Skin Health Monitoring: Detection and Early Intervention for skin diseases

This is our team

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CONTENT

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- RESEARCH PROBLEM
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BACKGROUND

Skin tone diversity enriches human culture but complicates diagnosis and management of skin issues.

Visual inspection and subjective assessments dominate current diagnostic approaches, leading to misdiagnosis and inappropriate treatment.

Access to professional dermatological care is limited, necessitating accessible home remedies.

INTRODUCTION

Skin issues affect millions worldwide, yet accurate diagnosis based on skin tone remains challenging.

Current diagnostic methods lack precision and accessibility, hindering effective treatment.

Clear guidance on affordable and practical home remedies is also lacking.

RESEARCH PROBLEM

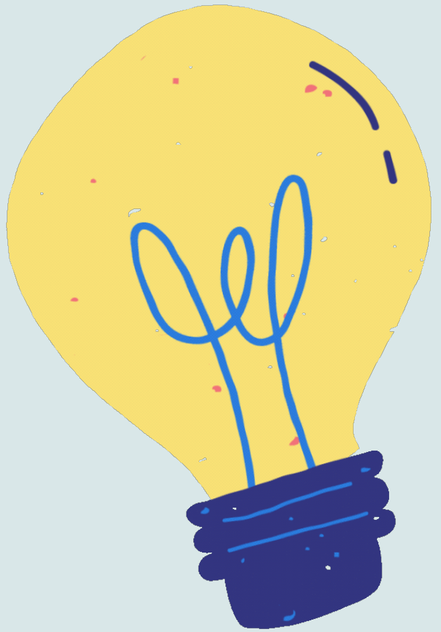
- To help with skin problems, we need better ways to figure out what type of skin issue someone has based on their skin tone and color.

- Right now, it's hard to find easy and accurate ways to do this, making it tough to get the right treatment.

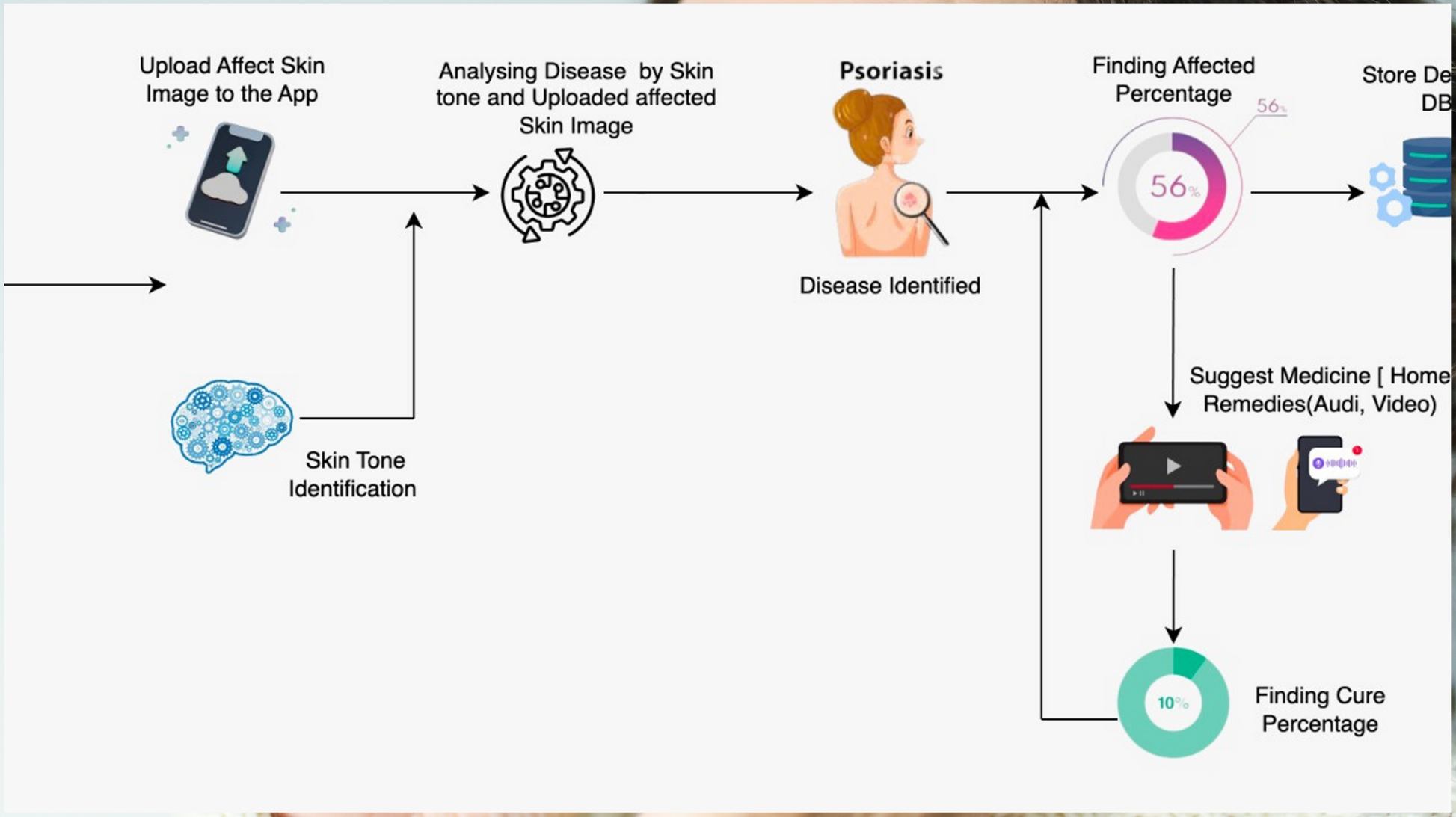
- People also don't have clear advice on how to take care of their skin issues, especially when they want affordable and easy solutions at home.

