

# Software Requirements Specification for Reading Room

Prepared by

Hafiz Al Asad(1611170042)  
Ashiful Alam Shuvo(1731435642)  
Sangeeta Paul Priya(1621735042)  
A.B.M. Kaish Ibna Sufian (1731253042)

*North South University*  
*Software Engineering(CSE 327)*

Dhaka, 7. July 2021

# Contents

<b>1</b>	<b>Introduction</b>	<b>2</b>
1.1	Purpose . . . . .	2
1.2	Intended Audience . . . . .	2
1.3	Intended Use . . . . .	2
1.4	Product Scope . . . . .	3
1.5	Risk Definition . . . . .	3
<b>2</b>	<b>Overall Description</b>	<b>4</b>
2.1	User Classes and Characteristics . . . . .	4
2.2	User Needs . . . . .	4
2.3	Operating Environment . . . . .	4
2.4	Constraints . . . . .	4
2.5	Assumptions . . . . .	5
<b>3</b>	<b>Requirements</b>	<b>6</b>
3.1	Functional Requirements . . . . .	6
3.2	Non Functional Requirements . . . . .	9

# Chapter 1

## Introduction

### 1.1 Purpose

The education system is gradually getting online-based. Following the trend, the system aims to provide education online. The main specialty of the system is that it will monitor the students while they are reading the study materials. The system will also let users create classes, join classes, provide teaching materials and most importantly observe a student's reading activity. The system will allow the teachers to check if students are reading the materials or not with the help of face detection and face tracking. It will also help the teachers to find out which section of the provided teaching materials the students spent most of their time so that the teacher can put more emphasis on that section. All in all, the system enhances the teacher's ability to keep track of the student's reading activity.

### 1.2 Intended Audience

This document is intended for all who are interested in this project including project members, developers, project managers, marketing staff, users, testers, and documentation writers. The rest of the document contains an overall description of the project, external interface requirements, system features, functional and non-functional requirements. The readers are advised to read it serially so that they don't miss anything and it is easier to understand.

### 1.3 Intended Use

Mainly there will be two type users of the system:

1. Students.
2. Faculties.

**Students:** Students can attend lectures, take exams, view their attendance records, progress reports etc as per their convenience. Attend lectures either at the scheduled time or on request view lecture at a later time. There can be forums, blogs etc to discuss various queries and to put up suggestions posted both by students and teachers. Students can take up various quizzes which can help them to realize their inbuilt talents in various fields.

**Faculties:** Faculties can take lectures, upload assignments, announcements, evaluate answer sheets and also can upload lectures and other discussions in various formats as in videos, power point presentations etc. Upload and Download of various assignments, notices, student's notices, journals, videos. There can be forums, blogs etc to discuss various queries and to put up suggestions posted both by students and teachers.

## 1.4 Product Scope

The product is for teachers and students to ensure a reliable online education system where the teachers will be able to keep an eye on the student through the system. There are many online education systems. But none of them provide these advantages to the teachers so that they can monitor the students while they are reading the study materials. This product will let the teachers check if students are reading the materials or not with the help of face detection and face tracking. It will also let the teachers find out which section of the provided teaching materials, the students spent most of their time so that the teachers can put more emphasis on that section.

## 1.5 Risk Definition

There are three main classifications of risks which can affect a software project:

1. Project risks.
2. Technical risks.
3. Business risks.

**Project risks:** Project risks concern different forms of budgetary, schedule, personnel, resource, and customer-related problems. A vital project risk is schedule slippage. Since the software is intangible, it is very tough to monitor and control a software project. It is very tough to control something which cannot be identified. For any manufacturing program, such as the manufacturing of cars, the plan executive can recognize the product taking shape.

**Technical risks:** Technical risks concern potential method, implementation, interfacing, testing, and maintenance issues. It also consists of an ambiguous specification, incomplete specification, changing specification, technical uncertainty, and technical obsolescence. Most technical risks appear due to the development team's insufficient knowledge about the Project.

**Business risks:** This type of risks contains risks of building an excellent product that no one needs, losing budgetary or personnel commitments etc.

## Chapter 2

# Overall Description

### 2.1 User Classes and Characteristics

The system generally will be used by two user classes-namely Student and Teacher.

#### **Student**

Students will use this product to read the study materials provided by the teacher. Students will be able to join classrooms under a particular teacher and study the reading materials uploaded by the teacher.

