ONLINE PROCTORING AND FACIAL TRACKING

A PROJECT REPORT

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE COURSE OF SOFTWARE ENGINEERING(CSE3001) IN B.TECH COMPUTER SCIENCE AND ENGINEERING

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BONAFIDE CERTIFICATE

This is to certify that the project report entitled "**SIRIUS-MEET, A VIDEO CONFERENCING SYSTEM**" is a bonafide work of V.V.Vaishnavi (19BCE1497), V.Maheysh (19BCE1120) and S.Girish (19BCE1268) who carried out the project work under my supervision and guidance.

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Place: Chennai

Date: 03-06-2021

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It’s our privilege and pleasure to express our heartful gratitude to Programme Chair **Dr. Justus S** for his encouragement and suggestions.

We are extremely thankful to our esteemed guide **Prof.Ilakiyasekvan.N** for his masterly guidance, timely help and encouragement throughout our project work.

We gratefully acknowledge the faculty of the School for their constant advice and extended support in completion of the project.

We would take this opportunity to sincerely thank our parents, family and friends for their unconditional love and valuable support.

Above all, we are grateful to God for establishing us to complete this project.

S.Girish **V. Maheysh** **V. V. Vaishnavi**

ABSTRACT

In today's world of emerging technologies, education has experienced more advancements in many Universities and Institutions. Online learning is one of the imminent trends in the education sector around the globe. Attending online classes for one full semester created more productive digital workspace. Online learning also develops high quality learning opportunities and improve students' outcomes and skills.

Our aim is to develop a video conferencing application like MS Teams, Zoom, Gmeet etc. This can be useful to conduct business meetings or personal video meeting during family functions providing a location independent lifestyle.

Keywords- Online learning, Video conferencing, meetings

TABLE OF CONTENTS

1. INTRODUCTION

Sirius-Meet is a Video Conferencing web application that will enable students to attend meetings online and interact with the faculties through their webcam. The application will provide the students a more comfortable environment with lower total costs, career advancements, geographic flexibility and more pacing options.

The main purpose of the project is:

- To enable video meeting with video and audio options
- To develop a chat box
- Enable file upload options
- To implement screensharing option

2. TOOLS AND TECHNOLOGIES

- JAVASCRIPT- Used for client-server connection and other main functionalities
- SOCKET IO- For real-time bidirectional communication
- HTML- Basic layout done using HTML
- CSS- Used for styling the HTML document

3. PROPOSED METHOD

The four major modules in our project include:

1. **Video conference**
   - Inter-process communication of the student and the faculty through webcam.
   - The users are provided with Mute, unmute, screen share, video-on and video-off options

2. **Assignments**
   - Files(assignments) will be uploaded by the students in this module. Teachers can download them for evaluation. (File management)

3. **White board**

   ➢ A white board for the faculty to write and explain the concepts clearly while screen sharing.

4. **Chat Box:**

   ➢ A chat box where students can drop in their doubts for clarifications. This involves multithreading concept.

The process of building these modules are as follows:

- The initial part of working focussed on creating the basic ui for the video meeting page and the back-end to stream the video and create a peer network using peerjs.
- Initially, it was time consuming to find out and test the libraries present before settling on the technology of peerJS and socketIo using javascript.
- As establishing and testing the video meeting functionality was going on,work was started on creating a chat network for the meet using socket-io and integrating it.
- These were the major functionalities target for completion by review 2.
- This was followed by the development of file upload, white-board and screenshare simultaneously. The major technologies in play here was socket.io for file upload and screenshare while vanilla JS was used for the whiteboard .
- File upload was planned to be designed in a unique way, with the facility to share the link on demand to any student as well, which would allow them to download it instantly.
- Integration of these structures after development independently took some time, to debug minor errors, integrate with the existing node.js server and to manage the UI.
- At this time a nav-bar was also added along with the mute audio and mute video functionalities to complete a fully functioning standalone prototype of out project.
- After testing and running on localhost till now, deployment was done onto Heroku relatively hassle free.

