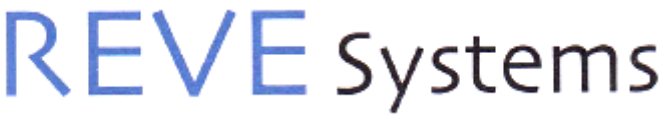
Internship Report

Swe-420

Submitted By : Md Habibur Rahman
Reg-no : 2017831002

Performed At :
REVE System Limited



Institute of Information and Communication Technology
Shahjalal University of Science and Technology

Date of Submission 16 July, 2022

Letter of Transmittal

Date : July 31,2022
Prof M. Jahirul Islam
Director
Institute of Information and Communication Technology
Shahjalal University of Science and Technology

Subject : **Letter of Transmittal**

Respected Sir,

I am glad to submit my Internship report that I had been instructed to submit. I had been working as an Intern at “REVE System” as our 4/1 semester offers a dedicated internship.

This report explains my whole internship journey at REVE System. My journey started on September 01,2021 and finished on February 28, 2022. During this period I worked under the supervision of Md Anisuzzaman Rubel(Project Manager at REVE System). This report illustrates my internship experience.

I tried my best to prepare this report on my actual experience. I therefore hope that you would accept my request and your kind consideration will be highly appreciated.

Yours Obediently
Md Habibur Rahman
Reg-No: 2017831002
SWE,4th Year, 1st semester
IICT,SUST

Letter of Endorsement

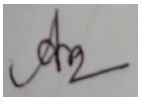
Subject: **Approval of the Report**

This letter is to certify that all the information mentioned in this document is true and not confidential to the company. The projects mentioned here have had successful involvement of Md Habibur Rahman, Institute of Information and Communication Technology, Shahjalal University of Science and Technology.

I wish him all the best and hope that he will lead a successful career.

Internship Supervisor

Md Anisuzzaman Rubel
Senior Project Manager and Team Lead
REVE System



Signature

Acknowledgement

First of all, I would like to thank my Institute, **Institute of Information and Communication Technology, SUST** for arranging the internship program for me. I am also grateful to **REVE System** for recruiting me as an intern.

I would like to express my heartfelt gratitude to **Mohammad Jahirul Islam**, Director, Institute of Information and Communication Technology, Shahjalal University of Science and Technology for running the internship program and giving me the opportunity.

I am also thankful to the honourable teacher, Fazle **Mohammed Tausif,Lecturer, SWE-SUST,** for his contribution and hard work in getting us admitted to different companies.

I am also grateful to my Team Lead and Project Manager **Anisuzzaman Rubel** vai. I also appreciate my other team members **Arnob Saha**(classmate), **Mohammad Shahad Mahmud**(Software Engineere), **Khairul Azman**(Ex-software engineer), **Rajibul Islam**(Ex-softwae engineere), **Mohammad Sadhan Sarkar**(Senior Software engineere) for their extreme support and co-operation.

Last of all, I would like to thank all of them who by any chance tried to help me in this journey.

Chapter 1: Introduction

1.1 Introduction

An internship is an official program offered by organisations to help train and provide work experience to students and recent graduates. The concept of working as an intern began a long time ago but has drastically evolved over the years

Institute of Information and Communication Technology(IICT) has always focused on industry-oriented study. For this reason Industry experts and students collaborate on a regular basis.

As a result, IICT arranges a 6-month internship for its students which glorify student's technical ability before finishing bachelor program. Internship helps students to link up their academic experience with Industry practices.

My industry collaboration was with REVE System which is one of the finest Software firms in Bangladesh. I have tried my best to implement my academic learning to the industry. I think I was successful in enriching my academic and industry experiences.

1.2 Objective

This report has been prepared as a requirement of the internship program provided by the Institute of Information and Communication Technology (IICT), SUST. The report is intended to reflect my achievements, project involvements, professional growth, and industrial experiences during the intern period.

1.3 Scope

This report provides a view to the experience that I gathered in my workplace at **REVE System**.This report also describes an overview of **REVE System** to the students of IICT who will continue the internship program next year.It will also present the industry **tools and technologies** used by **REVE System**. So, it will help new learners to avoid confusion about ongoing technologies in Bangladesh.

1.4 Lackings

While preparing the report, it was necessary to describe everything. But as for confidentiality, all the contents can not be shared. Again some contents and feedback gathered from the colleges and team members may not be perfect.Moreover, Industry perspective is totally different from academics. So illustrating industry views in academic reports is quite a tough job.

Chapter 2: Company Profile

2.1 About REVE System

REVE System is one of the best software companies in Bangladesh with more than 15 years of experience.It services to 78+ countries and 120 million of people world wide. It is one of the major collaborations of REVE Group.Its tools are designed to help expert users by reducing time/effort on repetitive, routine tasks, carry out exhaustive research and explore scenarios enabling large productivity gains.

It provides different support for enterprises and companies. The supports include :

- Carrier grade SBC, OTT, Billing, WebRTC & Cloud products with scalability & redundancy for high performance.
- Whitelabel mobile VoIP solutions with full customization & dedicated 24*7 support
- Secured communication platforms for enterprises for faster real-time business communication & collaboration
- Hosted mobile VoIP & Softswitch solutions with the flexibility of monthly payment option

2.2 Company Type

REVE System is mainly a **Product-based** company. Besides their own products, they provide various technical services to other companies and governments.

Product-based are those companies that will be working on their products and deliver that product to the end-users. They will look for candidates who have good technical and domain knowledge and are familiar with the latest tools and technology. In product-based companies, you work on the same product for years while in service-based companies it will be mostly for some months or years in rare cases.

On the other hand, REVE System doesn't compromise its service quality while providing service to others. **E-Gov,Bkash Chat** are known to the whole country for their magnificent work which are two major wings of REVE System.

2.3 Location and Physical Layout

The headquarter of REVE System is located in WCEGA Tower, 21 Bukit Batok Crescent, Uit 15-84,Singapore.There are other four Branch office located in Dhaka,Hong Kong,London and New Delhi.

Its Dhaka regional office is located at Plot-94,Purbachal Express,Dumni,Khilkhet, Dhaka 1205.

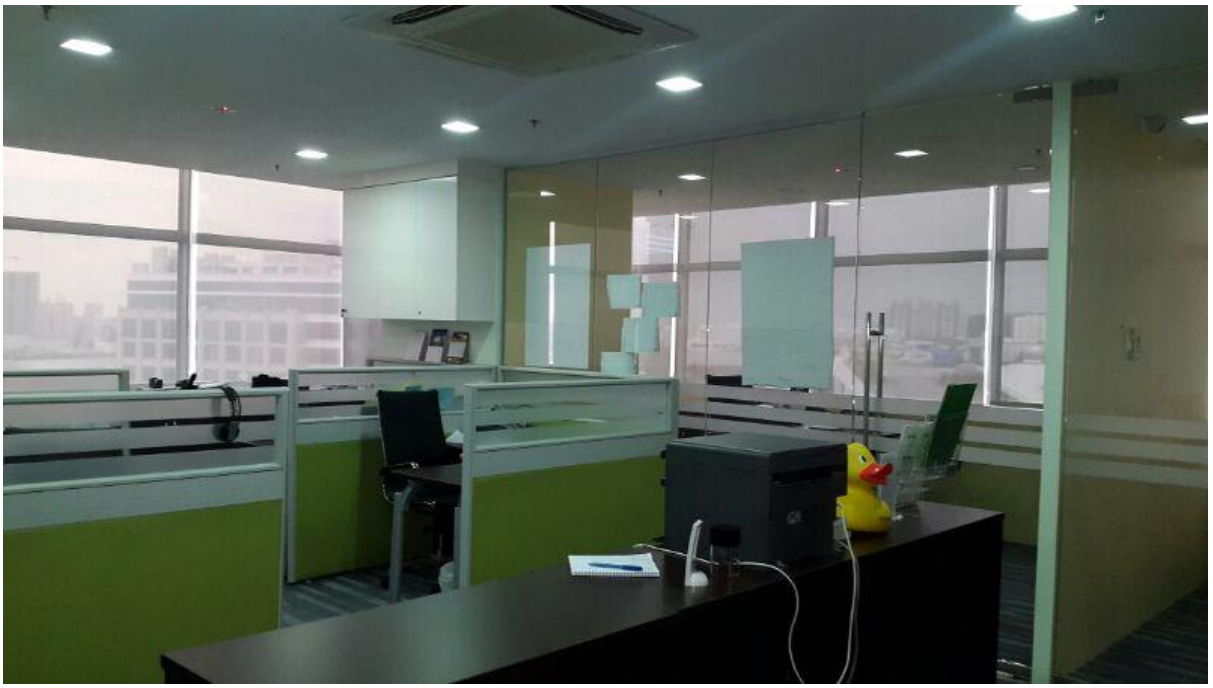


Fig 2.3 : Reve Office

2.4 REVE System Products

1. REVE SBC

- REVE SBC is a complete enterprise solution that offers carrier grade scalability, security with high performance. It offers robust network security under heavy loads & DoS attacks with distributed architecture for network availability & resiliency under any threat. It comes integrated with real-time billing platform with intelligent routing & policy management to give a leading performance of upto 20K concurrent calls with 1500 CPS

2. REVE OTT

- REVE OTT is a white label mobile OTT solution that allows communication service providers to build their personalised VoIP mobile OTT app and offer services like Instant Messaging (IM), Media sharing, Audio-Video Calling, among many other useful features.

