Machine Learning Approach to Detect & Annotate Eye Diseases using Retinal Images 2023-162

Status Document

Perera H. A. N. S.

IT20166106

B.Sc. (Hons) Degree in Information Technology Specializing in Software Engineering

Department of Information Technology

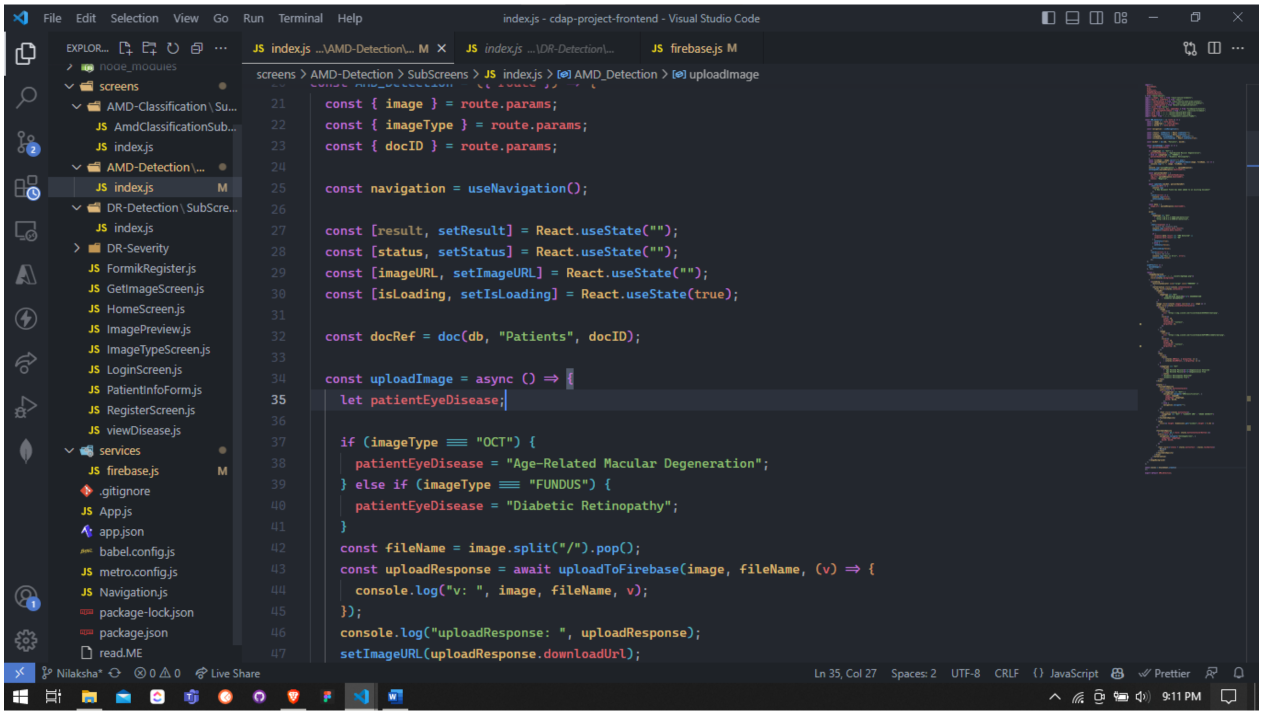
Sri Lanka Institute of Information Technology Sri Lanka

