CS 411W Lab 2

Inclusive Classroom

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1 Introduction

1.1 Purpose

Inclusive Classroom's (IC) primary goal is to increase the accessibility of online learning to low-income students. The solution is a two-pronged approach. The two primary sections will be the student flow and the teacher flow. The student will have the ability to passively download and upload, both assignments and lectures. Inclusive Classroom will attach a timestamp to completed assignments to enable teachers to determine if an assignment has been completed in time. The major goal of the teacher flow will be to allow the teacher to interact with these students with as little headache as possible. This will be done by automating processes for uploading lectures and

sending notifications of live stream status to students. The teacher will also be able to easily review the timestamp associated with the assignment.

1.2 Scope

Inclusive Classroom's (IC) primary goal is to increase the accessibility of online learning to low-income students. The solution is a two-pronged approach. The two primary sections will be the student flow and the teacher flow. The student will have the ability to passively download and upload, both assignments and lectures. Inclusive Classroom will attach a timestamp to completed assignments to enable teachers to determine if an assignment has been completed in time. The major goal of the teacher flow will be to allow the teacher to interact with these students with as little headache as possible. This will be done by automating processes for uploading lectures and sending notifications of live stream status to students. The teacher will also be able to easily review the timestamp associated with the assignment.

1.3 Definitions, Acronyms, and Abbreviations

High-speed Internet - Internet with consistent download speeds of at least 3.8 Mbps (Zoom)

English as a Second Language (ESL)

Family Educational Rights and Privacy Act (FERPA) - Federal law that protects the privacy of student education records

Google Classroom - "Free web service developed by Google for schools that aims to simplify creating, distributing, and grading assignments" (Google)

littleLearners - Former CS 410 group solution that emphasizes simple UI for students in the K-5 age range (Del Razo)

Stable Internet - Internet with less than 1% dropped packets (ICTP)

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1.5 Overview

The product specification will include the hardware and software that will be used to create Inclusive Classroom. The remaining sections of this document includes a detailed description of the hardware and software.

2 General Description

Inclusive Classroom will be developed using Node, React Native, SQL, and Redis as the caching layer. The product will consist of two flows, the student and the teacher. The student flow will enrich the online learning experience via automation. The teacher flow will allow the teacher to take advantage of the technology developed by Inclusive Classroom while adding minimal overhead for the teacher. Inclusive Classroom is made of the following Major Components:

- Client Side App: This is how the teacher or student will interact with Inclusive Classroom.
- The Caching Layer: Redis will be used to minimize the number of requests that need to be served from the database.
- Express Server: This server will be developed using Node. This server will handle user authentication, role management, saving and viewing assignments, livestreams, and videos.
- PostgreSQL: The Postgres Database will be used to store persistent data. This includes usernames, passwords, assignments, and class data.

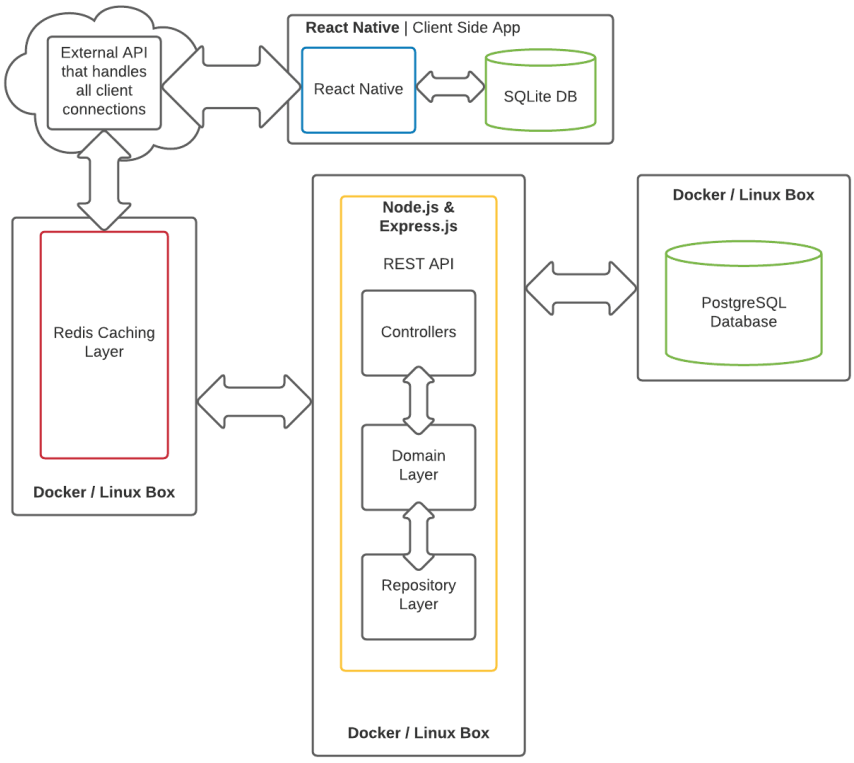

Figure 1: Major Functional Component Diagram

2.2 Prototype Functional Description

The goal of Inclusive Classroom is to improve the online learning experience of students. The time of completion will be timestamped onto each assignment. This allows the teacher to assess if the assignment was completed on time. The prototype will have the following features:

- Teacher's features
    - Log in
    - Begin/Record/View Livestreams
    - Create/Grade/View Assignments
- Student's features
    - Log in
    - View Recordings/Livestreams
    - View/Submit Timestamped Assignments
    - View Grades

2.3 External Interfaces

2.3.1 Hardware Interfaces

Inclusive Classroom will be developed using React Native. This allows the application to be deployed as a native application for android as well as a web application. Both the student and the teacher will need a computer or smart device to access Inclusive Classroom.

2.3.2 Software Interfaces

Inclusive Classroom will be implemented using a variety of third-party software tools. These include AWS, React-native, Node, Express, Docker, PostgreSQL, and Redis.

2.3.3 Communications Protocols and Interfaces

Inclusive Classroom will utilize IEEE 802.3/802.11 to be able to wirelessly connect to the internet. HTTPS will be used at the API to communicate between the application, database, and cache layer.