3. Cloud Telephony

- An On-premise white label solution with an Off-premise hosted service option as well. Buy any type of number be it DID, Toll free or Vanity from 50+ Countries. Steup in a short period with advanced routing without any hassles of server management. Enjoy flexibility & mobility for happy customers & employees.

4. REVE SMS

- REVE SMS is a carrier-grade professional business solution for executing seamless SMS campaigns. It is highly reliable and keeps you updated with advanced price management and real-time statistics. This robust platform can easily handle all types of SMS campaigns such as Promotional SMS, Bulk SMS, and Response Driven SMS and more.

5. REVE Secured Communication

- A white label & customizable solution targeted towards enterprises, to ensure secure business communication and collaboration among teams. It creates a virtual office platform, where team members can interact seamlessly through audio video call, instant messaging no matter where they are.

2.5 Tools and Framework

Over the years REVE System has worked with many tools and technology. Some of those are given below.

Languages :

- C
- C++
- JAVA
- Python
- Javascript
- Dart
- Typescript
- Android Native
- Typescript
- GO
- Node Js
- JSON
- HTML
- CSS/SCss
- JQUERY

Frameworks :

- Spring Boot
- Servlet
- React

- Flutter
- Spring MVC
- Spring Cloud

Databases:

- MySQL
- MongoDB

Servers:

- Apache Tomcat

Cloud:

- Amazon AWS
- Windows Azure

Microservice:

- Docker
- Jenkins

Version Control System:

- Git
- GitHub
- Git Lab

2.6 Facilities for Employees

According to the two-factor theory of job satisfaction, salary is just a hygiene factor. Motivation factors are important for high productivity. REVE System provides several facilities for the employees. They also arrange monthly team parties at different places. This helps the employees to calm their minds.

2.7 Domestic Environment

REVE System always treats its members as family. Its office environment is just like home. Work is fun here. As a result, productivity of the employees is insane.

2.8 Launch and snacks

The employees are provided with breakfast, lunch from the office. Also, there is tea, coffee, and snacks available all the time.

2.9 Office Schedule

The office starts at 8:00 am and ends at 5:00 am, from Sunday to Thursday. There is a 1:00 hour break from 1:30 pm for lunch and sports.

2.10 Office Culture

REVE System has a great working environment with a rich culture of fun and professionalism that attracts the best talents. The people with great problem solving capability always find REVE for their working destination. REVEians are very careful to maintain a culture that helps attract talented people and helps them achieve their best performance. This culture starts from workplace structure to operating principles of the development teams.

2.11 Working Environment

As REVE System treats its employees as family, they try to offer the best working environment. Everything in the office is well furnished. Every necessary product for the employees are available here. People here are super friendly and helpful. There is no sign of office politics.

2.12 Party Time

REVE System arranges parties on different occasions. When a project is delivered, a project party is held. When a new member joins the team, a party is held by REVE. The parties are very relaxing and peaceful which refreshes employees' minds.

2.13 Mega Event

Every year, REVE arranges a mega party for all the employees on 25 February. The event is thrown either in the country or abroad.

Fig 2.8 : Party Time

Fig 2.9 : Mega Event

Chapter 3: Learning in Internship

3.1 Introduction to the Project

At the very begining, we(me and my other classmate) were introduced to the project we would work on. This introductory session was held by our project manager and team lead **Anisuzzaman vai**(PM). Throughout our intern period, He was everywhere to guide us and consult on every single issue.

3.2 Introduction to the Technologies

After the introductory session, we went through the technology stack of the project and company. There were different stacks. The project is about to build a production level **Bangla ASR**. So we were introduced with tools and technologies like :

1. **Bangla ASR**
2. **STT Engine(Speech to text)**
3. **Language Model**
4. **Speaker Diarization**
5. **App Development**
6. **Streaming Technology like GRPC**
7. **Web technologies**

3.3 Study of NLP

After being introduced to different technologies, it was time for study. In the first step, we studied about **NLP**(Natural Language Processing). As our project is intended to establish a **Bangla ASR**, we made an overview of how an ASR works actually. Then our study extended to **STT Engine**(Speech to Text engine).

3.4 Study of Android Technology

As a part of study, we went through android technology. As our project requires an android app interface, we studied about that. While studying with android we learned various android technologies like **React Native,Flutter, Native Android Development** etc.

3.5 Study of JAVA Stack

As REVE System is a java based company, it was a must to study **JAVA** with a great proficiency. So we had to put a lot of effort into

studying JAVA. While studying with JAVA we went through JAVA frameworks and tools like **Spring Boot, Servlet, Hibernate, ORM, JDBC, JPQL** and others.

3.6 Study of Front-end Technology

Front-end Technology is one of the most powerful technologies to build a website now-a-days. A website may be very efficient,load-balanced and contain other super fast technology. But all can go in vain if its front-end is not interactive. So it is a must to study about front-end technology. So we studied html**, css, javascript, React js,Typescript** and other state management front-end technologies.

Chapter 4: Internship Demo Project

4.1 WER(Word Error Rate)

Word Error Rate is a standard to calculate error rate in STT(Speech to text). It's a ratio of automated text by ASR and real text. Our first task was to build an interface to calculate WER. So, we developed a web app with Django. This app was very simple as it provides two sections to provide automated text and real text. If two sections are provided with text, then output is shown in another page. **WER** is calculated with **EDIT DISTANCE**. So, it was necessary to implement Edit Distance while building the app.

