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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

B.Tech Project
Course Code : CS497

Silicosis Telemedicine & Data Collection Portal

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CERTIFICATE

This is certify that the work contained in this entitled “**Telemedicine Portal**” is a bonafide work of **Ashutosh Yadav (B16CS005) & Chetan Prakash Meena (B16CS006)** carried out in Department of **Computer Science and Engineering Indian Institute of Technology Jodhpur** under my Supervision and that it has not been submitted elsewhere for a degree.

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ABSTRACT

In this project we have to developed a Telemedicine Portal where a patient can video chat with doctor along with message chatting, and the patient can upload his CT scan, X-Ray Report and a photograph along with his detail. For video conferencing we uses Nodejs module Simple-Peer. This project will be useful in those area where people are facing difficulties to finding good doctor or for handicap patient who have difficulty in moving. And also we need to collect data of people which can be used to analyse the some critical disease like Silicosis.

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1 Introduction

1.1 Purpose and Scope of the Project

In a Telemedicine settings, a patient connect with doctors using tele-video conferencing. The doctors are interested in looking at patient data at the same time during the tele-conferencing including patient case history. In this project, we have built a cloud-based telemedicine portal which integrates the Electronic Health Care management along with video conferencing features. It also allows to upload radio logical, pathological data and clinical findings. As a pilot deployment, we have offered our platform to CSIR-IGIB and they have agreed to use the platform in their next Silicosis camp at Sirohi district, Rajasthan.

1.2 About the Website

For building this website we are using Nodejs Express server, which is hosted at 8008 port(locally). Here we have authentication portal where user need to first register and then login. After login user can fill form, place a call to other user, can check who is calling him and can accept or reject call offer and finally can logout. While make a call if user grant device permission then the call should be Video call else its just a simple text chat where both user can text each other. After connecting to each other user can see the form of patient i.e. doctor can show other people form also. And then finally can disconnect the call.

For establishing the call one user need to place a call which is then visible in the receiver page, now if receiver accept the call, he is redirect to another page where a code is send to sender(one who place a call) automatically, once the code is send a button is appeared to disconnect the call. On the other side(sender) is keep checking manually whether the code(send by receiver) is received. Once the code is received the connection is created between the users and the chat is started.