September 2023

Table of Contents

1. Project progress

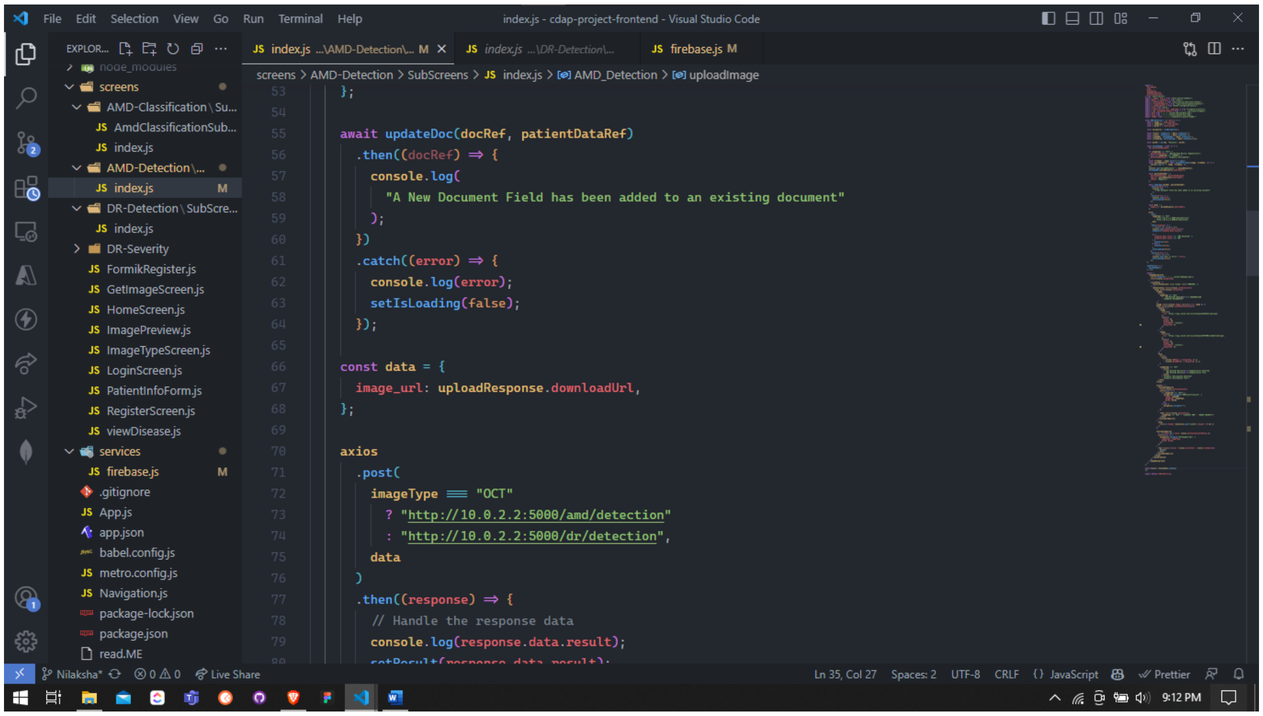
1.1 Frontend Implementation



index.js - cdap-project-frontend - Visual Studio Code
screens > AMD-Detection > SubScreens > index.js > AMD_Detection > uploadImage

```
  const { image } = route.params;
  const { imageType } = route.params;
  const { docID } = route.params;

  const navigation = useNavigation();

  const [result, setResult] = React.useState("");
  const [status, setStatus] = React.useState("");
  const [imageURL, setImageURL] = React.useState("");
  const [isLoading, setIsLoading] = React.useState(true);

  const docRef = doc(db, "Patients", docID);

  const uploadImage = async () => {
    let patientEyeDisease;

    if (imageType === "OCT") {
      patientEyeDisease = "Age-Related Macular Degeneration";
    } else if (imageType === "FUNDUS") {
      patientEyeDisease = "Diabetic Retinopathy";
    }
    const fileName = image.split("/").pop();
    const uploadResponse = await uploadToFirebase(image, fileName, (v) => {
      console.log("v: ", image, fileName, v);
    });
    console.log("uploadResponse: ", uploadResponse);
    setImageURL(uploadResponse.downloadUrl);
```