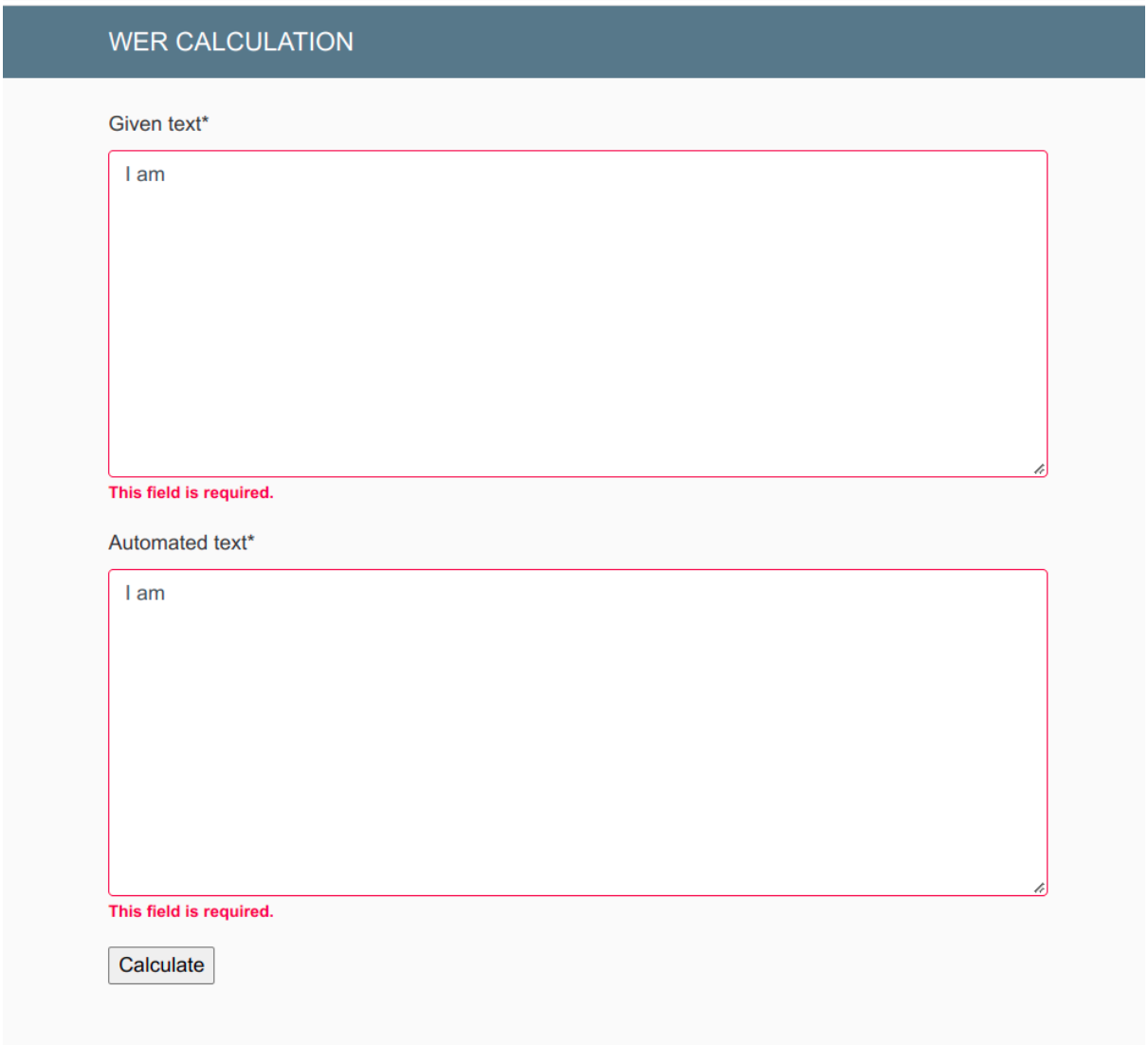


Fig-4.1 : WER Web App

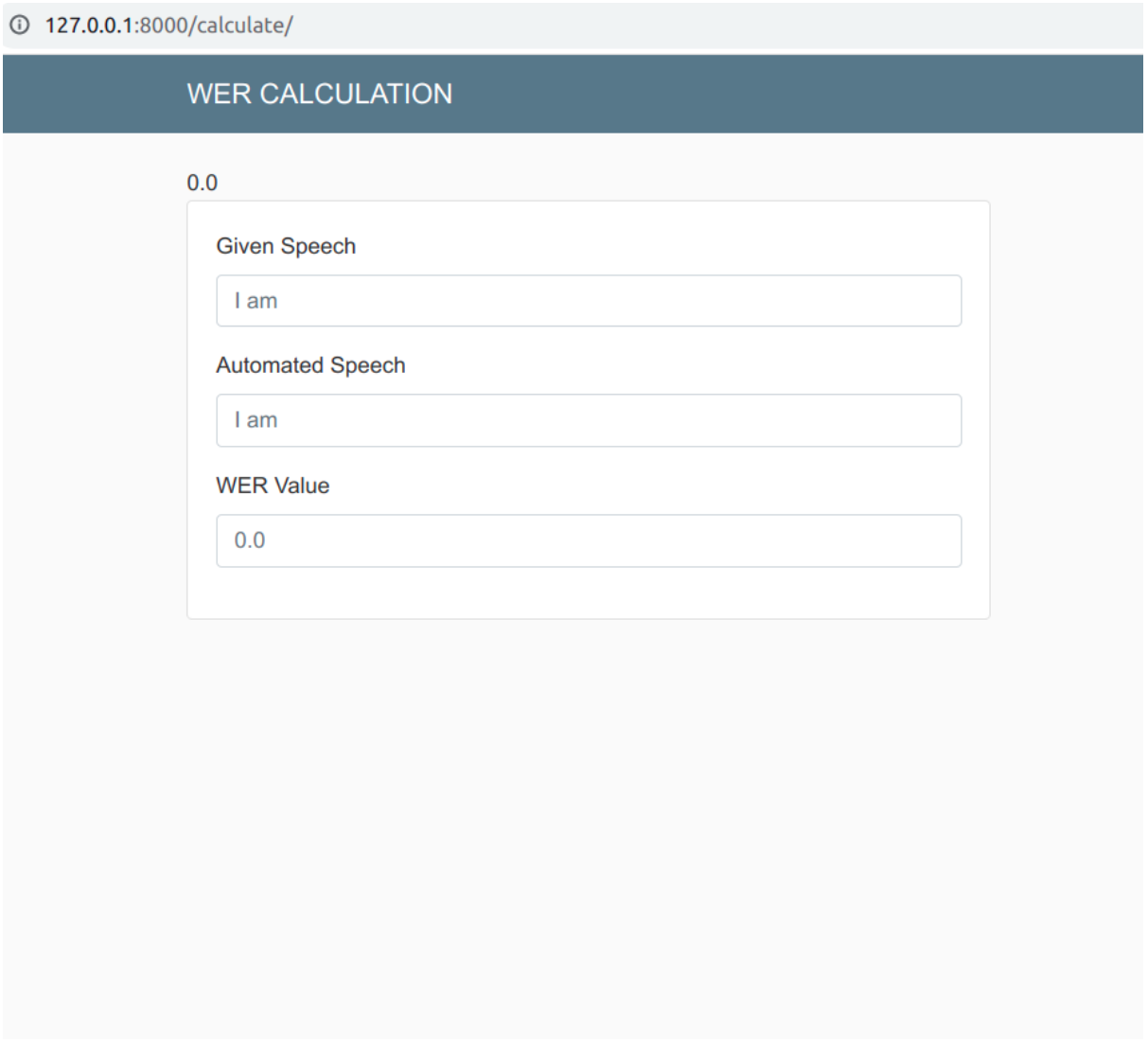


Fig-4.1 : WER Web App

Github: https://github.com/habib-wahid/WER-Calculation

4.2 Non streaming STT App

As we were involved in the **STT**(Speech to text) Engine project, it was necessary to develop a **non streaming android app** to show non streaming Bangla ASR output developed by our ML team. So we were engaged to develop an app. We developed the app with **Flutter**. The app provided some features like **recording,uploading** an audio file etc. Then uploaded audio was sent to the server through **API**. Then Bangla text of the audio was shown to the interface.

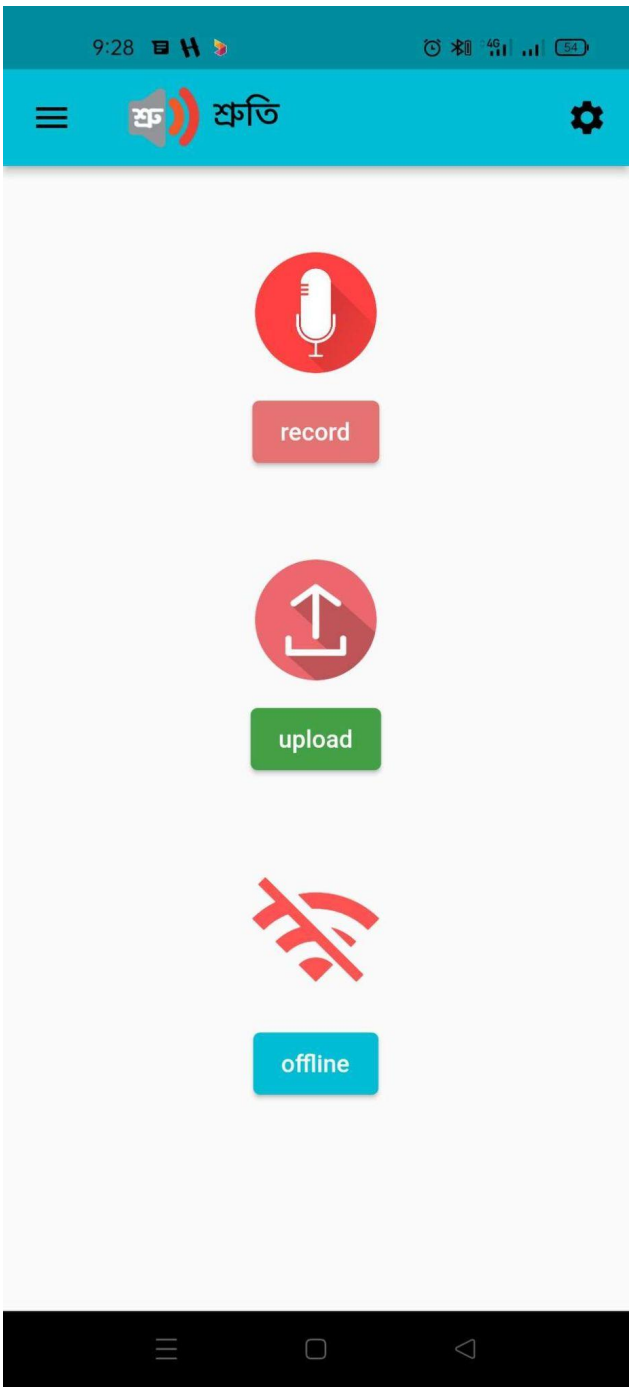


Fig-4.2 : Non streaming STT App

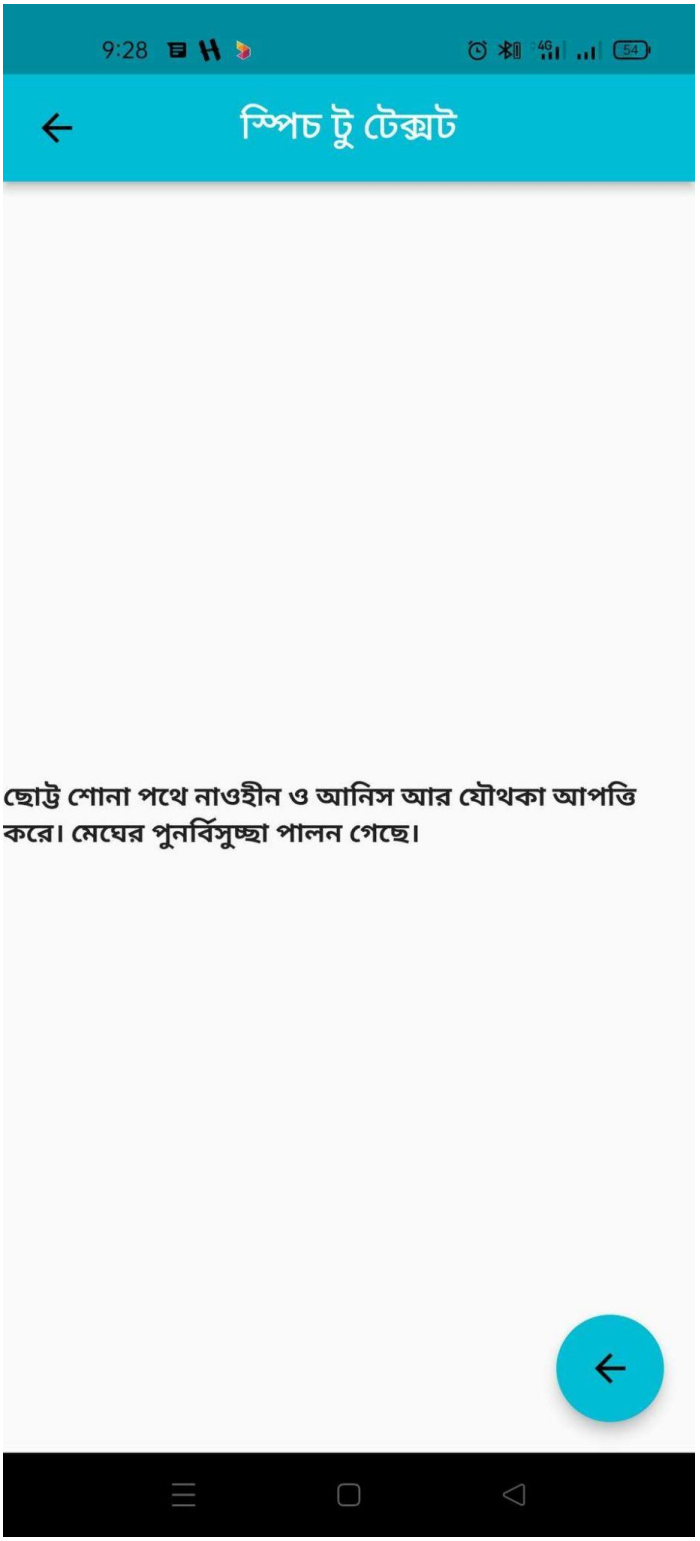


Fig-4.2 : Non streaming STT App

4.3 Demo Design of Shruti(শ্রুতি) App

As far as our journey addressed to REVE System, we were recommended to be involved in production level. Before getting involved in production level, we were asked to make a design for STT(শ্রুতি) app. The app included two major features. They are :