4. SDLC MODEL

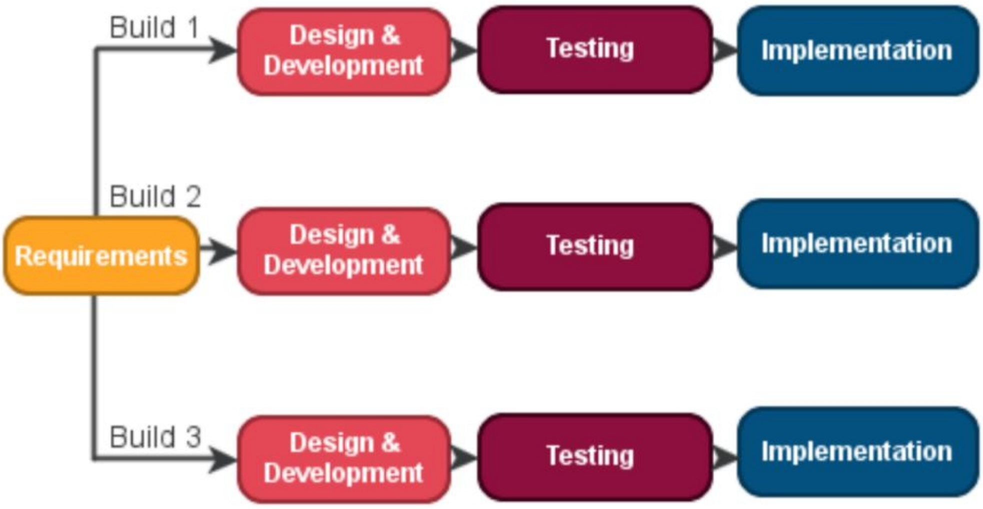
The iterative model is one of the model of software development life cycle that focuses on an initial, implementation, simplified which then progressive gains more complexity and broader feature until the final system is complete. Generally, iterative process starts with a simple implementation and iteratively enhances the system till the final system. Iterative model does not start with a full specification of the project.

WHY ITERATIVE MODEL?

Iterative model will be apt for SIRIUSMEET because each and every time on submitting our prototype in review, we may get to know different kind of features which we will be additionally learning in our project and also we might be removing few unnecessary features that the customer does not need. So, Iterative model will be Suitable for our project.

Other advantages:

- Generates working software quickly and early during the software life cycle.
- Results are obtained early and periodically.
- Progress can be measured.
- More feasible-less cost to change scope and requirements.
- Risks and identified and resolved during iteration; and each iteration is an easily managed milestone.



5. SOFTWARE ARCHITECTURE

Call and Return Architecture:

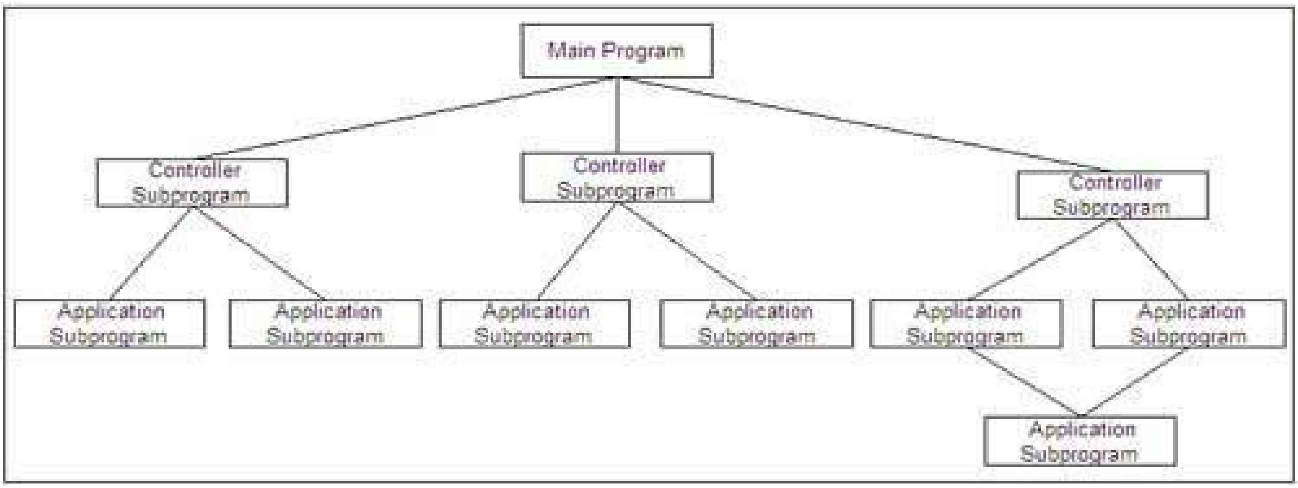
The call and return architectural style is characterized by viewing a system as a main entity which can call smaller sub-entities to perform an action. The outcome of this action is returned to the main entity. A call and return architecture will enable software designers to achieve a program structure, which has the following features:

–Modifiability, indicating that one of the sub-systems can be easily modified

–Modifiability, indicating that one of the sub-systems can be easily modified without influencing other sub-systems.