Figure 1 – Frontend Implementation

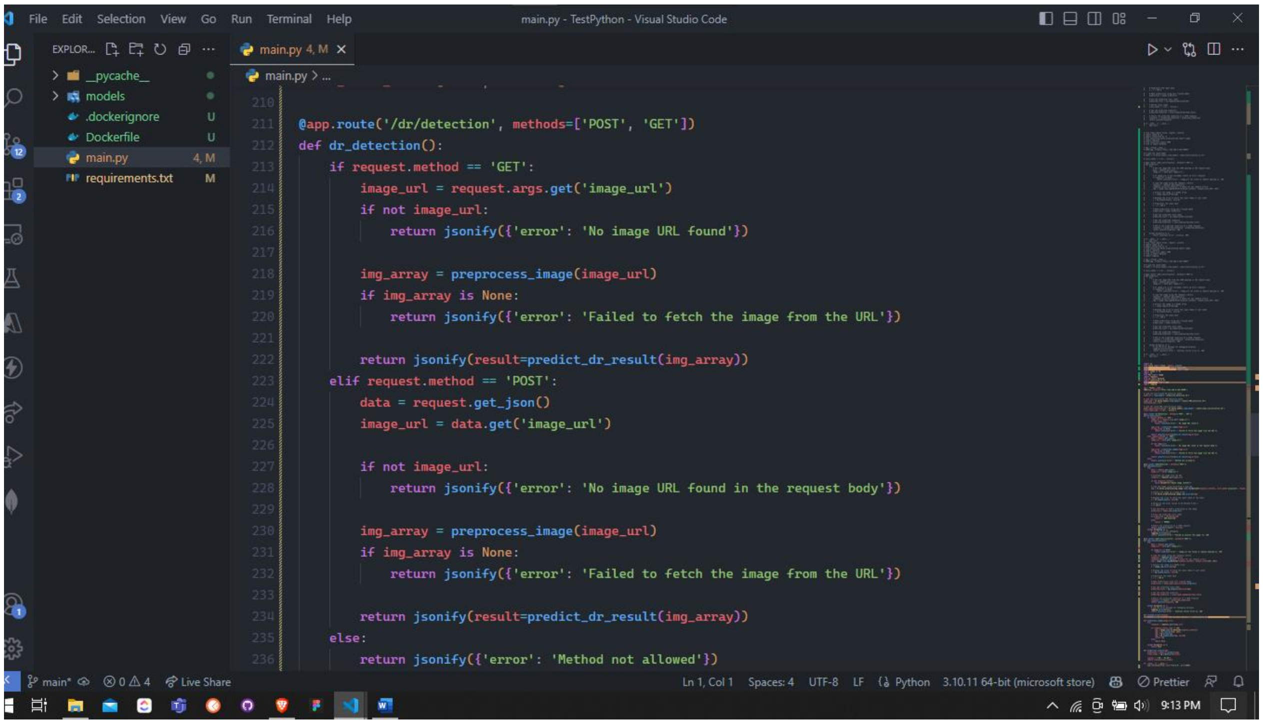


index.js - cdap-project-frontend - Visual Studio Code
screens > AMD-Detection > SubScreens > index.js > AMD_Detection > uploadImage

```
    };

    await updateDoc(docRef, patientDataRef)
      .then((docRef) => {
        console.log(
          "A New Document Field has been added to an existing document"
        );
      })
      .catch((error) => {
        console.log(error);
        setIsLoading(false);
      });

    const data = {
      image_url: uploadResponse.downloadUrl,
    };

    axios
      .post(
        imageType === "OCT"
          ? "http://10.0.2.2:5000/amd/detection"
          : "http://10.0.2.2:5000/dr/detection",
        data
      )
      .then((response) => {
        // Handle the response data
        console.log(response.data.result);
```

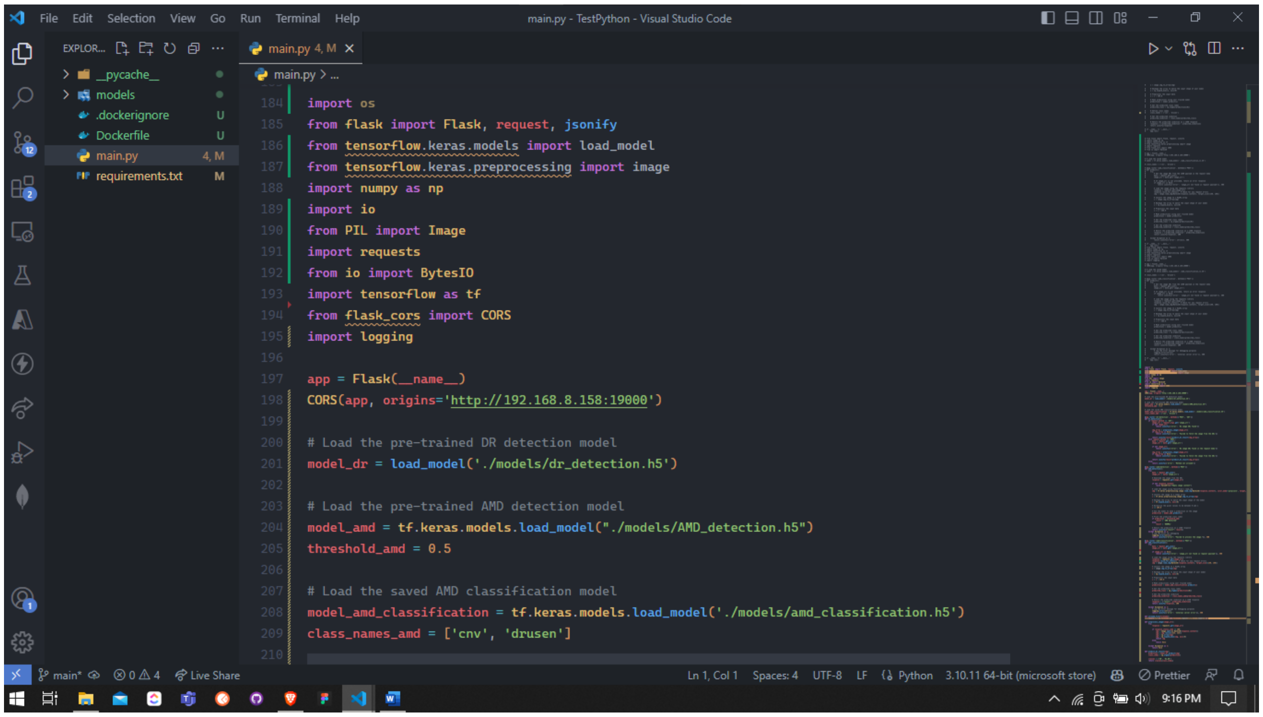
Figure 2- Frontend Implementation

1.2 Backend Implementation



```python

@app.route('/dr/detection', methods=['POST', 'GET'])
def dr_detection():
    if request.method == 'GET':
        image_url = request.args.get('image_url')
        if not image_url:
            return jsonify({'error': 'No image URL found'})

        img_array = preprocess_image(image_url)
        if img_array is None:
            return jsonify({'error': 'Failed to fetch the image from the URL'})

        return jsonify(result=predict_dr_result(img_array))
    elif request.method == 'POST':
        data = request.get_json()
        image_url = data.get('image_url')

        if not image_url:
            return jsonify({'error': 'No image URL found in the request body'})

        img_array = preprocess_image(image_url)
        if img_array is None:
            return jsonify({'error': 'Failed to fetch the image from the URL'})

        return jsonify(result=predict_dr_result(img_array))
    else:
        return jsonify({'error': 'Method not allowed'})
```