- ☐ **Streaming**
- ☐ **Non-Streaming**

Other features are **speaker diarization, audio pitch, sharing via other apps** etc which were illustrated in the design too.

According to the requirement, we developed the design of the app which was appreciated by our PM. Link of the design is given below:

https://docs.google.com/presentation/d/1qdJbEsUrlPTzr8yPMrExZ38Oelv_ka97yGq2XKj7euE/edit#slide=id.p

Chapter 5:Contribution to production.

5.1 Question & Answer App(প্রশ্নউত্তর)

Question & Answer Application is a digital Platform developed by **REVE System** to digitise question and answer sessions in **Bangladesh National Parliament**.

It is basically a web application. But its app version was mandatory to release for Android. So it was our first production level work. The team consisted of three members. The team was led by **Anisuzzaman Rubel vai(PM).** Other two members were **me, Arnob(classmate)**.

5.1.1 Overview

Question & Answer Application is a digital question and answer management system developed for Bangladesh Parliament. As it is a very handy project and was developed for the parliament, We didn't compromise with the quality of the app. Our project manager guided us throughout the whole journey.

5.1.2 Team

The team consisted of three members led by **Anisuzzaman Rubel vai(PM)**. As it was my first production level project, I was thrilled by

the work. My PM helped me greatly to develop the application. My other teammate Arnob was very cooperative.

5.1.3 Technology

The technology we used to develop the app are given :

1. **Flutter**
2. **Dart**
3. **Rest API**
4. **Git**

5.1.4 Features I Worked With

As it's a large application, I worked with many features. First of all, I worked with a user **profile which includes uploading photos, editing profile information and others**. Then all the **questions of a particular session** needed to be shown on the app which was developed by me. Lastly all the required **APIs** were integrated by me on my working features.