2 Specification & Functional Requirement

2.1 Use Case Diagram

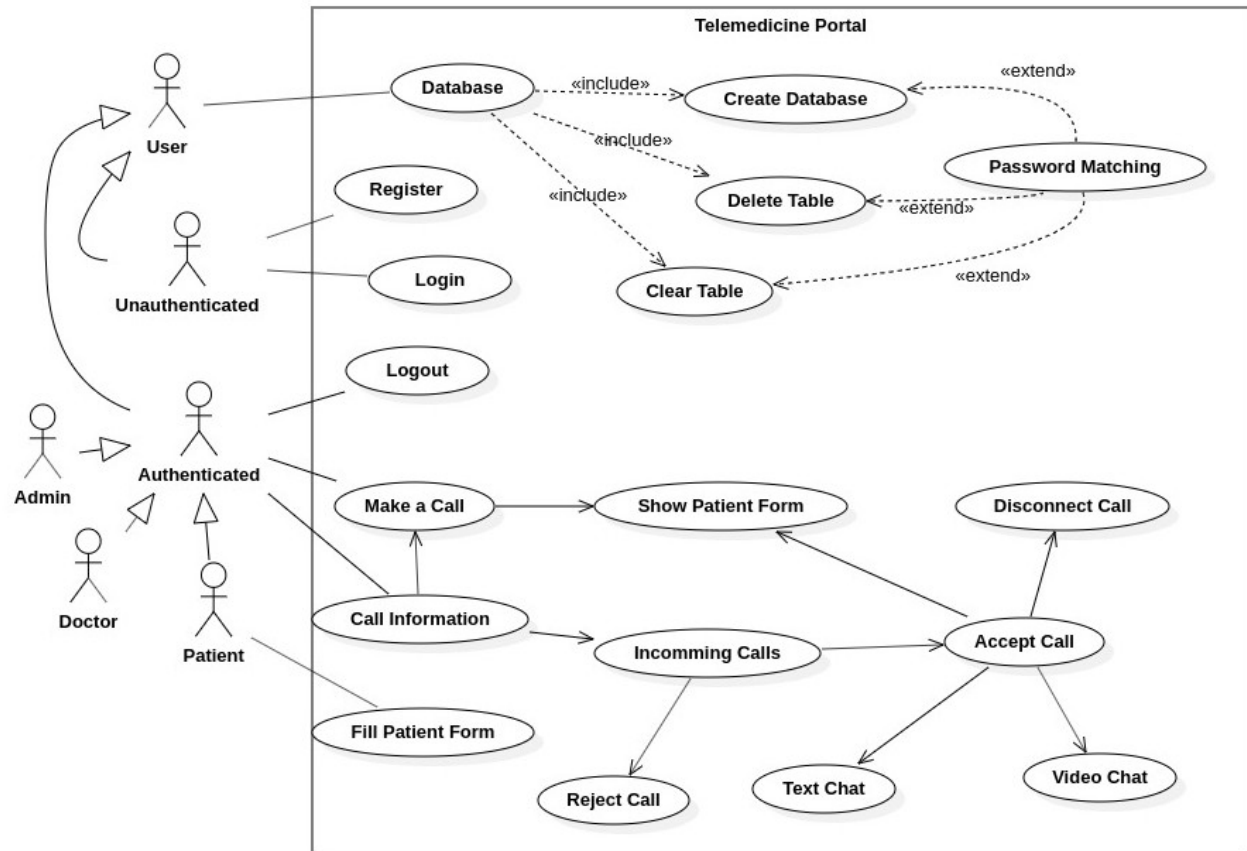


Figure 1: Use Case Diagram

2.2 Activity Diagram

2.2.1 Authentication

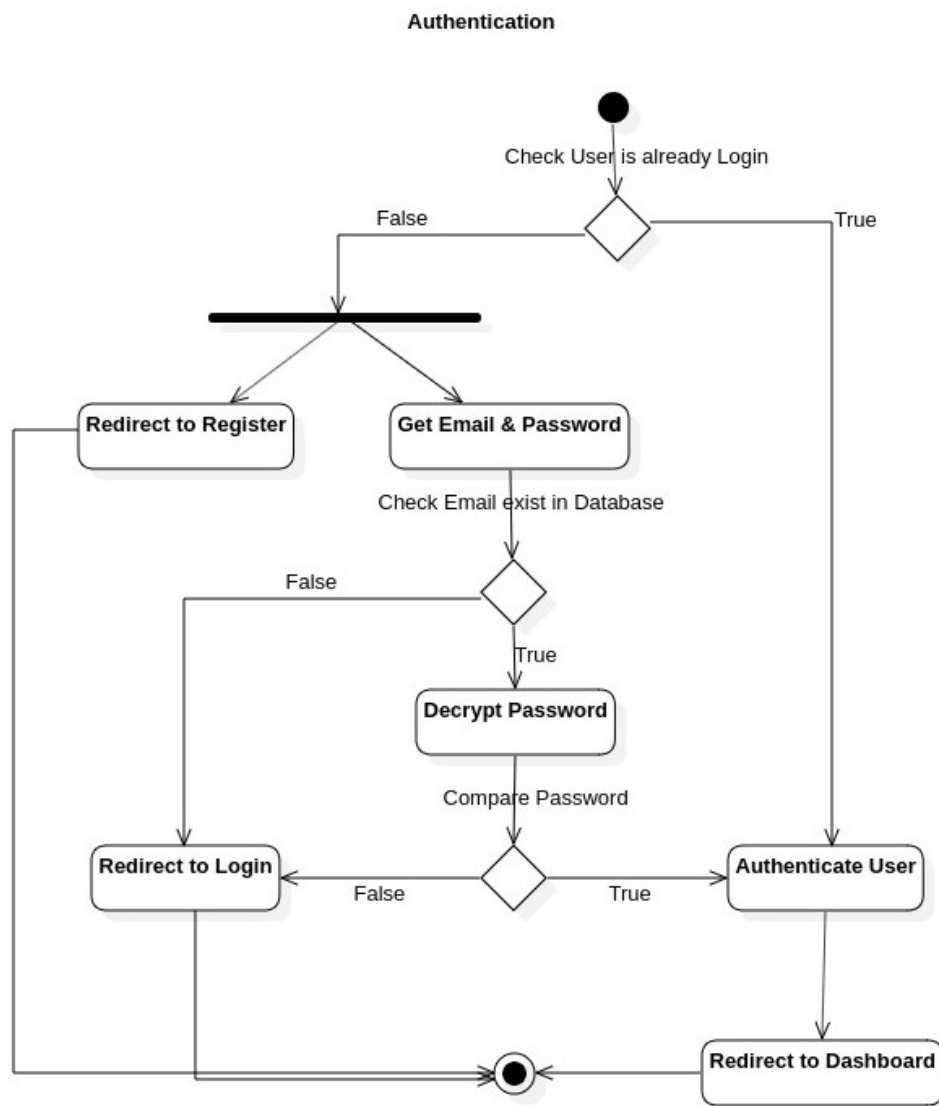


Figure 2: Activity Diagram for Authentication

2.2.2 Chat Communication

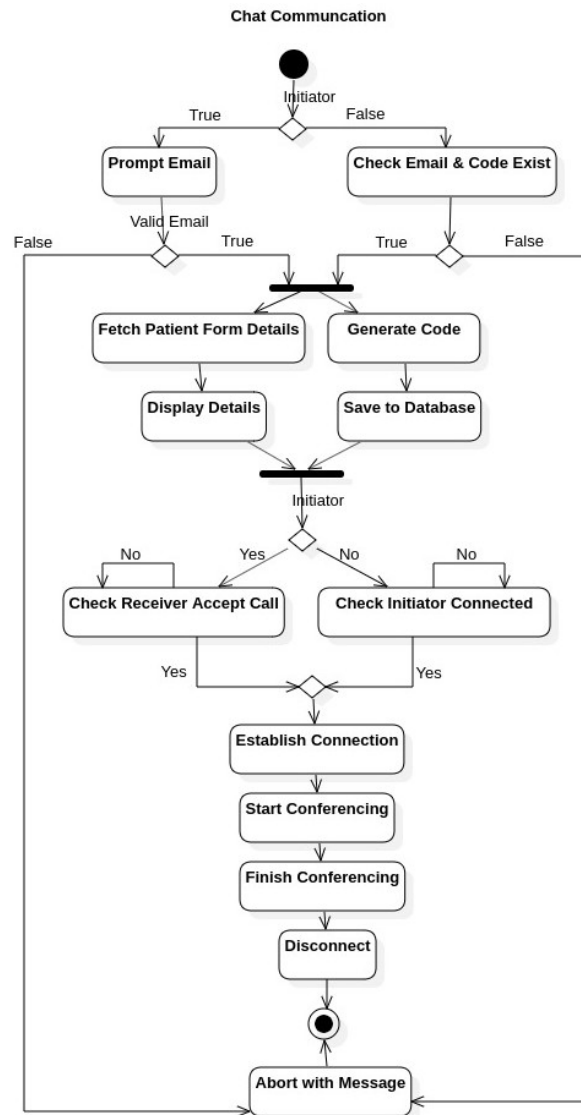


Figure 3: Activity Diagram for Chat Communication

2.3 Database

2.3.1 PatientForm

formID	INT PRIMARY KEY
userID	VARCHAR(255) NOT NULL
date	TIMESTAMP
place	VARCHAR(255)
regNumber	VARCHAR(255)
BOCWIDNumber	VARCHAR(255)
name	VARCHAR(255)
aadharNumber	VARCHAR(20)
dob	VARCHAR(30)
age	INT UNSIGNED
weight	INT UNSIGNED
sex	VARCHAR(10)
address	VARCHAR(255)
district	VARCHAR(255)
state	VARCHAR(50)
country	VARCHAR(50)
pincode	VARCHAR(10)
mobileNumber	VARCHAR(15)
presentOccupation	VARCHAR(255)
presentOccupationOther	VARCHAR(255)
occHisConstruction	INT UNSIGNED
occHisMines	INT UNSIGNED
occHisOtherOccupation	VARCHAR(255)
occHisOther	INT UNSIGNED
historyOfSmoking	VARCHAR(10)
chiefComplaints	VARCHAR(255)
chiefComplaintsOther	VARCHAR(255)
duration_suffer	VARCHAR(255)
photograph	VARCHAR(255)
xRayReport	VARCHAR(255)
ctScanReport	VARCHAR(255)
updated	TIMESTAMP NOT NULL
created	TIMESTAMP NOT NULL

2.3.2 User

userID	INT PRIMARY KEY
email	VARCHAR(255) NOT NULL
password	VARCHAR(255) NOT NULL
name	VARCHAR(255) NOT NULL
role	VARCHAR(50) NOT NULL
mobileNumber	VARCHAR(15)
created	TIMESTAMP NOT NULL