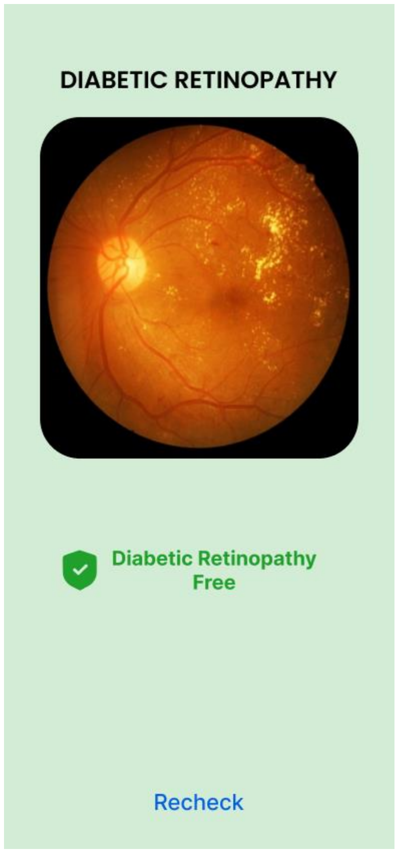
Figure 3 - Backend Implementation

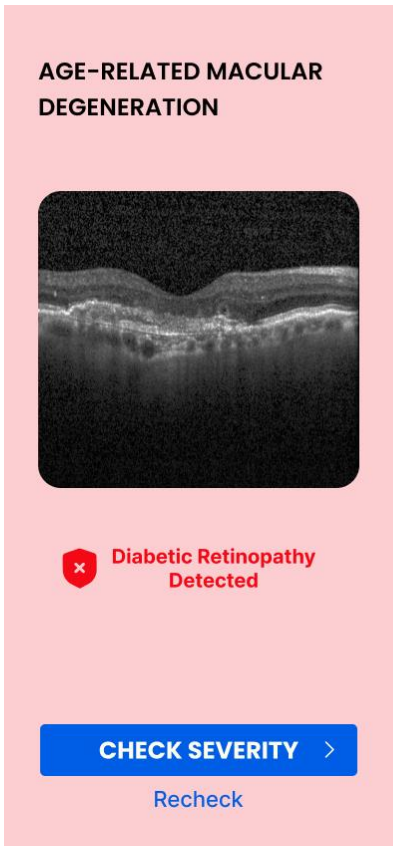


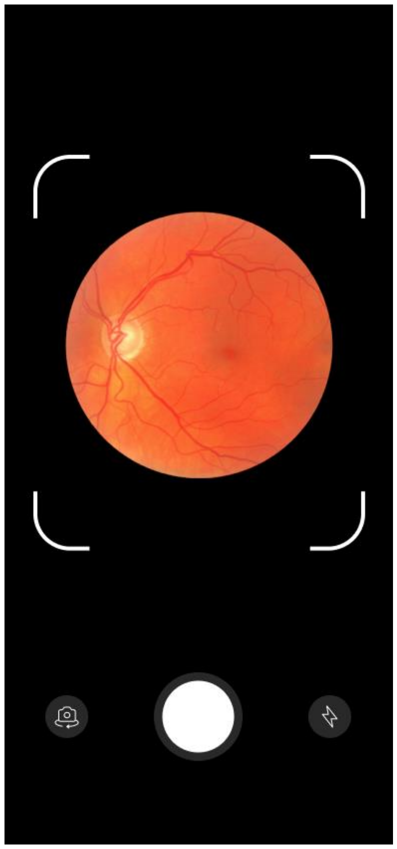
```python
import os
from flask import Flask, request, jsonify
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
import numpy as np
import io
from PIL import Image
import requests
from io import BytesIO
import tensorflow as tf
from flask_cors import CORS
import logging

app = Flask(__name__)
CORS(app, origins='http://192.168.8.158:19000')

# Load the pre-trained DR detection model
model_dr = load_model('./models/dr_detection.h5')

# Load the pre-trained AMD detection model
model_amd = tf.keras.models.load_model("./models/AMD_detection.h5")
threshold_amd = 0.5

# Load the saved AMD classification model
model_amd_classification = tf.keras.models.load_model('./models/amd_classification.h5')
class_names_amd = ['cnv', 'drusen']