#### **Teacher**

Teachers will use this product to create classes and upload study materials. Teachers will also be able to monitor a student's reading activity. This product is useful for teachers that want to track students' reading activity and find out the topics which are hard for the students.

### 2.2 User Needs

1. Teachers can form classrooms.
2. Students can join classrooms.
3. Teachers can provide reading materials.
4. Students can view the reading materials.
5. Teachers can view the reading info of the student.
6. Both the teacher and the student has to log in or sign up first to perform any of the mentioned functions above.

### 2.3 Operating Environment

This product will work on any device supporting web browsers like Chrome, Mozilla Firefox, Microsoft Edge etc.

### 2.4 Constraints

Users of the system may not be familiar with online education system. Since the web-version will be sharing a database, the wait-times of the users might increase if there is a queue of incoming requests. Besides, a constant

internet connection must be ensured to run the product correctly. Moreover, several other constraints may arise while building the product.

## 2.5 Assumptions

The system will depend on a number of APIs to perform various tasks. For federated identity service, the system will use an authentication API. For face detection, face recognition and face tracking, the system will call various APIs to integrate the functions successfully. If any of the APIs are unavailable or don't provide the necessary support, then the system will fail to implement the features. Besides, the system also requires users to have a fully functional front camera and a stable internet connection to operate without any issues. The system will depend on a number of APIs to perform various tasks. For federated identity service, the system will use an authentication API. For face detection, face recognition and face tracking, the system will call various APIs to integrate the functions successfully. If any of the APIs are unavailable or don't provide the necessary support, then the system will fail to implement the features. Besides, the system also requires users to have a fully functional front camera and a stable internet connection to operate without any issues.

## Chapter 3

# Requirements

### 3.1 Functional Requirements

- **Log In**

Actors have to provide a username and password to log in to the system.

1. Typical course of event

- (a) Actor goes to site -> System respond with Log In page.
- (b) Actor enters username, password -> System verifies credentials and redirects to site homepage.

2. Alternate course of event

- (a) If actor enters wrong credentials or keeps any field blank -> system prompts the actor to reenter credentials or sign-up first.

- **Log Out**

After completing the desired task, an actor can log out of the system. This use case can be initiated only if the actor is logged in already.

1. Typical course of event

- (a) Actor clicks the 'log out' button -> System redirects to login page.

2. Alternate course of event

- (a) N/A

- **Sign – Up**

Actor (teacher, students) can create an account by providing his email, username and password. This use case can be initiated if the actor is in login page.

1. Typical course of event.

- (a) The actor clicks on the 'sign-up' button -> System responds with sign-up page.
- (b) The actor enters username, password email -> System validates the credentials and creates an account for the actor redirecting to the login page.

## 2. Alternate course of event

- (a) If user enters invalid formats of username, password or email -> the system prompts the actor to reenter that particular field again.
- (b) If the actor's input matches with an already existing username or email -> System also prompts the actor to reenter.

- **Sign – In With** Actor (teacher, students) can sign-in with a federated identity instead of creating an account. This use case can be initiated if the actor is in login page.

## 1. Typical course of event

- (a) Actor clicks the 'sign-in with' button -> System responds with the authenticating API of the federated identity.
- (b) Actor enters username password -> API verifies credentials and allows the system to redirect to the system homepage.

## 2. Alternate course of event

- (a) If the credentials are incorrect or actor keeps any field blank -> API of the federated identity prompts the actor to reenter credentials.

## • **Join Class**

## 1. Typical course of event

- (a) The student clicks the 'join a class' button -> System responds with a join classroom page.
- (b) The student enters the classroom code provided by the teacher and clicks the 'join class' button -> The system verifies the code and redirects to the classroom page where the student is prompted to upload his/her passport size photo.
- (c) Student selects his/her photo from the local directory and clicks the 'upload' button -> System uploads the photo and redirects the student to the classroom.

## 2. Alternate course of event.

- (a) If the student enters an invalid code -> System prompts the student to reenter the classroom code.
- (b) If the system fails to recognize a face in the photo uploaded -> It would prompt the student to upload another photo with a face in it.

## • **Provide Reading Materials**

After creating classroom, only teacher can provide reading materials by uploading it from his/her local directory to the system. This use case can be initiated if the teacher is in a classroom created by the teacher.

