hasib Mahmud

ECE Department

North South University, Bangladesh

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Dr. Mohammad Rezaul Bari

Associate Professor and Chairman,

Department of Electrical and Computer Engineering

North South University, Dhaka

APPROVAL

The capstone project entitled “**Blockchain, IPFS, and Encryption based framework for disease diagnosis on smartphones**” by Hasib Mahmud (ID # 1621065042), is approved in partial fulfillment of the requirement of the Degree of Bachelor of Science in Computer Science and Engineering in September, 2020 and has been accepted as satisfactory.

Supervisor:



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Dr. Tanzilur Rahman

Assistant Professor

Department of Electrical and Computer Engineering

North South University Dhaka,

Bangladesh.

DECLARATION

This is our truthful declaration that the “**Capstone Project Report**” we have prepared is not a copy of any “**Capstone Project Report**” previously made by any other team. We also express our honest confirmation in support of the fact that the said “**Capstone Project Report**” has neither been used before to fulfill any other course related purpose nor will it be submitted to any other team or authority in future.

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Hasib Mahmud
ECE Department
North South University, Bangladesh

ACKNOWLEDGEMENT

First of all, we wish to express our gratitude to the Almighty Allah for giving us the strength to perform our responsibilities and turn our dreams into a reality.

This Blockchain project has bridged the gap between our theoretical knowledge and real life implementation of related technologies. We have learned techniques of researching, analysing, brainstorming, and finally finding alternative, better solutions to problems.

We are grateful to everyone who has assisted us in one way or another to finish this work.

We would like to convey our gratitude to our faculty **Dr. Tanzilur Rahman** because without his guidance, suggestions, direction, constant inspiration, encouragement and kind cooperation throughout the project, we would not be able to accomplish this work. We would have lost our focus on the actual goal of the project without his proper guidance.

We thank our **friends and family** for their moral support and prayers.

ABSTRACT

People are using many wearable sensors and medical IOT(Internet of Things) devices nowadays to measure and to diagnose their personal health status. Measuring heartbeat is one of them. Irregular heartbeat rate can indicate many potential or existing illnesses. But these sensors and IOT devices can be expensive and may not be easily available in the market. At present, we mostly use smartphones which need not to be very expensive and are easily available. We can offer rich reports using machine learning based on patient's data. So, we have built a cloud based smartphone application framework that collects data (primarily heartbeat rate) from users using available sensors (e.g.: microphone), and processes the data with the help of machine learning scripts and maintains data integrity. Personal Health Record (PHR) service is becoming a valuable source of data for hospitals and doctors. It has become necessary that the patient keeps the ownership of the data, securely organises, shares these medical data and can remain anonymous in this system. In order to achieve these goals, we are going to implement Blockchain, IPFS, and Encryption technologies in a virtual private network, applications of which are getting very popular in health care services. This implementation complies with General Data Protection Regulation (GDPR). There are already some papers written on how we can implement Blockchain in the health care system but very few have been implemented till now. Besides, the use of cryptocurrencies for each transaction in Blockchain increases the overall cost and Blockchain is not scalable. So, we are implementing BigchainDB to solve these problems.