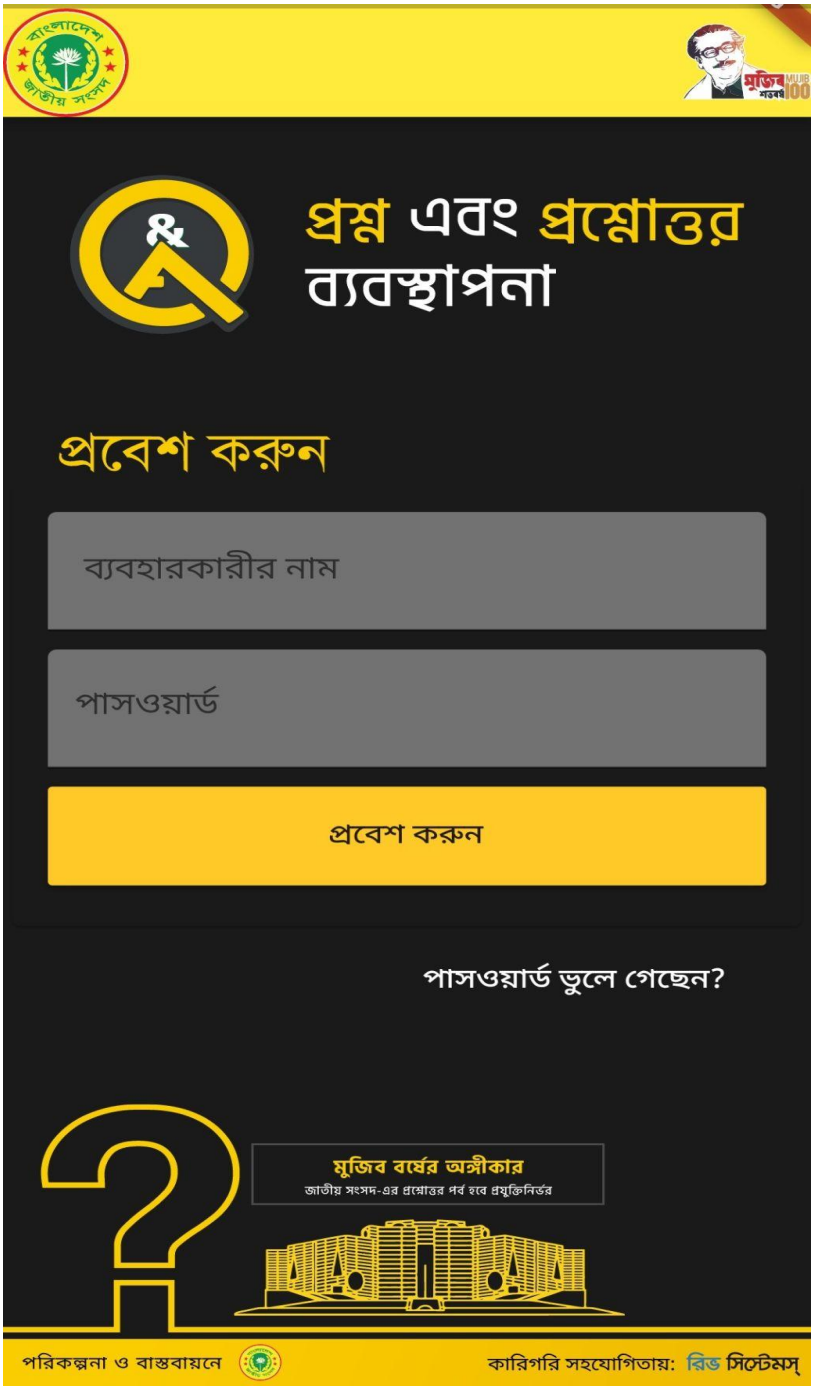


Fig-5.1 : QAMS App

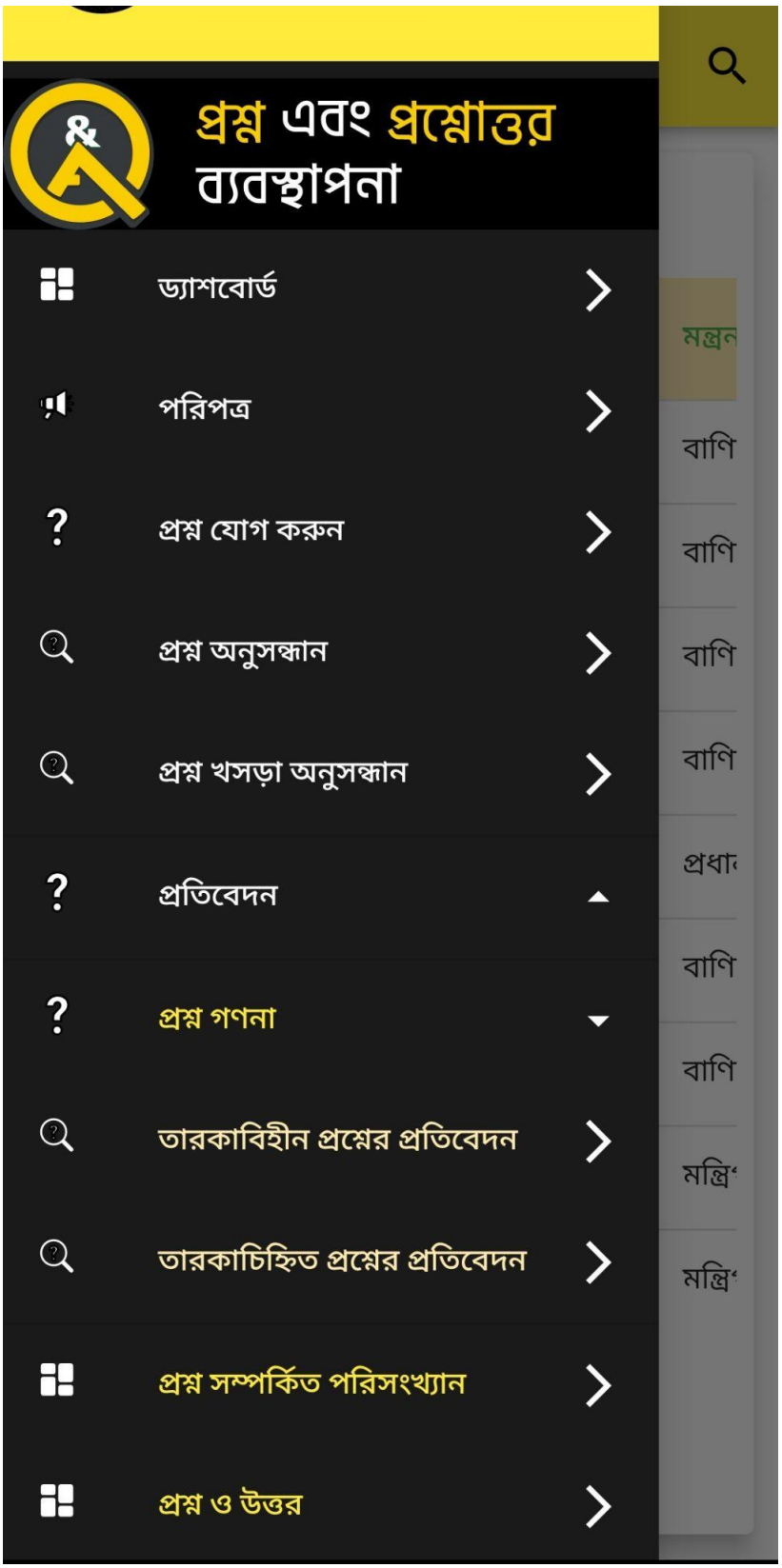


Fig-5.1 : QAMS App

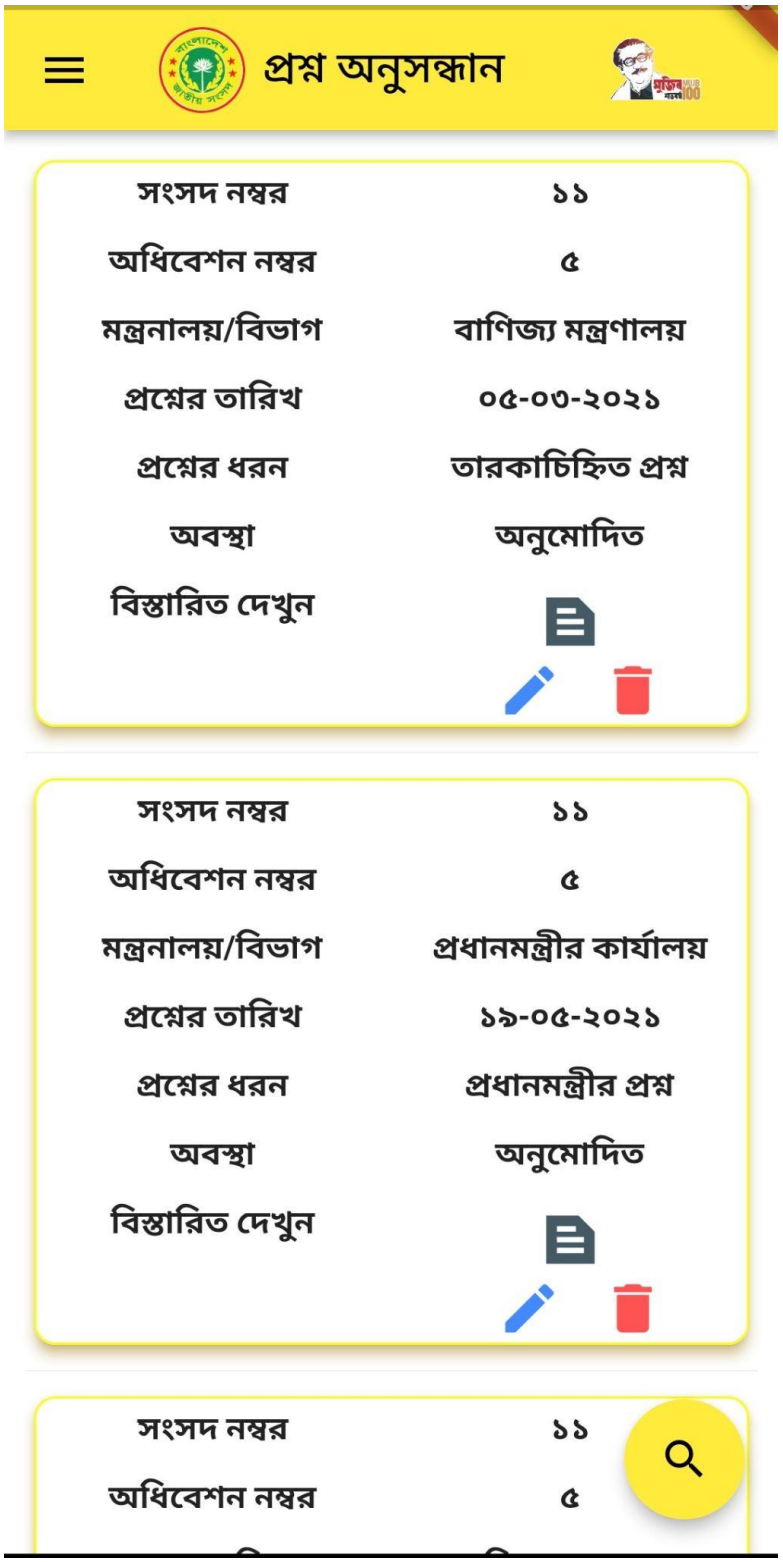


Fig-5.1 : QAMS App

5.2 Shruti(শ্রুতি)

Shruti(শ্রুতি) app is one of the core production graded android app which illustrates the output of the Bangla ASR developed by REVE System. It is a R&D based application.This application implements both streaming and non streaming ASR Model.

5.2.1 Overview

Shruti(শ্রুতি) app implements the output of both Bangla Streaming and Non-Streaming ASR. The application is developed with native android as it implements
The app has basically two sections from interface level. They are

- **Streaming**
- **Non-Streaming**

Non-Streaming Part : This phase lets a user upload an audio file in mp3 or flac format. Then the audio is sent to the server through an API and brought a translated text of the audio.

Streaming Part : This part was the most critical section as **Streaming technology** had been implemented in this section. Basically, this section includes both **recording and data transfer in real time**. Recorded audio is cut on a regular basis and sent to the

server through **GRPC**(Remote Procedure Calls developed by Google). **GRPC** has four modules.
One of them is **Bidirectional Streaming RPC** which was implemented to communicate between **Server and Client**. Then output is shown to the user on a real-time basis.

5.2.2 Team

The team consisted of three members led by **Anisuzzaman Rubel vai(PM)**. The other member is **Mohammad Sahad Mahmud**(Software Engineer) who actually developed the back-end. **I** am the third one who developed the interface and GRPC streaming API from the front-end.

5.2.3 Technology

The technology we used to develop the app are given :

1. **Native Android**
2. **GRPC**
3. **Android Recording Library**

5.2.4 Features I Worked With

All the features of the application are maintained **and developed by me**. Both streaming and non-streaming parts are integrated by me under the supervision of the PM. It was one of the finest **R&D** based tasks I ever accomplished.