## 1. Typical course of event

- (a) Teacher clicks 'provide reading materials' button -> System responds with a window allowing the teacher to browse his/her local directory and select any file.
- (b) Teacher selects his/her desired file and clicks the upload button -> System uploads the file and shows that the upload is successful.

## 2. Alternate course of action

- (a) N/A

## • **Read Reading Materials**



After joining a classroom, the student can view any reading materials provided by the teacher. This use case can be initiated if the student is in a classroom joined by the student.

1. Typical course of event.

- (a) Student clicks the file provided by the teacher -> System responds by opening the file and allowing the student to view and scroll through the file. At the same time, the system turns on the camera of the device and starts using the face recognition and tracking APIs for recognizing face and tracking student's eye and reading time on the document.

2. Alternate course of event

- (a) If the access to the camera is denied by the student -> System prompts the student to grant access or he/she can't view the file.
- (b) If the system fails to detect camera on the device -> It would allow the student to view the file without showing any further prompts.

• **View Reading Info**

Teacher is provided with a list of options to monitor student's activity on the reading materials uploaded. This use case can be initiated if the teacher is in a classroom.

1. Typical course of event

- (a) Teacher clicks the 'view reading info' button in the classroom -> System responds with the view reading info page where there is a list of names of all the reading materials uploaded.
- (b) Teacher clicks the name of a particular reading material to view its reading info -> System responds with a student reading info page where there are three options which are: detecting face of students, time spent by the students graph analysis of time spent.

2. Alternate course of event

- (a) N/A

• **Detect face of students**

Displays the name of all students and states whether or not the photo of the student provided while joining the class matches with the photo captured while reading the study materials. . This use case can be initiated if the teacher is in the student reading info page.

1. Typical course of event

- (a) Teacher clicks the 'detect face of the students' button -> System responds with a list of all the students which states whether or not their faces while reading study materials matched with the photo provided while joining the class.

2. Alternate course of event

- (a) If the student doesn't provide any photo while joining the class -> System will show that no photo was found.

• **Time spent by students**

Shows the total time spent by the student reading the study materials. It also shows the page by page reading time of the students. This use case can be initiated if the teacher is in the student reading info page.

1. Typical course of event

- (a) Teacher clicks the 'time spent by students' button -> System responds by showing a list of all the students along with the total time spent by each of them reading the study material.
- (b) The teacher clicks on a particular student -> System responds with the page by page reading time of the student.

2. Alternate course of event

- (a) If the device used by the student doesn't have any camera -> it would show that no camera was detected by the system.
- (b) It would show that no camera was detected by the system -> System would display no camera was detected by the system.

- **Graph Analysis Of time spent**

Shows various graphs depicting the time spent by different students on a particular reading material. This use case can be initiated if the teacher is in the student reading info page.

1. Typical course of event

- (a) Teacher clicks the 'graph analysis of time spent' button -> System responds with various graphs showing the diverse time-periods of each student reading the study material.

2. Alternate course of event

- (a) N/A

## 3.2 Non Functional Requirements

### Performance:

Since the system integrates AI, it is important to keep the focus on accuracy and speed for better performance. That's why, the system should use the latest API for detecting face/landmark, recognizing face and tracking eyes. In the backend, the system will use Postgre SQL with Django in accordance with the documentation of Django. This will reduce the risks of the system being unstable. Besides, it will ensure reliability and help to achieve the desired performance. If the system loses the connection to the Internet, the user should be informed about any changes as soon as he/she gets back online.

### Safety:

In case of fatal errors in the database, like a disk crash or any other temporary failure, the recuperation technique will reestablish a previous duplicate of the database that was supported up to documented capacity. Then it will reproduce a present status by gathering information from the backed up log, up to the hour of failure.

### Security:

The security of the communication between the system and server will be maintained carefully. Since this is a generic app, a user can be both student and teacher. The shared data between the general user and the instructor will be encrypted. The system will use HTTPS protocol to secure the website. HTTPS protects the integrity of any website. It helps prevent intruders from tampering with the communications between a website and its users' browsers.

### Quality:

- **Availability:** Anyone, anytime from anywhere can access this product. The system can be used from any web browser. Moreover, it will also have a dedicated android application for android users.
- **Maintainability:** The system will make sure to give proper services to the users by fixing bugs and pushing updates if necessary.