OBJECTIVES

Identifies the disease based on the skin tone of the person and it gives the stage of the disease and provides a solution suitable for the disease



SYSTEM DIAGRAM



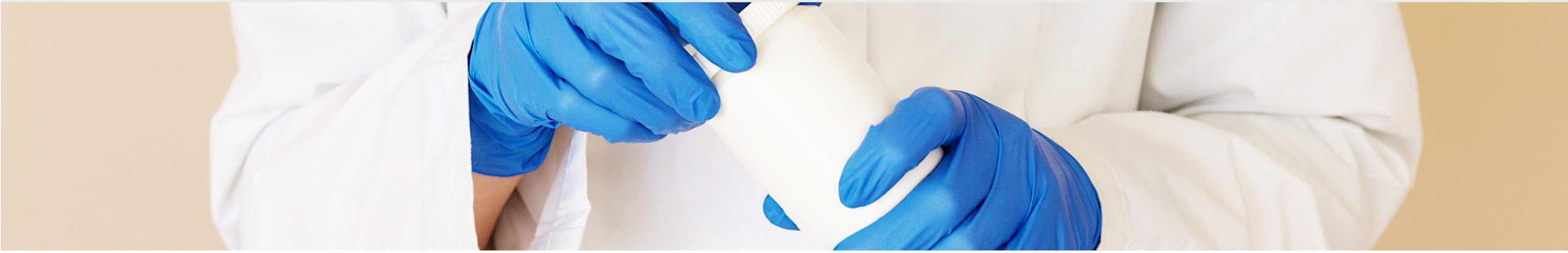
RESEARCH GAP

While there is a growing need for accessible and accurate methods to diagnose skin issues based on skin tone, existing approaches are often limited in their effectiveness and accessibility. Additionally, there is a lack of clear guidance on affordable and easy-to-use home remedies for managing various skin problems.

RESEARCH QUESTION

What methods can be developed to accurately identify different types of skin issues based on an individual's skin tone and color, considering the limitations in current diagnostic approaches?

Predicting the skin disease based on the skin tone using the image uploaded & Web Scraping



INTRODUCTION

Identifying skin diseases based on skin tone can be intricate due to the broad spectrum of pigmentation among individuals. While melanin levels influence skin tone, using it as the sole criterion for diagnosis may lead to inaccuracies. Therefore, a holistic approach integrating various factors such as symptoms, medical history, and diagnostic tests is imperative for precise identification and tailored treatment of skin conditions across diverse skin tones.

Research Problems

- Limited Awareness and Self-Treatment Practices
- Subjectivity in Traditional Diagnostic Approaches
- Inadequate Predictive Capabilities
- Insufficient Public Health Insights

Research Gap

- Holistic Predictive Models
- User-Friendly Integration
- In-depth Evaluation and Validation
- Public Health Impact Assessment

OBJECTIVES

Main Objective

Identifying skin disease of different skin tones based on the image uploaded.