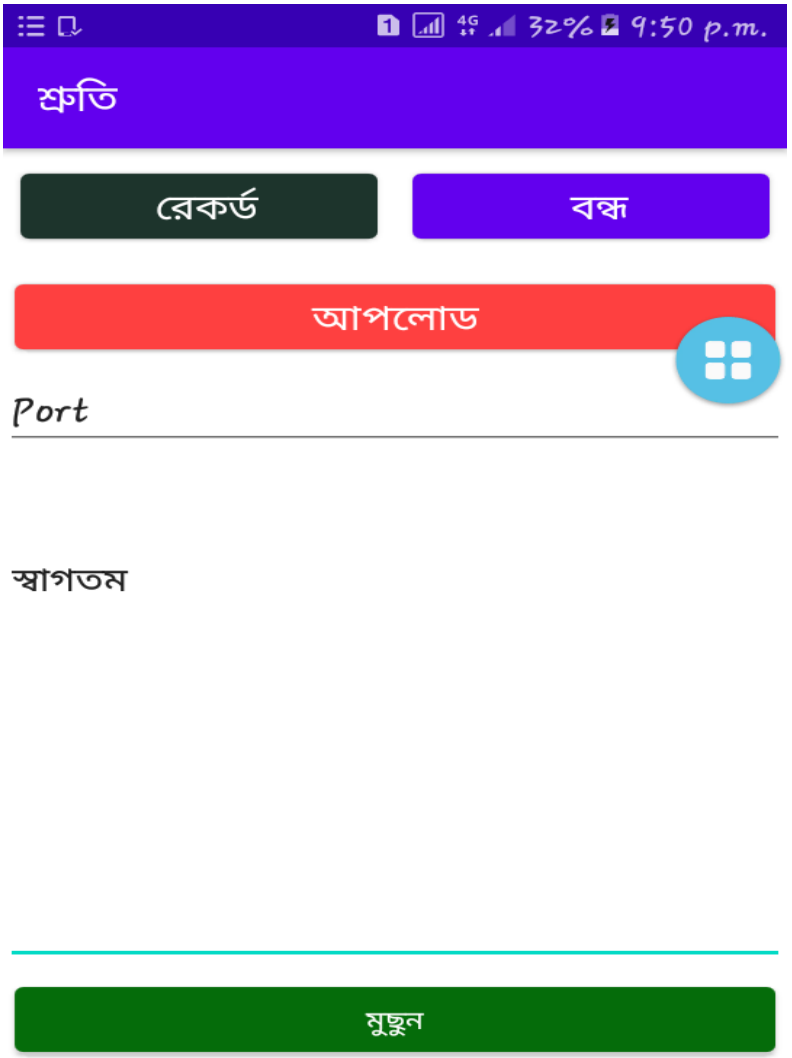


Fig-5.2 : Shruti App

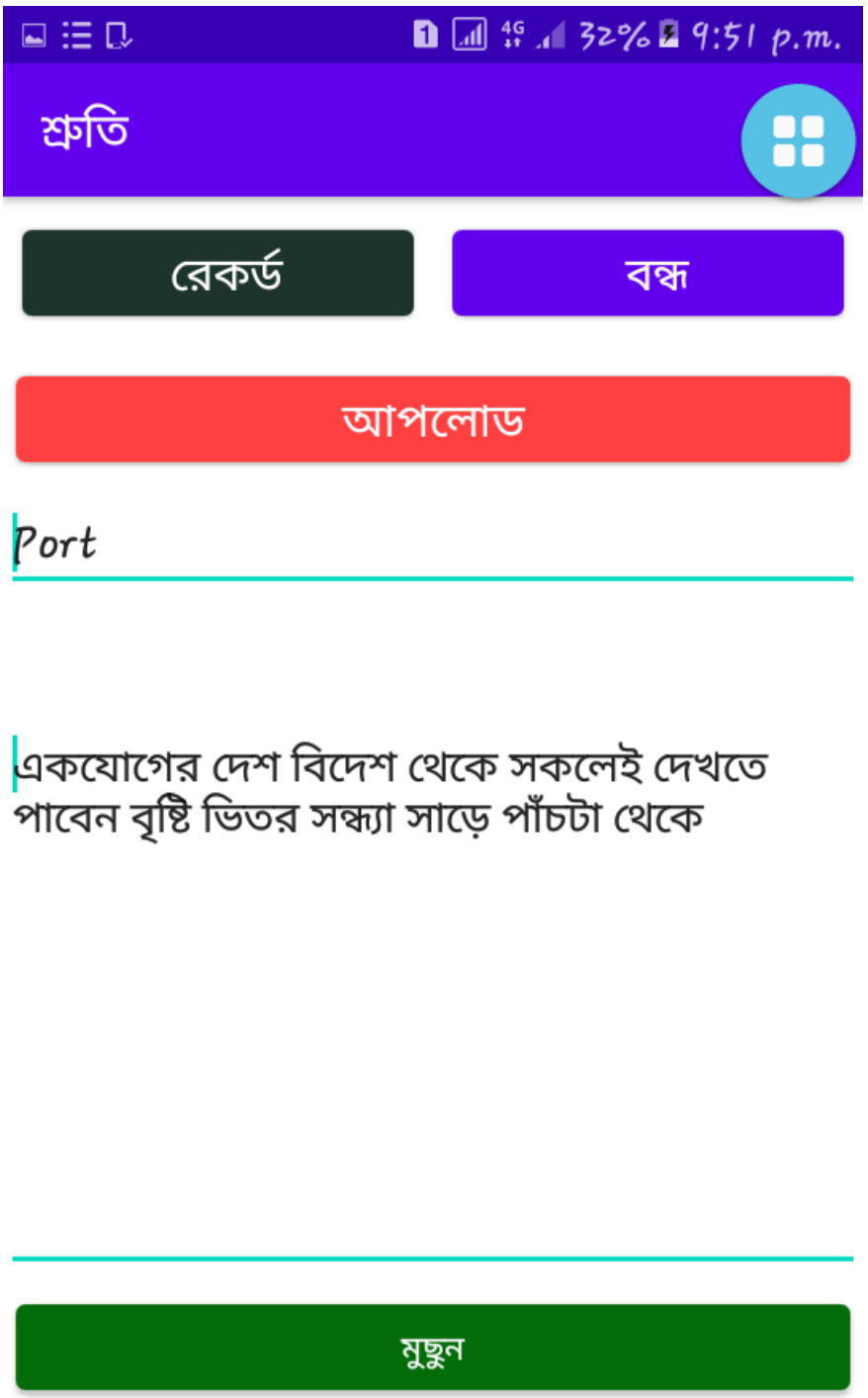


Fig-5.2 : Shruti App

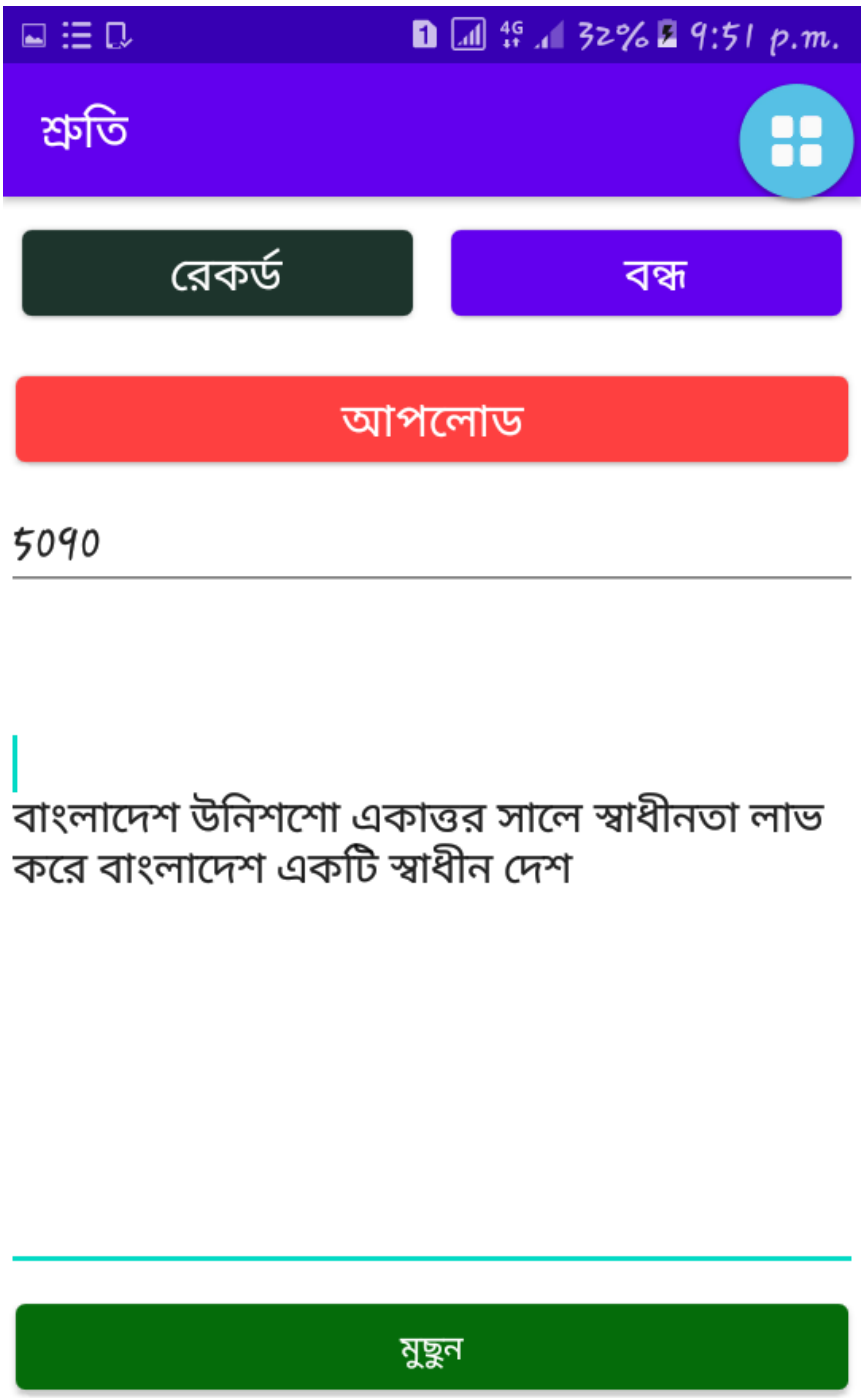


Fig-5.2 : Shruti App

5.3 Corpus Data Collection Application

Corpus Data Collection application is a huge web application which provides an interface for data collection from ground level, data annotation, data validation and other stuff.

5.3.1 Overview

Corpus Data Collection application is being developed by REVE Systems for collection of **10000 H** of audio data. This huge data will be collected through the application. The collected data will go through the **annotation** phase. The data will be annotated through the annotator. After the annotation, the data will be **validated** by the validator. Then the data will be ready to train the Bangla ASR which is being developed by the company. All of the features mentioned above are being developed in the Corpus Data Collection application.

5.2.2 Team

The team consisted of four members and was developed by Md. Sadhan Sarkar(Senior Software Engineer). Other two members were Khairul Azman(Ex-Software Engineer) and Arnob Saha(Classmate).

5.3.3 Technology

Front-End :

- ❖ HTML
- ❖ CSS
- ❖ Bootstrap
- ❖ Javascript
- ❖ React Js
- ❖ Typescript

Back-End :

- ❖ JAVA
- ❖ Spring Boot
- ❖ Hibernate
- ❖ ORM
- ❖ JPA
- ❖ JDBC
- ❖ JPQL

Server :

- ❖ MySQL

Version Control System :

- ❖ GitLab

5.3.4 Features I Worked With

There were several features I worked with. At the start of the project, I started to develop the front-end with **React Js**. I worked on **Registration, Script Distribution, Script Add module**. Then I started to work with the **Back-end** part. Then different back-end modules and API were developed by me. Different highly performanced **SQL** queries were also written by me.