2.3.3 Calls

callID	INT PRIMARY KEY
myID	VARCHAR(255) NOT NULL
otherID	VARCHAR(255) NOT NULL
created	TIMESTAMP NOT NULL
type	VARCHAR(10) NOT NULL
code	VARCHAR(8000) NOT NULL

2.4 Technologies Used

2.4.1 Nodejs

Nodejs platform is used to develop a web application along with various module to make our life easy. Following modules are used in our project:

- **bcryptjs**- To encrypt and decrypt password at browser level.
- **body-parser**- To extract the entire body portion of an incoming request stream and exposes it on request.body
- **connect-flash**- To display flash messages
- **express**- For application framework
- **express-handlebars**- For view engine
- **express-session**- For creating and managing user session
- **formidable**- For uploading file to server
- **mysql**- To creating connection, making query queries to the SQL Database
- **passport**- For request authentication, it act as a middleware
- **simple-peer**- For video chat, building connection between two machines on internet, and transferring data between these to machines

- **nodemon**- Dev-Dependency, As every time we chnages our server file we need to rerun our node server.js command, so to get ride of this problem we use it
- **watchify**- Dev-Dependency
- **npx**- Dev-Dependency

2.4.2 Heroku

For deployment we use Heroku, our website is host on Heroku server where we add an addons ClearDb for SQL database to make queries. Remember that we make our website in such a way that only server is allowed to manage our database if client want to use database then it need to contact with server and then server is responsible the doing the job done. Currently our website is hosted on [Silicosis Telemedicine Portal](#).

2.4.3 SQL Database

For database we are currently using MariaDB SQL database on our localhost machine but in deployment we are using free addon, already mentioned above, just for testing purpose.

3 Challenges

- Creating peer to peer connection, which is then solved by using simple-peer module of Node.js,
- Creating multiple parallel connection at a same time,
- Managing call is also very difficult for us as we are not using trigger function on our database so at initiator(one who place call) side, he need to continuously check for reply,
- Deployment is also very difficult, as we need free service provider and we don't want to use AWS. At last we uses Heroku, but it doesn't provide free database, that we somehow solve.

4 Future Plans

- First thing we do is to update User Interface, as currently we don't have much functionality, so we somehow manage these.
- Then we need to add some functionality like updating user profile and form, email verification, notification, etc.
- Integrates the Electronic Health Care management along with video conferencing features.

- Record Doctor audio and then use it to summarizing of the whole discussion and then show that to patients.

5 References

1. <https://stackoverflow.com>
2. <https://www.google.com>
3. <https://www.w3schools.com>
4. <https://github.com/mysqljs/mysql>
5. <https://getbootstrap.com/docs/4.3/getting-started/introduction>

6 Application Previews

Please enter email address of user you want to communicate

Register

Email address

Password Confirm Password

Name

Role

Phone Number

Already have a Account? [Login](#)

Login

Email address

Password

No Account? [Register](#)

Patient's Form

[Registration Details](#)

[Personal Details](#)

[Contact Details](#)

[Occupation Details](#)

[Medical Details](#)

History of Smoking:

Total Duration of Suffering:

Chief Complaints:

Dashboard

Welcome

Incoming Calls

test@gmail.com

2019-11-25T13:15:28.000Z

Patient's Form

Next

Registration Details:

Date

dd / mm / yyyy

Place

Place

Registration Number

Registration Number

BOCW ID Number

BOCW ID Number

Save

Submit

Patient's Form

Previous

Next

Personal Details:

Name of Beneficiary

Name of Beneficiary

Aadhar Number

Aadhar Number

Date of Birth

dd / mm / yyyy

Age

Age

Weight

Weight

Sex

Male

Save

Submit

Patient's Form

Previous

Next

Contact Details:

Address

Address

District

District

State

State

Country

Country

Pincode

Pincode

Mobile Number

Mobile Number

Save

Submit

Patient's Form

Previous

Next

Occupation Details:

Present Occupation

Mason

Specify Occupation

Specify Occupation

Duration of Exposure(in years)

Years

Building & Construction

Years

Mines

Years

Other

Specify Occupation

Specify Occupation

Save

Submit

Patient's Form

Previous

Next

Medical Details:

History of Smoking

Mild

Total Duration of Suffering

Duration of Suffering

Chief Complaints

Cough

Chief Complaints

Save

Submit

Patient's Form

Previous

Next

Medical Details:

Photograph

Browse...

No file selected.

Chest X-Evaluation Report

Browse...

No file selected.

CT Scan Report

Browse...

No file selected.

Save

Submit