–Scalability, indicating that the system can handle an increased or decreased in the number of users, without affecting the function of system

This substyle used is **Main program/subprogram architecture.** Here, the function is decomposed into a control hierarchy where the main program invokes a number of program components, which in turn may invoke other components.



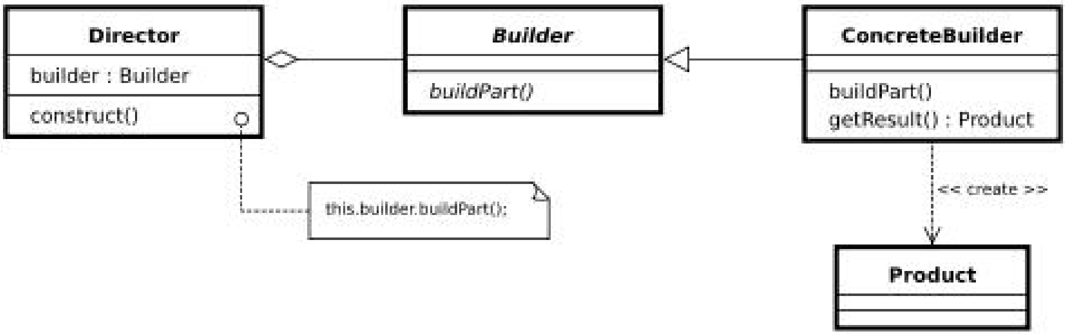
Our project follows this architecture. A node.js server acts as the main program, which in turn makes calls to other HTML pages. The required page is returned as and when the user requires it. This architectural design was useful during design of the projects as the subprograms could be developed and tested independently of the other components. For instance, testing out if the video stream was optimal on the meeting page could be done independently, just by linking it with the node.js server.

This architectural design is also useful to isolate and debug failures during runtime. Since the subprograms are modular, errors can be identified and debugged easily. As a video conferencing system will need to handle a varying load, abiding by the scalability provided in this model is essential.

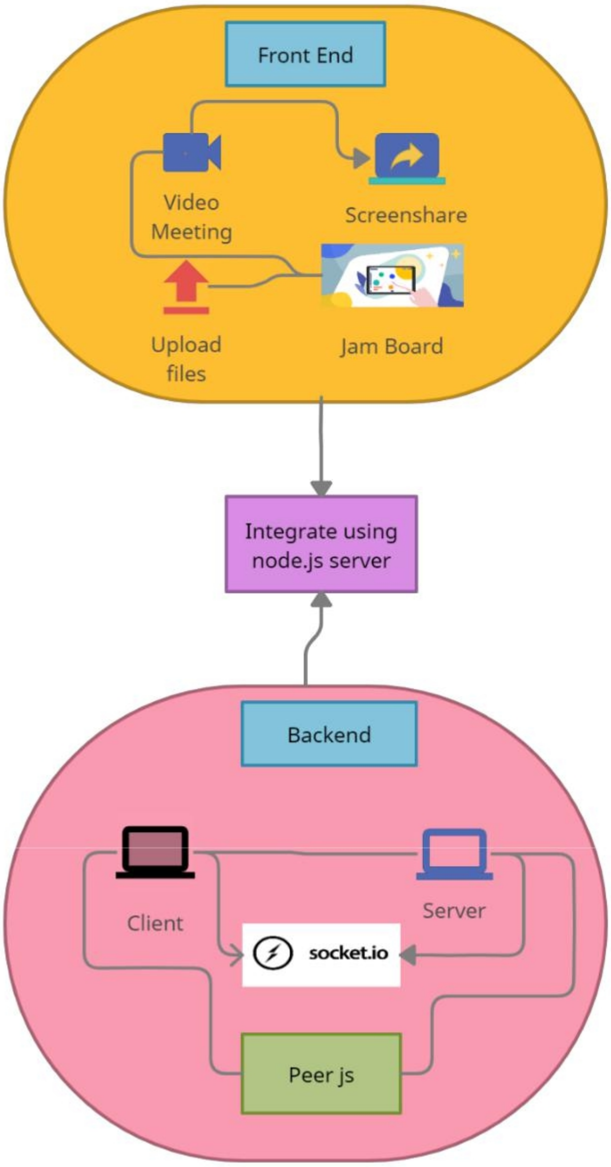
6. DESIGN PATTERN

BUILDER PATTERN:

Builder pattern builds a complex object using simple objects and using a step by step approach. This type of design pattern comes under creational pattern as this pattern provides one of the best ways to create an object. A Builder class builds the final object step by step. This builder is independent of other objects. In our project, a step by step process takes place as we first enter our name before joining the meet. After joining the meet, the meeting occurs. Mute, unmute and screenshare are built by the video Meeting module. This is followed by other steps of uploading files, whiteboard. In the final step when the code is executed, the model is deployed.