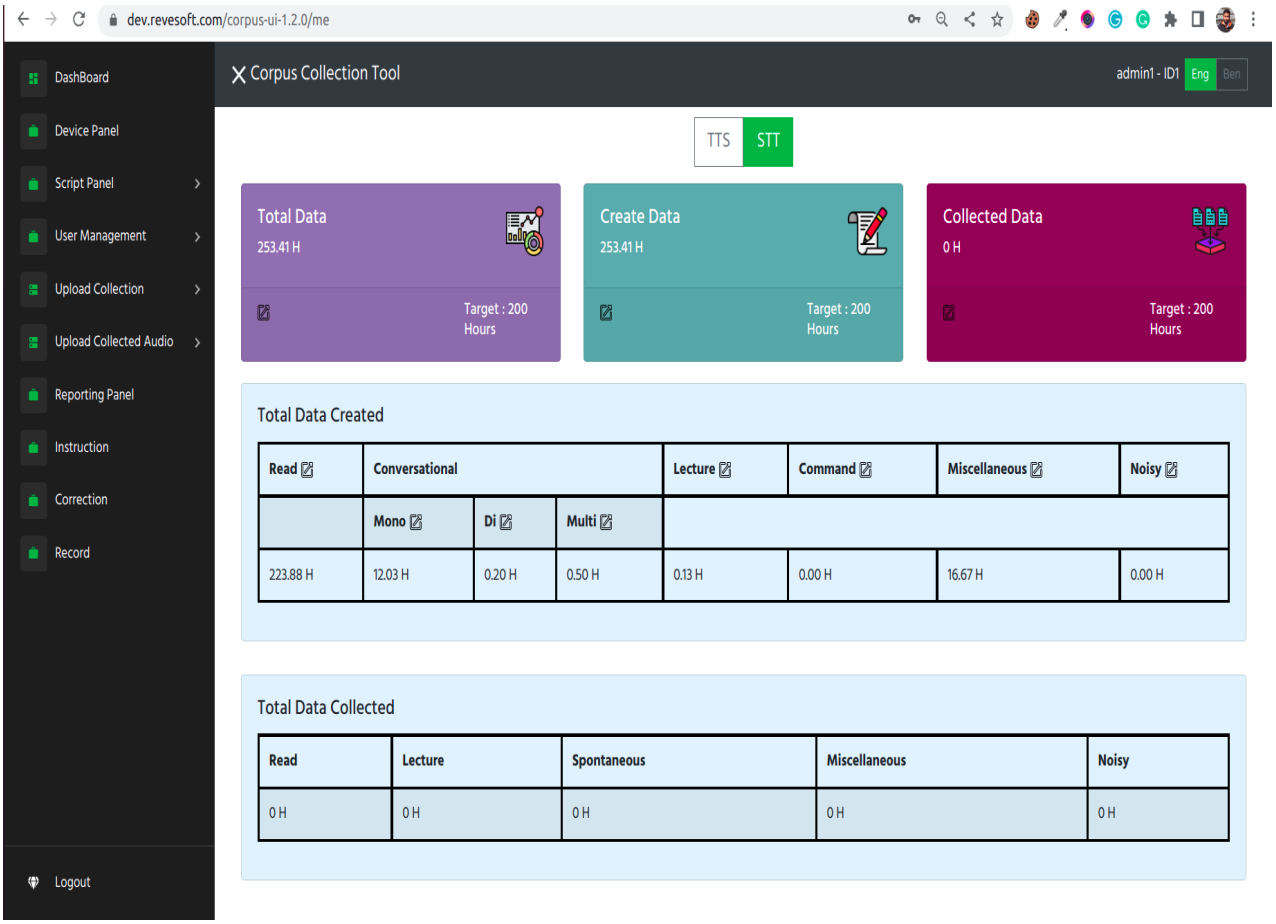


Fig-5.3 : Corpus Web application

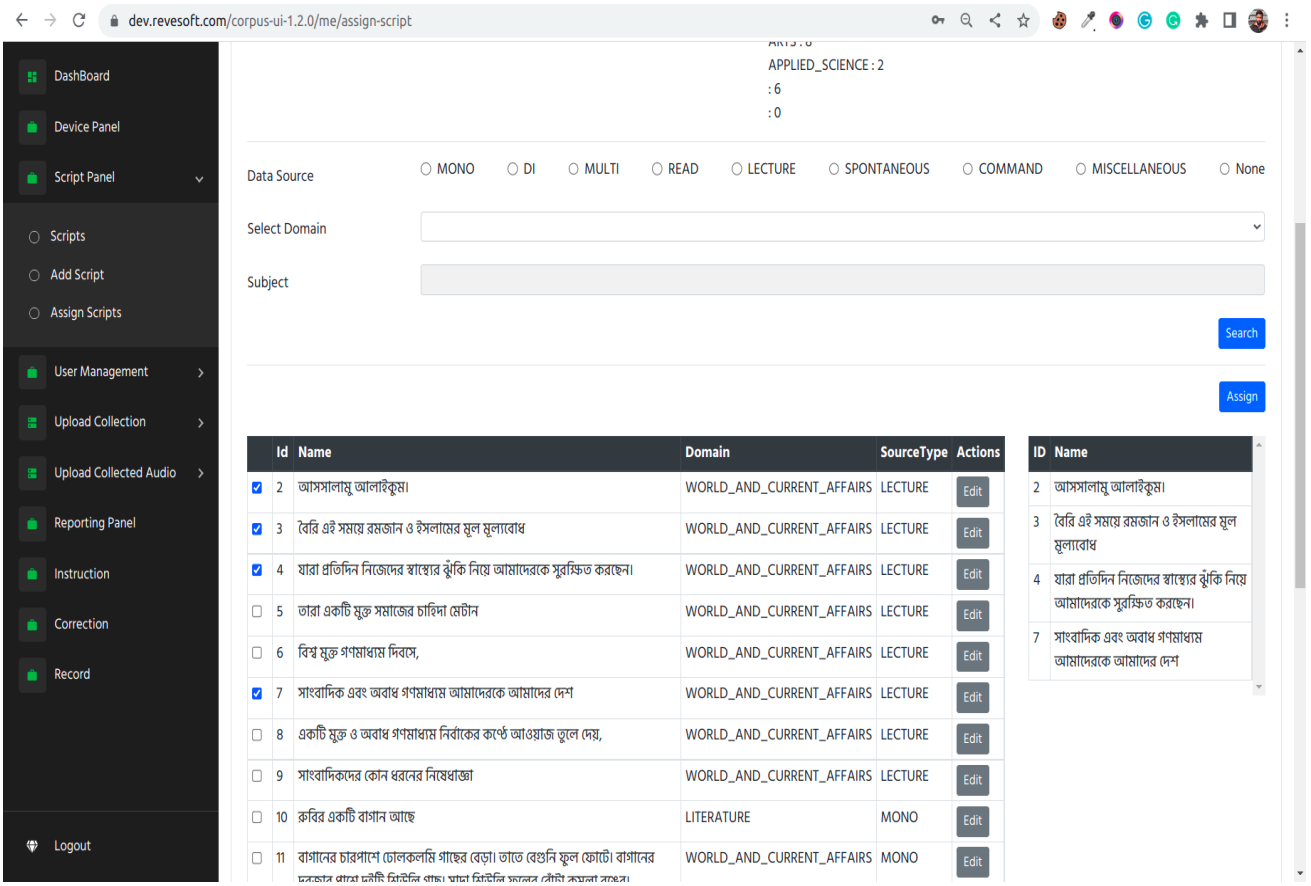


Fig-5.3 : Corpus Web application

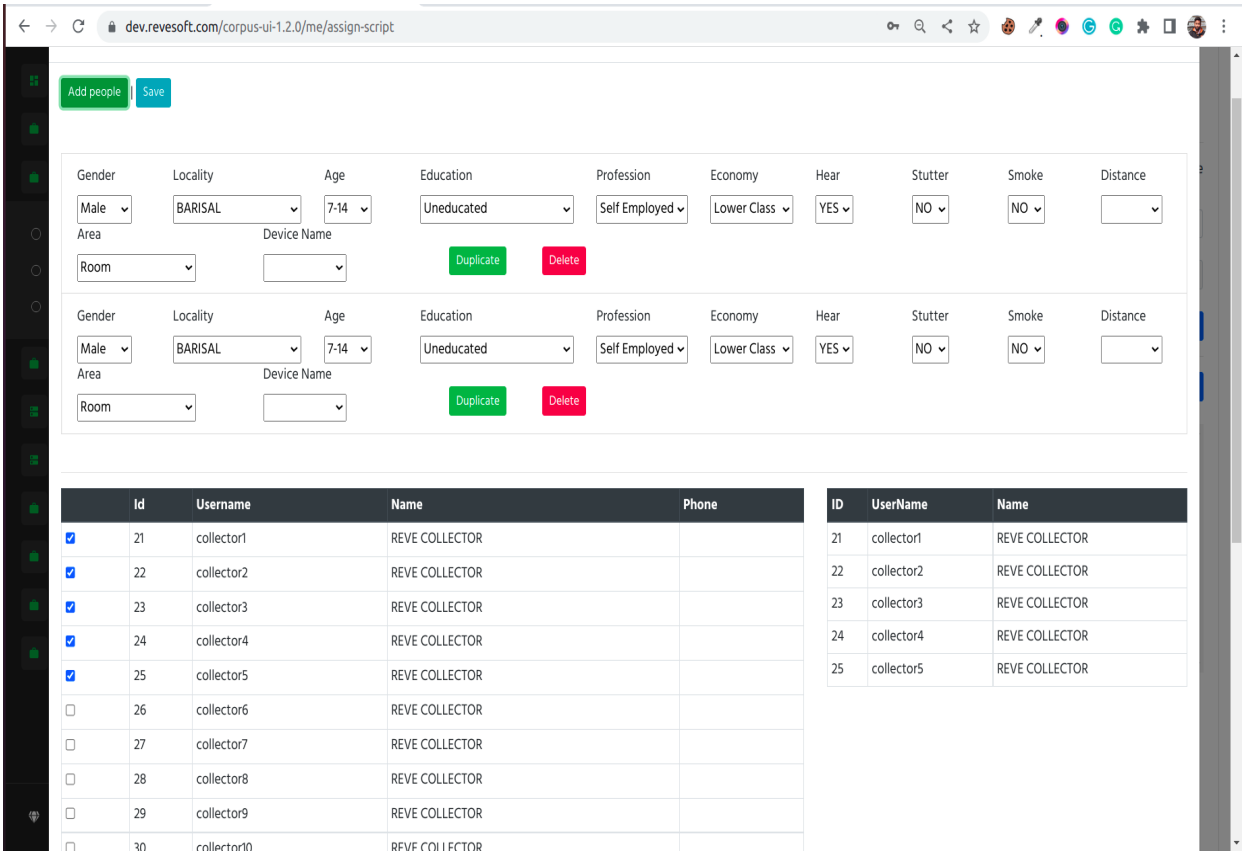


Fig-5.3 : Corpus Web application

Chapter 6: Professional Growth

6.1 Technology and Tools I Learned

As I finished my internship at REVE System, I had to learn the company's tools and technologies. All of my learning are being stated below:

6.2 Tools

Now-a-days there are various tools that make a programmer's life easy. I had also used some amazing tools in my daily work. They are:

- ❖ Visual Studio Code
- ❖ Android Studio
- ❖ IntelliJ IDEA
- ❖ Android Emulator
- ❖ Postman/INsomnia

6.3 Technology

6.3.1 React Js

React makes it painless to create interactive UIs. Design simple views for each state in your application, and React will efficiently update and render just the right components when your data changes.

React gives functionality like building encapsulated components that manage their own state, then compose them to make complex UIs.

Fig-6.3.1 : React Component

6.3.2 GRPC

gRPC is a modern open source high performance **Remote Procedure Call** (RPC) framework that can run in any environment. It can efficiently connect services in and across data centres with pluggable support for load balancing, tracing, health checking and authentication.It is also applicable in last mile of distributed computing to connect devices, mobile applications and browsers to backend services.

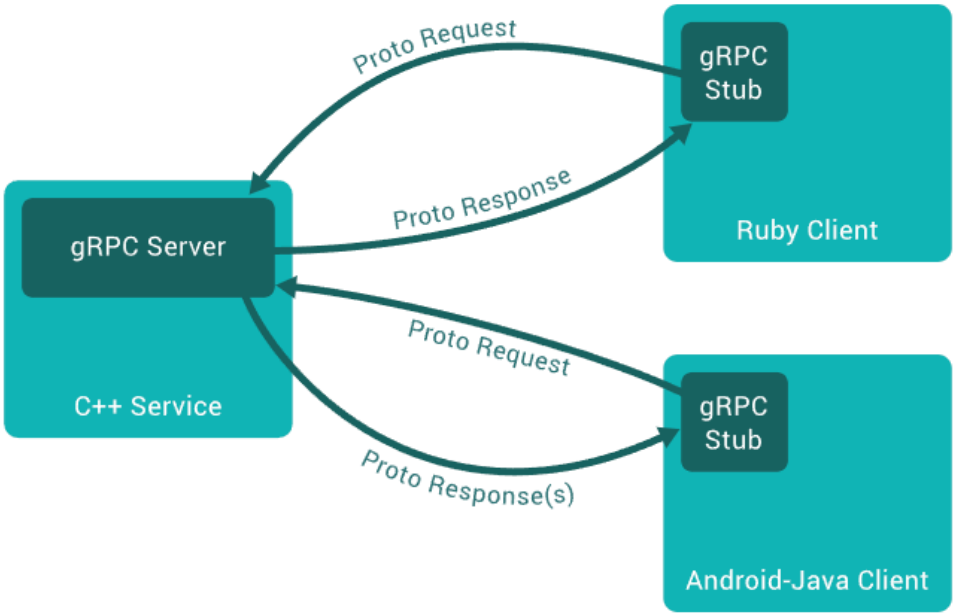


Fig-6.3.2 : gRPC call

6.3.3 Typescript

TypeScript is an open-source language that builds on JavaScript, one of the world's most used tools, by adding static type definitions.
Types provide a way to describe the shape of an object, providing better documentation, and allowing TypeScript to validate that your code is working correctly.

6.3.4 Spring Boot

Spring Boot makes it easy to create stand-alone, production-grade Spring based Applications that you can "just run".

We take an opinionated view of the Spring platform and third-party libraries so you can get started with minimum fuss. Most Spring Boot applications need minimal Spring configuration.

6.3.5 Inversion of Control

IoC is a design principle which recommends the inversion of different kinds of controls in object-oriented design to achieve **loose coupling** between application classes. In this case, control refers to any additional responsibilities a class has, other than its main responsibility, such as control over the flow of an application, or control over the dependent object creation and binding (Remember SRP - Single Responsibility Principle). If you want to do TDD (Test Driven Development), then you must use the IoC principle, without which TDD is not possible. Learn about IoC in detail in the next chapter.

6.3.6 Flutter

Flutter is an open source framework by Google for building beautiful, natively compiled, multi-platform applications from a single codebase. Flutter code compiles to ARM or Intel machine code as well as JavaScript, for fast performance on any device.

6.4 Development of Skill

During the internship, I worked with **Arnob(classmate),Sadhan Sarkar vai(Senior Software Engineer) and Md Sahad Mahmud vai(Junior Software Engineer)**. We worked collaboratively on different projects. As a result our code had been supervised by senior developers. As we were new to the team, we needed to learn a lot. We wrote buggy codes. As our seniors were there, they always helped us to write clean code.

6.4.1 Pair Programming

Pair Programming is one of the most helpful development techniques in the software industry. When two people work together, they can

share their ideas,write clean code, implement clean ideas. **I** made pair programming with **Md Sadhan Sarkar vai and Arnab Saha**(classmate). As a result of pair programming our code writing capability had improved over the time.