```

Figure 4 - Backend Implementation

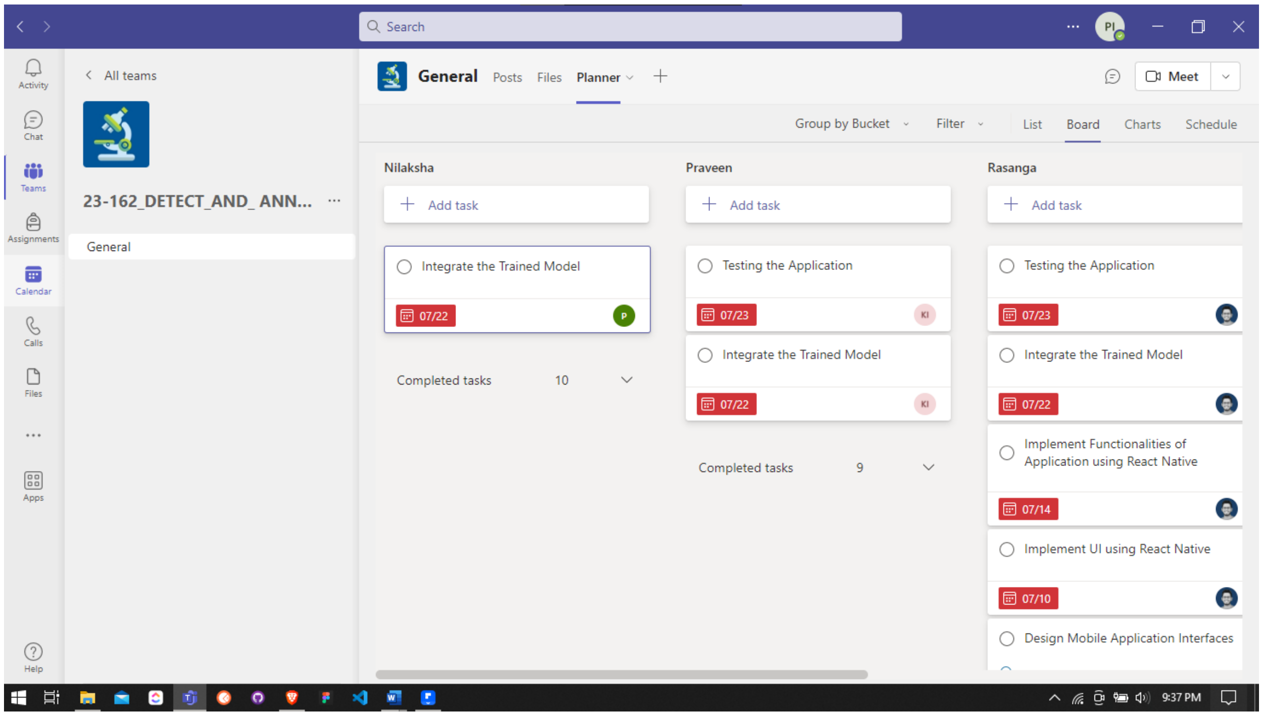
1.3 Mobile App UIs




AGE-RELATED MACULAR DEGENERATION
Diabetic Retinopathy Detected
CHECK SEVERITY
Recheck