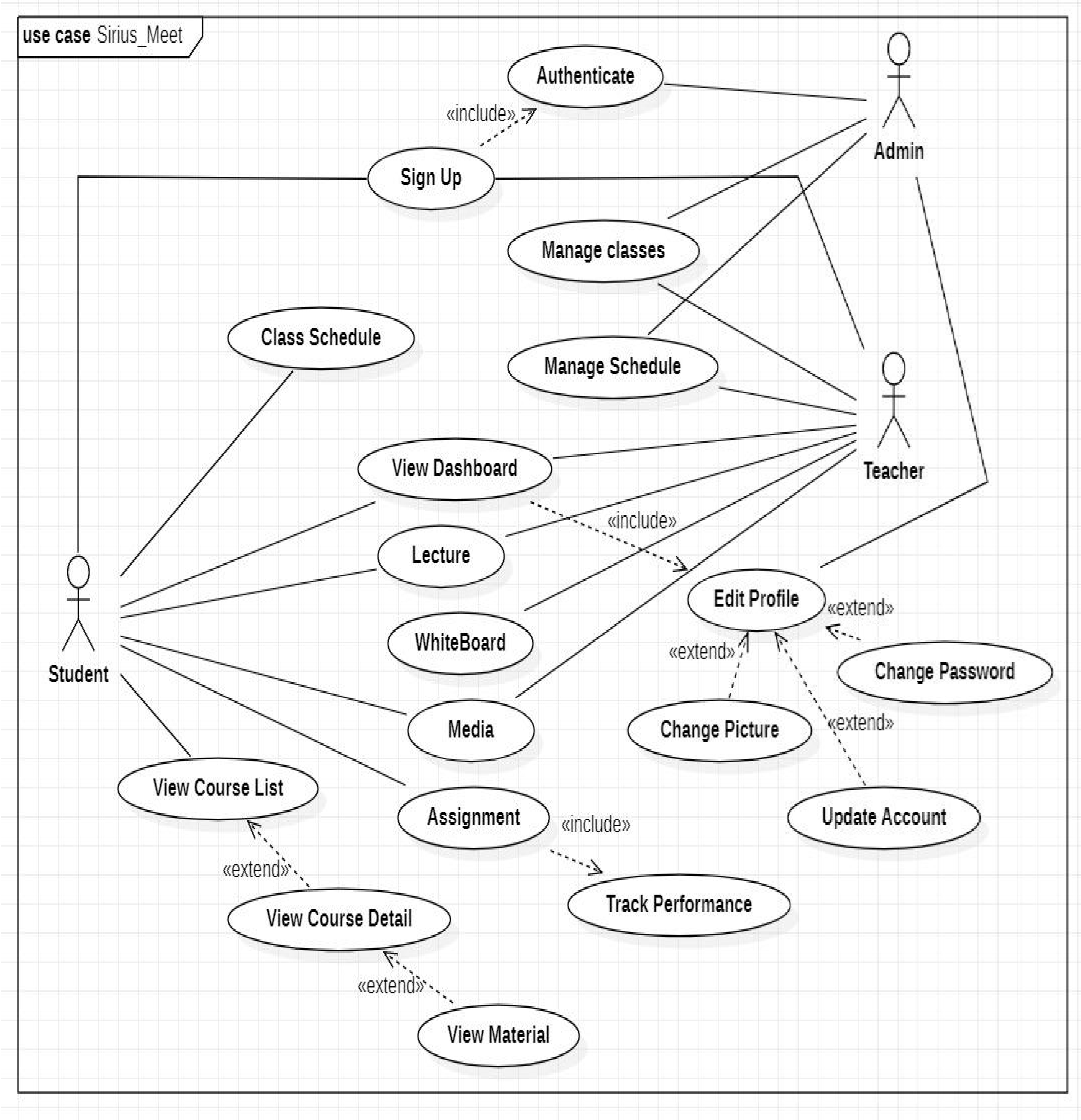


7. SYSTEM ARCHITECTURE

