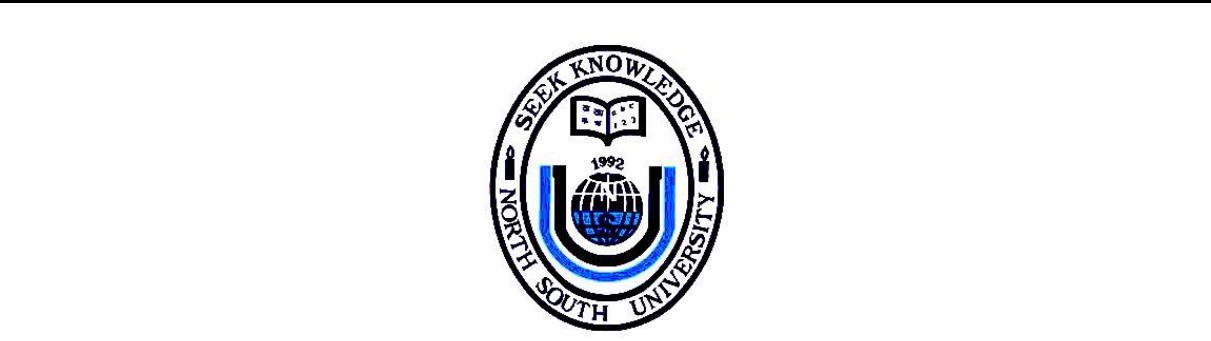
Department of Electrical and Computer Engineering

North South University



CSE 499B.6

Senior Design Project

**Title: Online Class & Examination Monitoring Platform**

Reported by

|  |  |  |
| --- | --- | --- |
| **Name** | **ID** | **Section** |
| Md Sharif Hossain | 1712336642 | 6 |
| Kazi Moshiur Rahaman | 1712832642 | 6 |
| Rubaida Ferdous | 1711126042 | 7 |
| Galib Faruk Gani | 1531012642 | 6 |

Faculty Advisor:

**Dr. Mohammad Ashrafuzzaman Khan**

Associate Professor Department of ECE

Summer 2021

**Letter Of Transmittal**

May, 2021

To

**Dr. Mohammad Ashrafuzzaman Khan**

Associate Professor,

Department of Electrical and Computer Engineering,

North South University, Dhaka.

**Subject:** Online Class & Examination Monitoring Platform.

Dear Sir,

With due respect, we would like to submit our report on “Online Class & Examination Monitoring Platform” as a part of our BSc program. The report talks about the video conferencing system and how we have worked on it to make it better not only for the students but also for the teachers too.

We are presenting this report to you and we are looking forward for your valuable judgment. It would be our pleasure if you find this report useful and we would be very grateful on you if you help us with our project with our thoughts and guidance.

Sincerely Yours,

**Md Sharif Hossain**

ID: 1712336642

Department of Electrical and Computer Engineering,

North South University, Dhaka

**Kazi Moshiur Rahaman**

ID: 1712832642

Department of Electrical and Computer Engineering,

North South University, Dhaka

**Rubaida Ferdous**

ID: 1711126042

Department of Electrical and Computer Engineering,

North South University, Dhaka

**Galib Faruk Gani**

ID: 1531012642

Department of Electrical and Computer Engineering,

North South University, Dhaka

**Approval**

The capstone project entitled “Online Class & Examination Monitoring Platform” by Name (ID # ) and Name (ID #), is approved in partial fulfillment of the requirement of the Degree of Bachelor of Science in Computer Science and Engineering on September, 2021 and has been accepted as satisfactory.

**Supervisor:**

**Dr. Mohammad Ashrafuzzaman Khan**

**Associate Professor**  
Department of Electrical and Computer Engineering North South University  
Dhaka, Bangladesh.

**Department Chair:**

**Dr. Mohammad Rezaul Bari**

Associate Professor & Chairman  
Department of Electrical and Computer Engineering North South University  
Dhaka, Bangladesh.

**Declaration**

This is our truthful declaration that the **“**Online Class & Examination Monitoring Platform**”** we have prepared is not a copy of any other online video conferencing system previously made by any other team. We also express our honest confirmation in support of the fact that the said **“**Online Class & Examination Monitoring System**”** has neither been used before to fulfill any other course related purpose nor it will be submitted to any other team or authority in future.

**Table of Contents**

**Acknowledgement**

First of all, we wish to express our gratitude to the Almighty Allah for everything that Allah has provided us with. We would also like to express our profound gratitude to our honourable course instructor, **Dr. Mohammad Ashrafuzzaman Khan,** for his constant and meticulous supervision, valuable suggestions, his patience and encouragement to complete the thesis work. We would also like to thank the ECE department of North South University for providing us with the opportunity to have an industrial level design experience as part of our curriculum for the undergraduate program. Finally, we would like to thank our families and everybody who supported us and provided with guidance for the completion of this project.

**Abstract**

In this pandemic situation, most educational institutions and many business organizations conduct their activities over online meeting platforms like Google Meet or Zoom. But these applications only provide a meeting platform. The host needs to monitor the members manually. In the online examinations, teachers need to monitor the students' activities one to one by themselves.