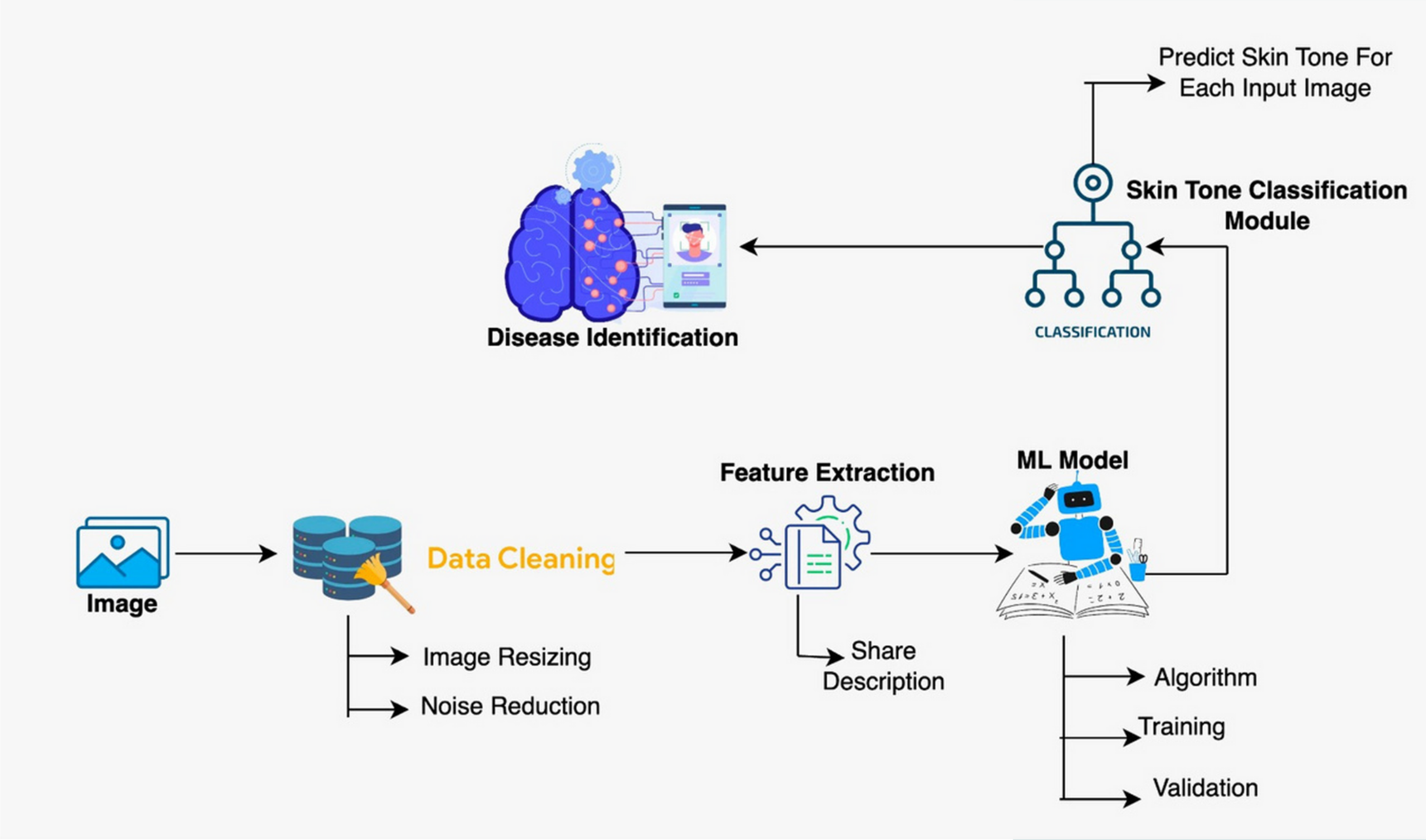
Sub Objectives

- Predict User's Skin Tone
- Image-Based Skin Disease Identification
- Duration Prediction for Identified Skin Diseases
- Web Scraping for Public Awareness

METHODOLOGY

- INDIVIDUAL SYSTEM ARCHITECTURE
- TOOLS AND TECHNOLOGIES
- REQUIREMENTS
- CURRENT PROGRESS
- NEXT EXPECTED PROGRESS

INDIVIDUAL SYSTEM ARCHITECTURE



TOOLS & TECHNOLOGY

Language : Python

Frontend : Flutter

Libraries : Tensorflow, CNN, Seaborn, Matplotlib, Keras

REQUIREMENTS

- Functional Requirements : Extract images from scanned images
- Non Functional Requirements : Accuracy, Speed, Scalability, Reliability
- System Requirements : Any IOS or Android devices with 2GB of RAM, Camera, and internet connectivity.
- User Requirements : Simple interface, Easy to operate