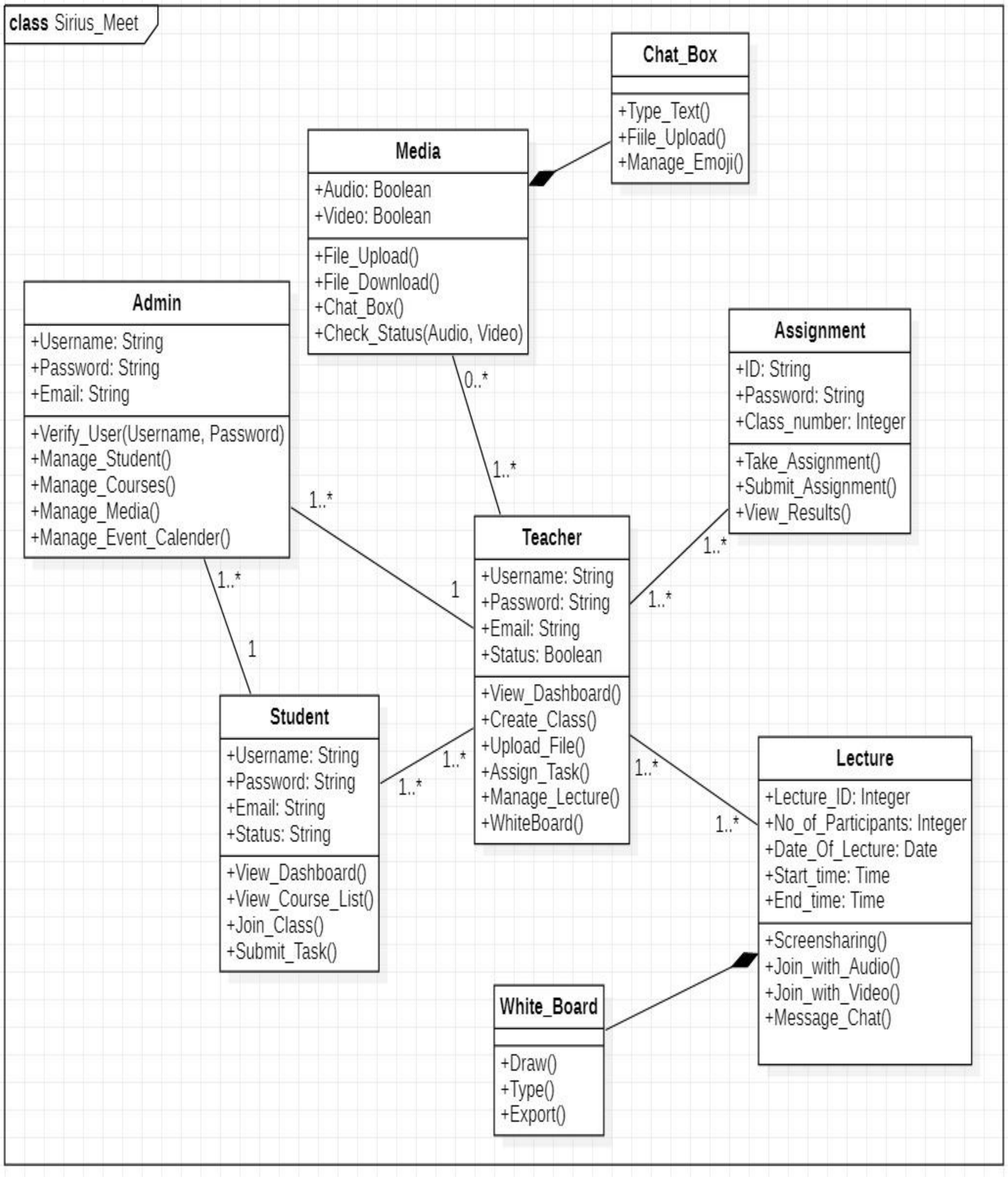


8. UML DIAGRAMS

8.1 USE CASE DIAGRAM