2. Project View



Nilaksha

Add task

Integrate the Trained Model 07/22

Completed tasks 10

Praveen

Add task

Testing the Application 07/23

Integrate the Trained Model 07/22

Completed tasks 9

Rasanga

Add task

Testing the Application 07/23

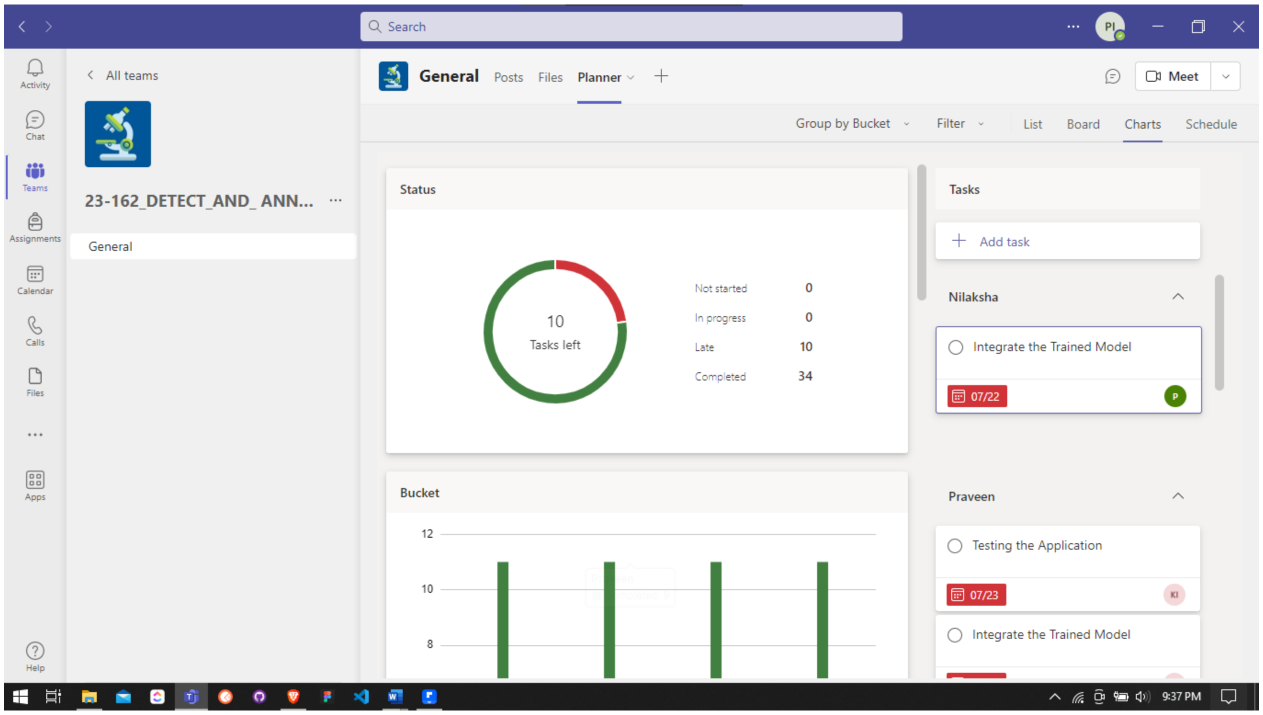
Integrate the Trained Model 07/22

Implement Functionalities of Application using React Native 07/14

Implement UI using React Native 07/10

Design Mobile Application Interfaces