"Pair programming is an Agile software development technique originating from Extreme programming (XP) in which two developers team together on one computer. The two people work together to design, code and test user stories. Ideally, the two people would be equally skilled and would each have equal time at the keyboard".

I am grateful to my team and colleagues who actually helped me a lot in pair programming.

6.5 Professional Learning

Industry life and personal life are totally different. We practise a lot of bad manners in our personal life. But industry life is full of professionalism. REVE System offers an environment which is super professional and industry oriented.

6.5.1 Quality of work

REVE System always emphasises on the quality of work. For their quality, they are known worldwide. The people work here also give

their 100% to ensure product quality. When people try to give 100%,product must be healthy.

6.5.2 No bullying and blaming

REVE System always hires people with great excellence and professionalism. Everyone tries to give their 100%. So there is no chance of bullying and blaming. We shared our learning and techniques. We won,we lost. There is nothing like blaming each other when we lose. In a similar way we shared credit when we successfully launched the product. REVE provides super excellency in this matter.

6.5.3 Always Complete own work

At **REVE**, Everyone is assigned to a particular work and he does his work in his way. At times of scrum, everyone shares their progress with others. All the projects are done in this way.

6.5.4 Success and Failure

At **REVE** it is said, “there is nothing called failure, everything is learning”. So we do not know anything named Failure. When I failed, my team lead always said it’s learning. It’s a great level of professionalism.

On the other hand, Success is treated here greatly. When I got success in any project, everyone appreciated me. I was amazed by the culture

6.5.5 Attitude

REVE System is a Software Company full of fun and creative and Reveins are very much friendly. As an intern, these attract me very much and I always try to follow them to be a successful Software Engineer as well as a successful man.

Chapter 7: Conclusion

7.1 Conclusion

We are almost on the edge of final year. Our 16 years of education is going to end. Before the final hour, the 6-month internship period gave us a chance to implement our academic learning in the real world. I was thrilled while doing my internship. For the first time my learnings were being implemented in real systems. This internship opportunity helped me to gather a vast knowledge about the software industry. I learned how the system works. This learning will surely help me after finishing my graduation. I hope this learning curve will help me more than others who do not get the opportunity.

I would like to convey my thanks to the Institute of Information and Communication Technology, Shahjalal University of Science and Technology for providing me an opportunity to gain an idea of the competitive environment in the professional field. It has certainly lifted my software development skills in terms of design and coding. I now look forward to facing the upcoming challenges of the world.

Last of all, I would like to thank my company REVE System for providing me with this great opportunity. I had learned quite interesting things during my internship time. My company and colleagues always supported me in the whole journey.

Even though that was something new for me, I was able to change

myself with this. Different tools and technologies, experienced human resources, a large range of business domains, innovative products, inspirational and motivating higher authority and friendly environment were the most significant factors to learn professionalism, positive attitude, winning mentality, self- initiative, team strength.

Last of all, I would like to thank my department IICT. I also would thank my teachers and my company REVE System for this glorious opportunity. I hope my experience will be helpful for me and I will be able to share it among students.