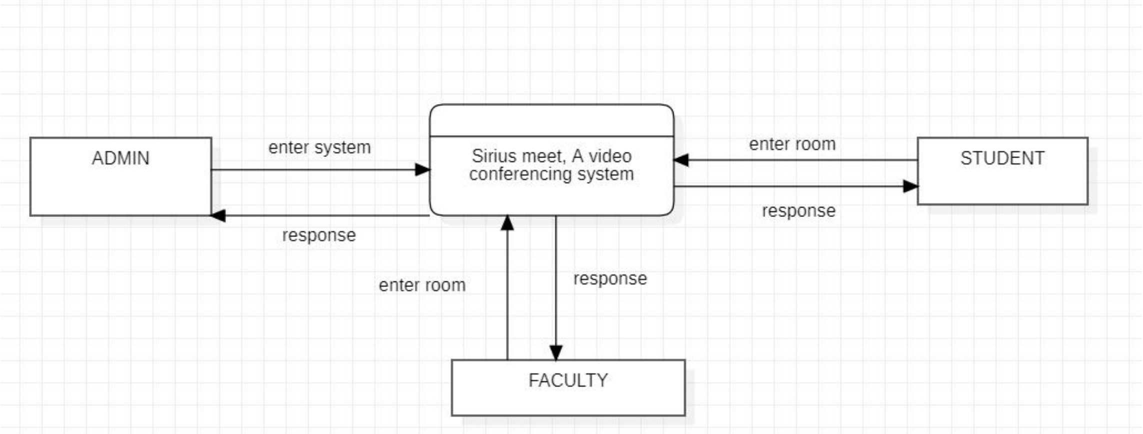


8.2 CLASS DIAGRAM

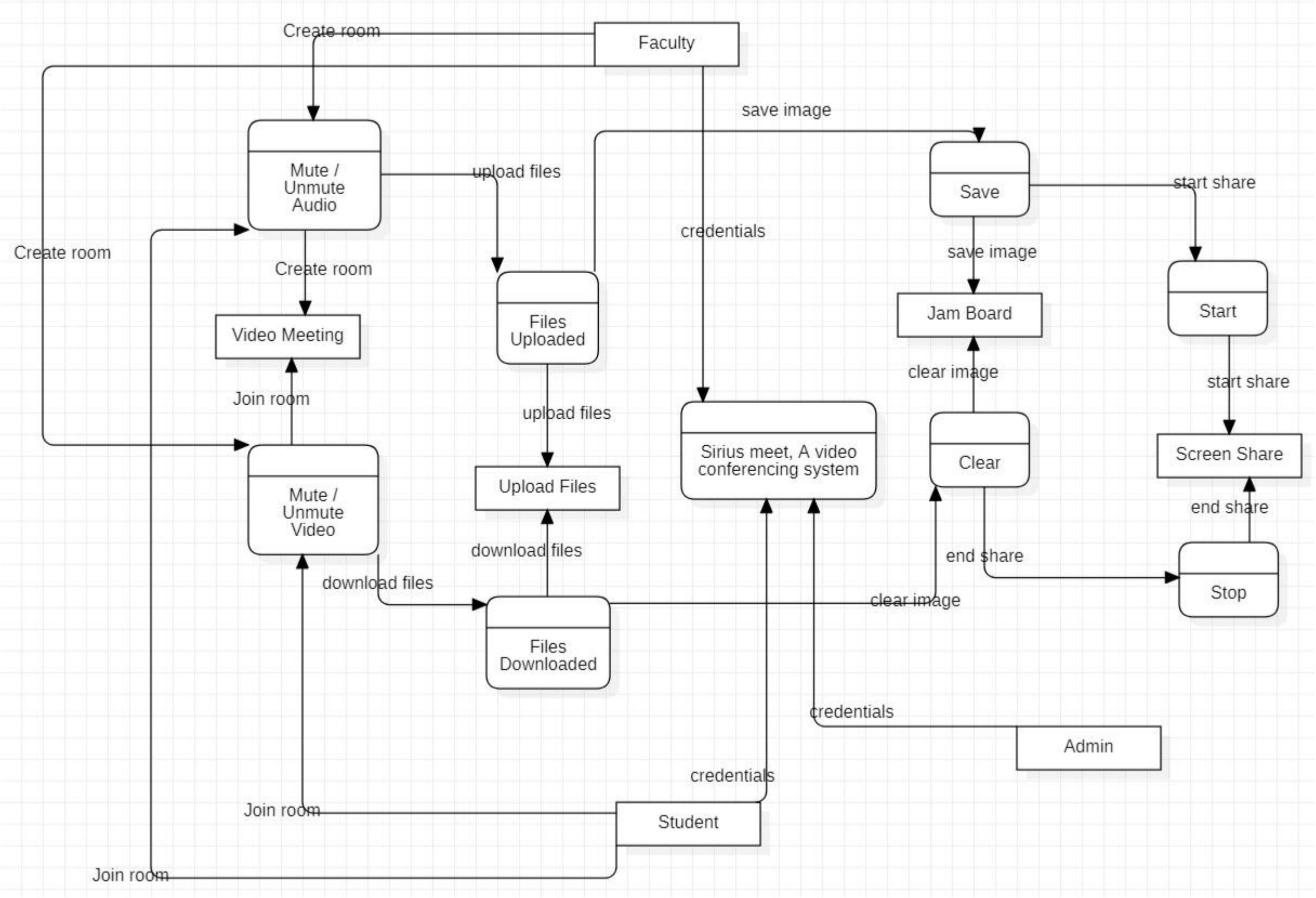