Figure 6 – Planner - Task List View



Not started	0
In progress	0
Late	10
Completed	34

Tasks

Add task

Nilaksha

Integrate the Trained Model 07/22

Praveen

Testing the Application 07/23

Integrate the Trained Model

Figure 7 - Planner - Chart View

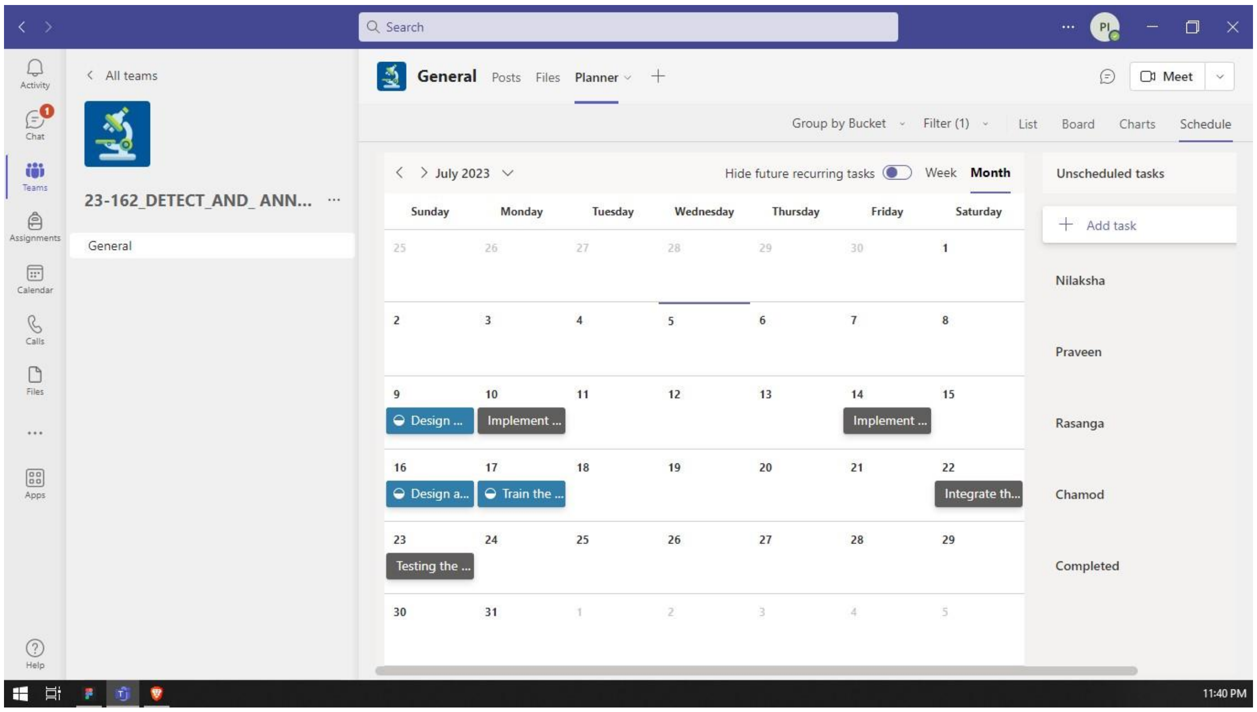


Figure 8 - Planner - Schedule View

3. Gantt chart

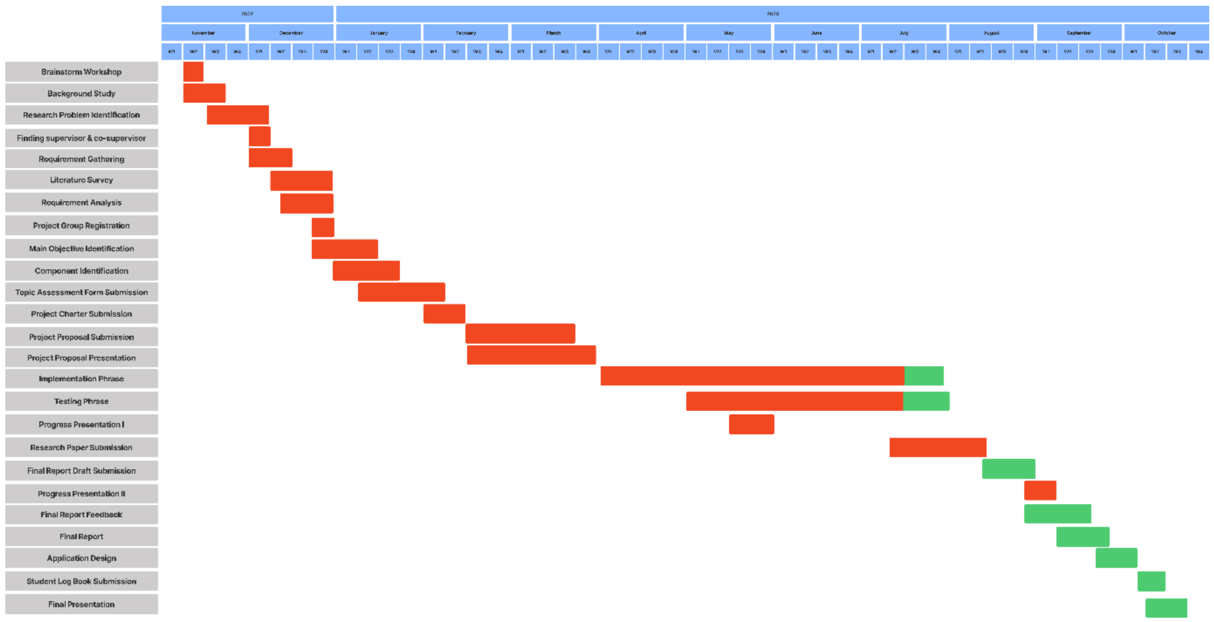
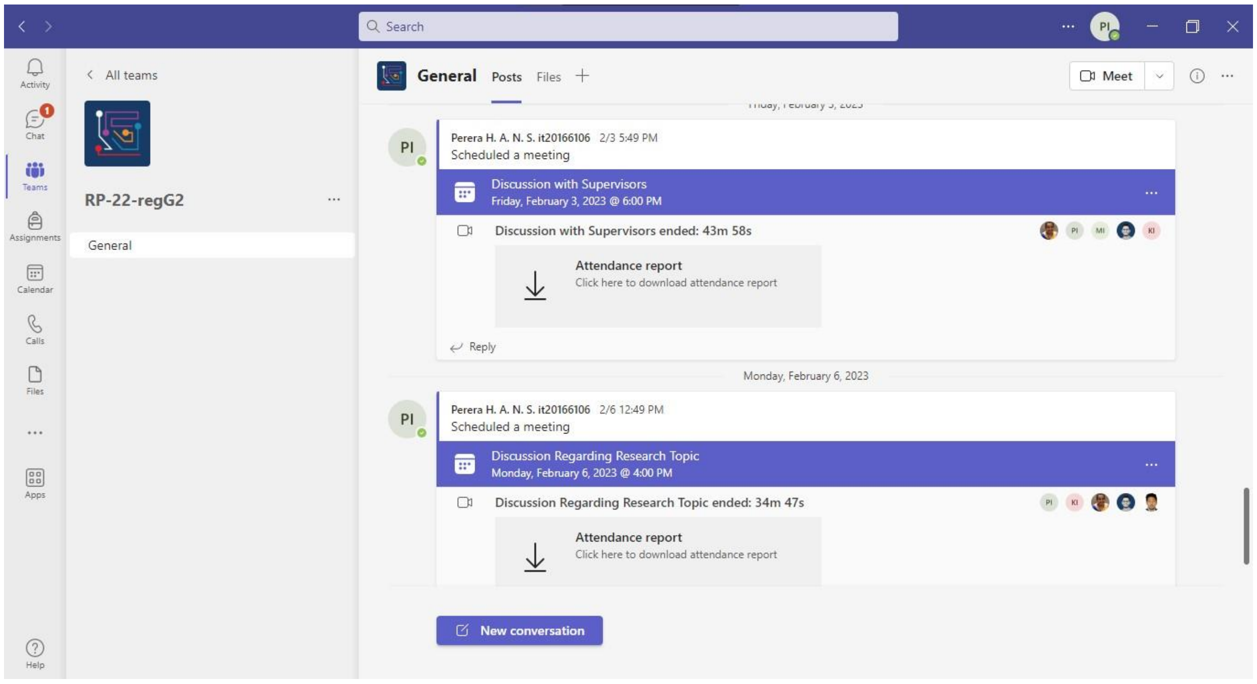