We are planning to build a platform that will provide a more audited video conferencing service. This project's primary purpose is to periodically identify the meeting members by pre-given face recognition data and confirming if the person in front of camera is the authentic one or not. Also, it will provide one step more fair exam policies. We have built two kinds of student evaluation system: MCQ and written exam. During both kinds of exams, clipboards and right click buttons of the mousepads of user computers will be deactivated so that no one can copy the questions. Also, the system will notify the host if someone minimize or leave the exam tab or go to another tab. The overall system gives more fair examination conducting policy than the regularly practicing ones.

page10image43287568

CHAPTER 1: INTRODUCTION

# Introduction

## **Problem Analysis**

Terms like “Online education”, “Education from home” or “Work from home” are being more popular since 2020. All educational institutions are closed physically from March,2020 till now. Many of these institutions are conducting their classes and assessments via online. They mostly use “Zoom” or “Google Meet” as video conferencing for taking classes, Google Forms and Google Classroom for taking examinations or class assessments. These technologies are helping unexplainably for online class and assessments. In these platforms, the host or the teacher needs to monitor the members or the students manually. In the online examinations, teachers need to monitor the students' activities one to one by themselves. There exist a lot of holes for plagiarism and sharing assessment answers between the classmates. Even there are possibilities of attending one student’s examination by another person. So, it was demand of time to make a better platform for conducting online classes and assessments.

## **Related Works**

* + 1. **Traditional video conferencing platforms:** Google Meet, Zoom, Microsoft Teams, Skype, etc. platforms provide the features like video conferencing, on-call messaging, screen sharing or meeting recording. Most of them offer many of the same basic functions, like call encryption, support for up to 720p HD video. But there are no extra audits over the hosts to monitor them.
    2. **Online form or examination related platforms:** Google form, Google doc, Socrative, etc.
    3. **Canvas Learning Management System:** Canvas is a web-based learning management system, or LMS. It is used by learning institutions, educators, and students to access and manage online course learning materials and communicate about skill development and learning achievement. It is full of tools and features to enhance your online course experience. As a student, one can view content created by the instructors and participate in course assignments and communications. The instructor will customize the learning experience in Canvas, so each class may look different.

Canvas can detect cheating in online exams and tests by using both technical and non-technical methods. Technical tools used include proctoring software, lockdown browsers, and plagiarism scanners. Non-technical methods used include comparing answers and exchanging questions.

Recently, for the very first university in South Asia, North South University has been contracted with Canvas Learning Management System. NSU seems to implement many of its features soon. But the contract process is too costly to be followed by many other institutes.

## **Motivation**

We have faced unfairness and complexities while attending online classes and examinations. Our honourable faculties face challenges too to monitor each student while conducting classes. From this experience we decided to design a platform which will give a better online class and examination conducting platform.

## **Overview**

This is the report of a project considering the use of video conferencing for taking online classes and examination. For the recent outbreak of covid in 2019 all educational institutes are facing problems as they are not being able to take physical classes due to the fear of infection which has somewhat pushed the educational institutes towards online classes, which has turned into a challenge. The use of online video conferencing system was not that wide spread in the educational system before, but the use of video conferencing system has incensed in huge numbers. The use has increased that is true but the problems stayed and through this project we are trying to overcome the problems we have pointed out the problems that a lecturer faces while taking a class or an exam.

There are a number of well-known systems or web applications like zoom, cisco WebEx, google meet and the list goes on, but none of them are equipped with the proper tools that are needed to be present in this modern-day pandemic situation. We are working on such a web application which will be able to not only host meeting like every other video conferencing system but will also reduce the work of the person who is hosting the class or exam, it will check if the person who is entering the meeting is the one intended to join the meeting or not by face detection which will make the video conferencing system not only smarter but safer too. Due to online classes teacher cannot concentrate on each and every student and we have thought of it too in every specific interval the system will check if the student is there or not if the student is actually concentrating in the meeting or not, further we are trying to detect if students are on the same tab or not which means the student cannot copy in exam and were are also working on object detection which will make things easier from the teachers side too as they will get an alert when our system detects something unusual.