8.3 DATA FLOW DIAGRAM

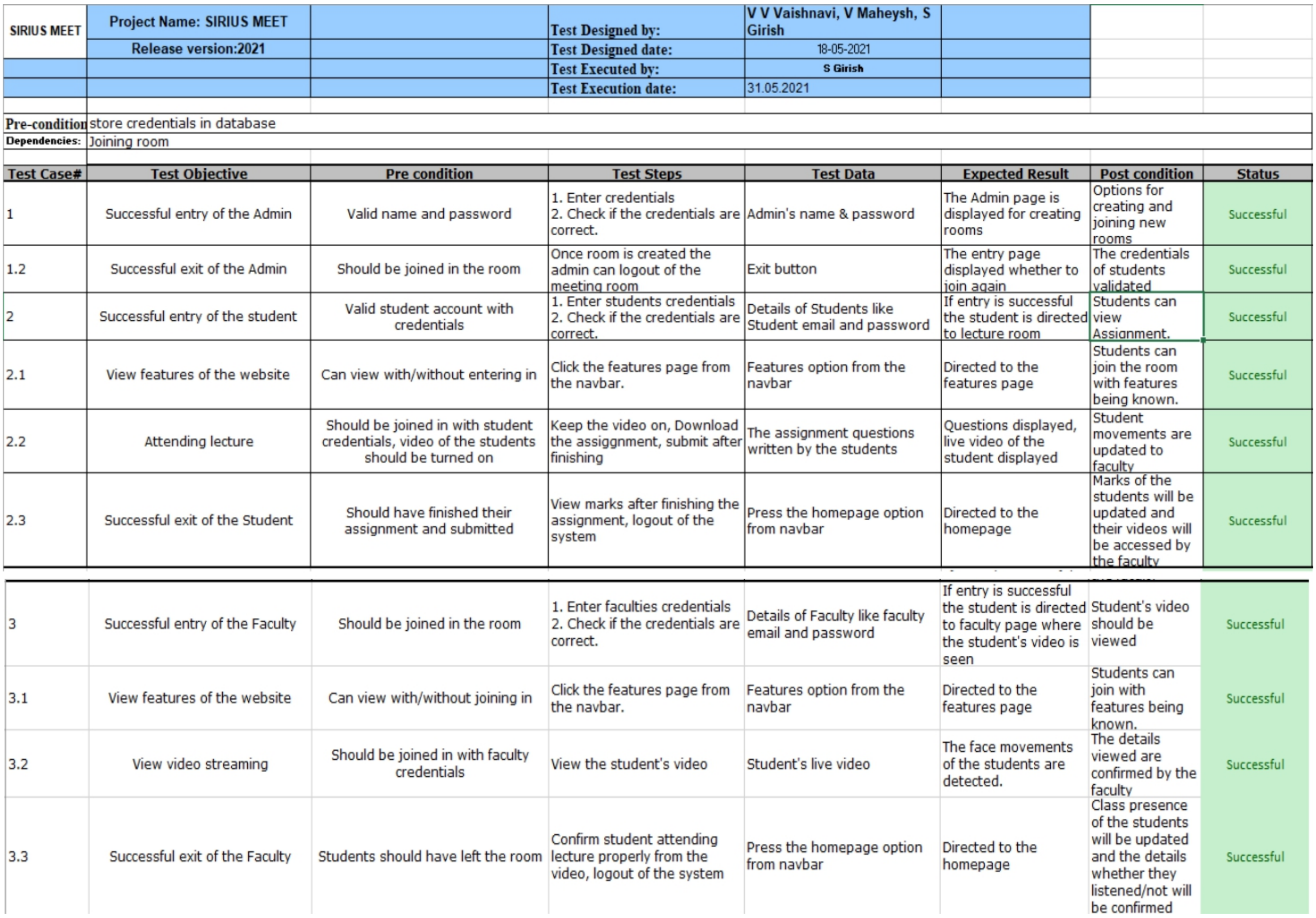
LEVEL 0:



LEVEL 1:



9. TESTING PHASE



SIRIUS MEET	Project Name: SIRIUS MEET		Test Designed by:	V V Vaishnavi, V Maheysh, S Girish			
	Release version:2021		Test Designed date:	18-05-2021			
			Test Executed by:	S Girish			
			Test Execution date:	31.05.2021			
Pre-condition	store credentials in database						
Dependencies:	Joining room						

Test Case#	Test Objective	Pre condition	Test Steps	Test Data	Expected Result	Post condition	Status
1	Successful entry of the Admin	Valid name and password	1. Enter credentials 2. Check if the credentials are correct.	Admin's name & password	The Admin page is displayed for creating rooms	Options for creating and joining new rooms	Successful
1.2	Successful exit of the Admin	Should be joined in the room	Once room is created the admin can logout of the meeting room	Exit button	The entry page displayed whether to join again	The credentials of students validated	Successful
2	Successful entry of the student	Valid student account with credentials	1. Enter students credentials 2. Check if the credentials are correct.	Details of Students like Student email and password	If entry is successful the student is directed to lecture room	Students can view Assignment.	Successful
2.1	View features of the website	Can view with/without entering in	Click the features page from the navbar.	Features option from the navbar	Directed to the features page	Students can join the room with features being known.	Successful
2.2	Attending lecture	Should be joined in with student credentials, video of the students should be turned on	Keep the video on, Download the assiggnment, submit after finishing	The assignment questions written by the students	Questions displayed, live video of the student displayed	Student movements are updated to faculty	Successful
2.3	Successful exit of the Student	Should have finished their assignment and submitted	View marks after finishing the assignment, logout of the system	Press the homepage option from navbar	Directed to the homepage	Marks of the students will be updated and their videos will be accessed by the faculty	Successful
3	Successful entry of the Faculty	Should be joined in the room	1. Enter faculties credentials 2. Check if the credentials are correct.	Details of Faculty like faculty email and password	If entry is successful the student is directed to faculty page where the student's video is seen	Student's video should be viewed	Successful
3.1	View features of the website	Can view with/without joining in	Click the features page from the navbar.	Features option from the navbar	Directed to the features page	Students can join with features being known.	Successful
3.2	View video streaming	Should be joined in with faculty credentials	View the student's video	Student's live video	The face movements of the students are detected.	The details viewed are confirmed by the faculty	Successful
3.3	Successful exit of the Faculty	Students should have left the room	Confirm student attending lecture properly from the video, logout of the system	Press the homepage option from navbar	Directed to the homepage	Class presence of the students will be updated and the details whether they listened/not will be confirmed	Successful

10. CONCLUSION

After a better understanding on the concepts involved to develop the system, Sirius Meet, an online conferencing system was implemented.

Peerjs and SOCKET IO were the main technologies used for establishing user connections, which made the teacher's job easier for conducting classes. From this, they could mute, unmute, chat, upload files, write on white board while teaching and share screen.

Students were able to successfully interact with their faculty online, which made digital learning effective.

11. FUTURE SCOPE

In this project, we are trying to incorporate a video conferencing system for attending meetings and engage students in e-learning.

Few ways to prevent unnecessary hacking skills, that can change the video to a faked one could be prevented.

Additional functionalities like end call, raise hand etc could be added in the video meeting page. The file upload and download page can be tested for load. Further, the UI can be upgraded to make it more responsive.

12. REFERENCES

[1] https://stackoverflow.com/questions/56707417/how-to-import-socket-io-from-client-side-in-vanilla-javascript

[2] https://stackoverflow.com/questions/59810122/file-uploads-through-socket-io-javascript-filereader

[3] https://www.youtube.com/watch?v=rxzOqP9YwmM

[4] https://www.npmjs.com/package/socket.io

[5] https://codepen.io/michaelsboost/pen/cnCAL

13. TEAM CONTRIBUTIONS

S.GIRISH - Contributed to whiteboard and screensharing module

V.MAHEYSH- Contributed to video module and mute unmute buttons

V.V.VAISHNAVI- Contributed to chat box and file upload modules