Figure 9 - Gantt Chart

4. Screenshots of Conversations and Calls - Microsoft Teams

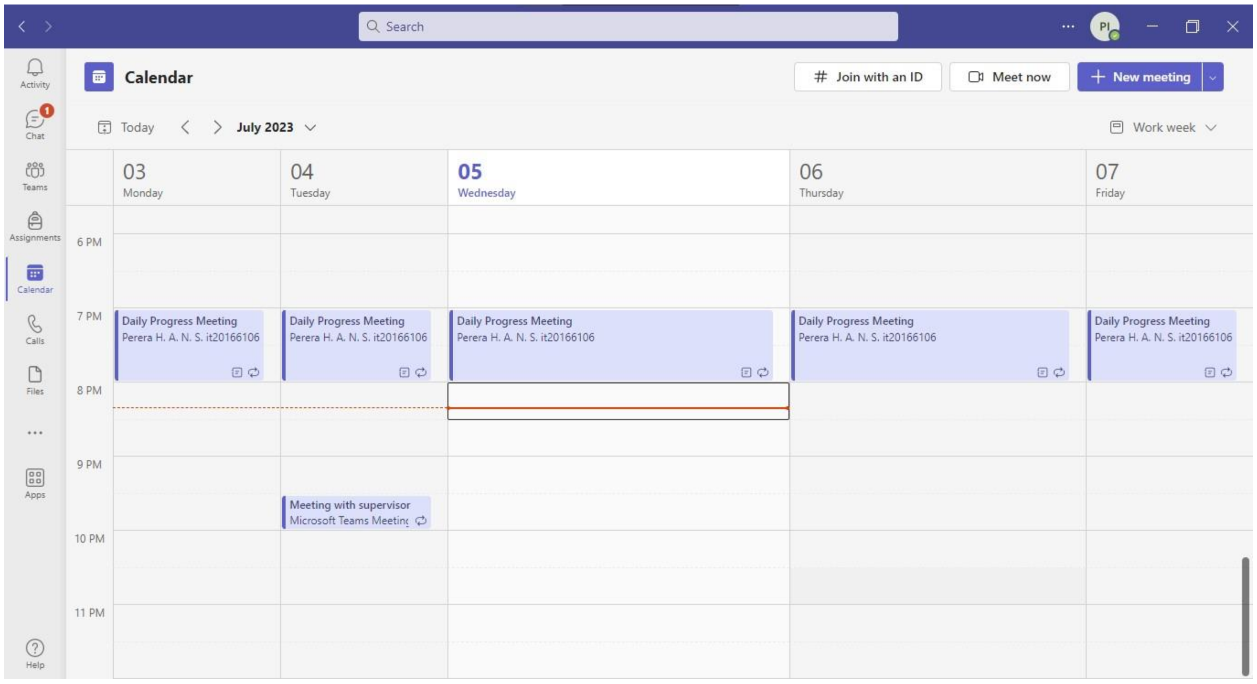


Perera H. A. N. S. it20166106 2/3 5:49 PM
Scheduled a meeting
Discussion with Supervisors
Friday, February 3, 2023 @ 6:00 PM
Discussion with Supervisors ended: 43m 58s
Attendance report
Click here to download attendance report
Reply

Monday, February 6, 2023

Perera H. A. N. S. it20166106 2/6 12:49 PM
Scheduled a meeting
Discussion Regarding Research Topic
Monday, February 6, 2023 @ 4:00 PM
Discussion Regarding Research Topic ended: 34m 47s
Attendance report
Click here to download attendance report

Figure 10 - MS Teams Channel



03 Monday	04 Tuesday	05 Wednesday	06 Thursday	07 Friday
Daily Progress Meeting Perera H. A. N. S. it20166106	Daily Progress Meeting Perera H. A. N. S. it20166106	Daily Progress Meeting Perera H. A. N. S. it20166106	Daily Progress Meeting Perera H. A. N. S. it20166106	Daily Progress Meeting Perera H. A. N. S. it20166106
	Meeting with supervisor Microsoft Teams Meeting			

Figure 11 -Scheduled Meetings

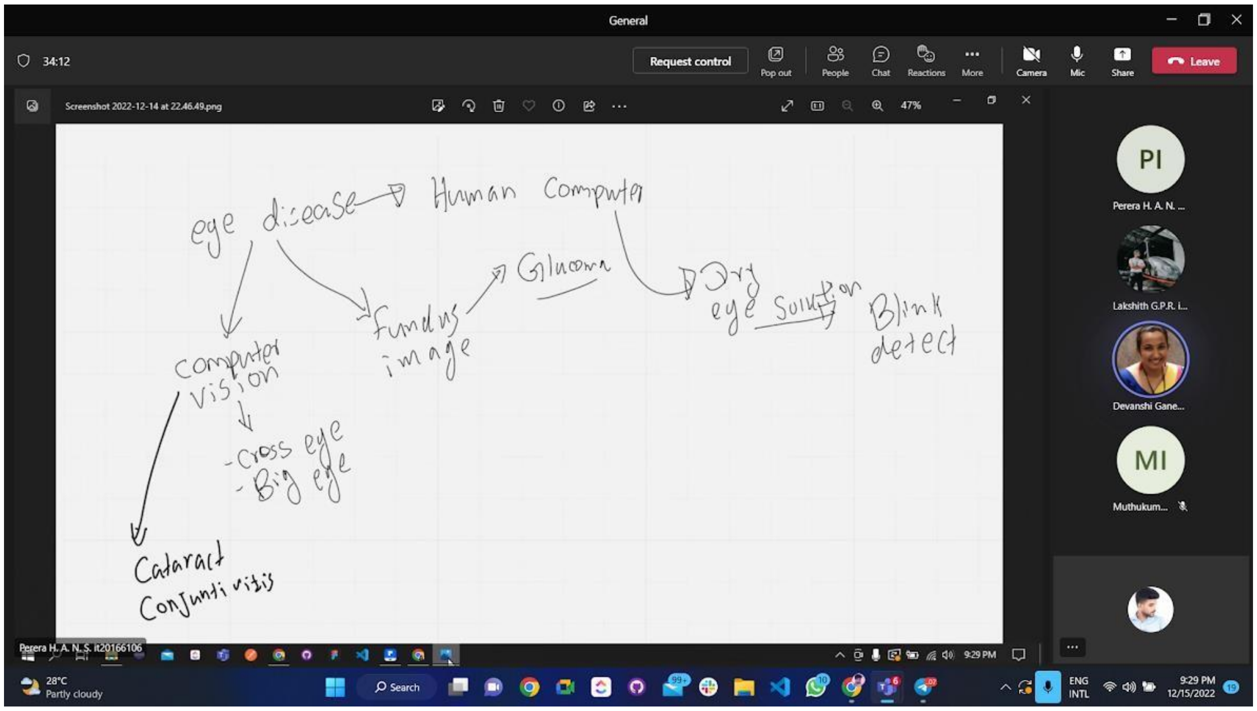


Figure 12 -Meetings with Supervisors