page10image43287568

CHAPTER 2: METHODOLOGY

# Methodology

## **Features**

* + 1. **Registration and Login:** Anyone can register into the platform using unique usernames and emails to get started using the features. Users can log into the system once they are done with registration. They can also reset password if it is forgotten somehow.
    2. **Course Management:** Users signed in as a teacher can create courses and invite others (students) to collaborate under their supervision. Hosts can delete or terminate the courses once the purpose is completed.
    3. **Video Conferencing:** Users or hosts can create meetings and invite members. Hosts can schedule meetings for specific times and can get reminders before the meetings. Members can join a pre-existing meeting using meeting links created and shared by hosts. Meeting members can exchange in call messages. The audio part is encrypted and video conference supports up to 720p HD video.
    4. Biometrically Identity Confirmation: The users will need to provide a set of live images of their faces to complete the user profiles. The system will re-verify each five minutes if the joined members are authentic ones according to the registered profile. If there is no match, a signal or an error message will be given to the host. A flag will be shown to the hosts if there is noticed something unwanted or unexpected.
    5. Online Examination Monitoring: This is one of the most key features of the project. Overall Examination Monitoring is conducted via several parts:
       1. **Setting up an MCQ question set:** A host can create an MCQ question set with options as well as correct answers which will be automatically evaluated from the system. The questions will be shuffled and time-bounded for the students.
       2. **Clipboard and keyboard freezing during MCQ exams:** If a host wants to take an MCQ exam, the browser will freeze the clipboard, right selection button and keyboard. The exam system will need only the left selection key. As a result, no student can directly copy the question.
       3. **Separate written examination system:** If a host wants to take a written exam, s/he can post a set of questions. There will be answer scrips and word limiting options in the answer bar. Like MCQ module, students cannot copy the questions and if any student minimize the exam tab, the host will be notified.
       4. **Activities monitoring:** We have used Page-Visibility-API using JavaScript which will allow us to take necessary action if a webpage is minimized or a new tab is opened in the browser. By using this, we have minimized the plagiarism options during examination.

## **Used Platforms**

* + 1. **React Framework:** React is a free and open-source front-end JavaScript library for building user interfaces or UI components. It is maintained by Facebook and a community of individual developers and companies. React can be used as a base in the development of single-page or mobile applications. We used React framework in our video conferencing and related tools.
    2. **Frappe Framework:** Frappe is a full stack, batteries-included, web framework written in Python and JavaScript with MariaDB as the database. It is the framework which powers ERPNext, is pretty generic and can be used to build database driven apps. We have user Frappe to integrate our different modules in one platform as it supports both Python and JavaScript.
    3. **Visual Studio Code editor:** Visual Studio Code is a streamlined code editor with support for development operations like debugging, task running, and version control. It aims to provide just the tools a developer needs for a quick code-build-debug cycle and leaves more complex workflows to fuller featured IDEs, such as Visual Studio IDE. Its features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. This is a very powerful code editor. We have used VSC as the core editor for all frameworks and platforms.
    4. **DNN:** A deep neural network (DNN) is an artificial neural network (ANN) with multiple layers between the input and output layers. There are different types of neural networks but they always consist of the same components: neurons, synapses, weights, biases, and functions. We have used DNN for our face recognition module.
    5. **OpenCV:** OpenCV is the huge open-source library for the computer vision, machine learning, and image processing and now it plays a major role in real-time operation which is very important in today's systems. By using it, one can process images and videos to identify objects, faces, or even handwriting of a human. We have used DNN and OpenCV together for our face recognition module and integrating it.
    6. **GitHub:** GitHub is a web-based platform used for version control. Git simplifies the process of working with other people and makes it easy to collaborate on projects. Team members can work on files and easily merge their changes in with the master branch of the project. We have used GitHub for version controlling, collaborating and submitting our works in this project.

page10image43287568

CHAPTER 3: RESULTS

# Result Analysis

## **Works done over the course**

We have started the course CSE499A in Spring 2021 and we are continuing CSE499B in Summer 2021. Over these two semesters, we have tried to implement and launch an effective demo for our project. The features and implementations that worked partially or fully are described below.

* + 1. Video Conferencing:
    2. Login-Registration module:
    3. Examination Monitoring module:
    4. Face recognition:
    5. Integration:

## **Future works**

The practically implemented project is just a beta version of the overall theoretical project. It can be modified further. More features could be added as well as the existing features could be improved too. Some potential modifications are mentioned below.

* + 1. Plagiarism detection:
    2. Classroom:
    3. Sharing study materials:
    4. Study community:

page10image43287568

CHAPTER 4: CONCLUSION

# Conclusion

## **Team contribution**

This project needed more research time rather than hard coding. We needed to use open-source solution parts for our project. Teamwork helped to research from the huge source of internet and find a considerable solution set.

Work distribution: Md Sharif Hossain (SH), Kazi Moshiur Rahaman (KR), Rubaida Ferdous (RF), Galib Faruk Gani (GG)

|  |  |
| --- | --- |
| **Tasks** | **Responsibilities** |
| Problem analysis | GG, RF, SH, KR |
| Project proposal | GG, RF, SH, KR |
| Related works analysis |  |
| Solution analysis | GG, RF, SH, KR |
| Work flow and sub-tasking |  |
| Functional analysis and use case diagram | RF, SH, KR |
| Video conference analysis | GG, RF, SH, KR |
| Video conference implementation | SH, KR |
| Face recognition analysis | GG, RF, SH, KR |
| Face recognition implementation | GG, RF, SH, KR |
| Login-Registration system |  |
| Examination module analysis |  |
| Examination module implementation |  |
| Browser Tab monitoring |  |
| Dashboard and Mother Platform |  |
| Integrating sub-modules |  |
| Project report and presentation |  |

## **Discussion**

The main motive of this project was to help the teachers with online classes and altogether form a better system which can be of better use in the current situation of the covid outbreak, as we are fairly new to this out break and online classes I believe this new system that we are working on and the extra features that we are putting in the system will not only help the host/user now in the situation but will also be of greater use after the pandemic.

**References:**