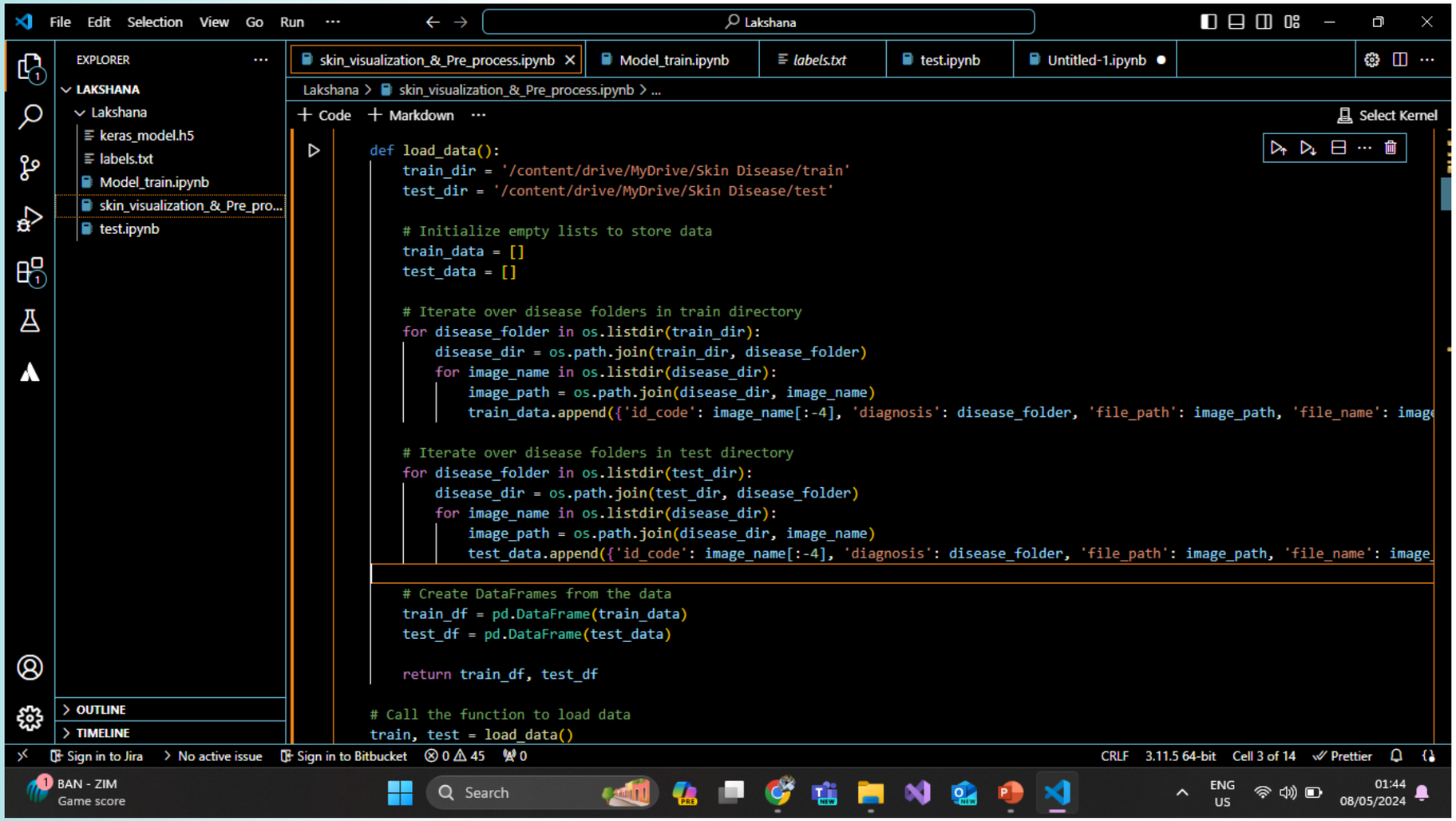
CURRENT PROGRESS

- Acquired a dataset to ensure the model produces precise predictions
- Utilizing the image processing algorithms, I've constructed a prediction model
- API Deployment
- Implemented mobile application and integrated frontend and backend

NEXT EXPECTED PROGRESS

- Testing the application
- Bug fixing
- Enhancing the UI of the application

DATASET PREVIEW



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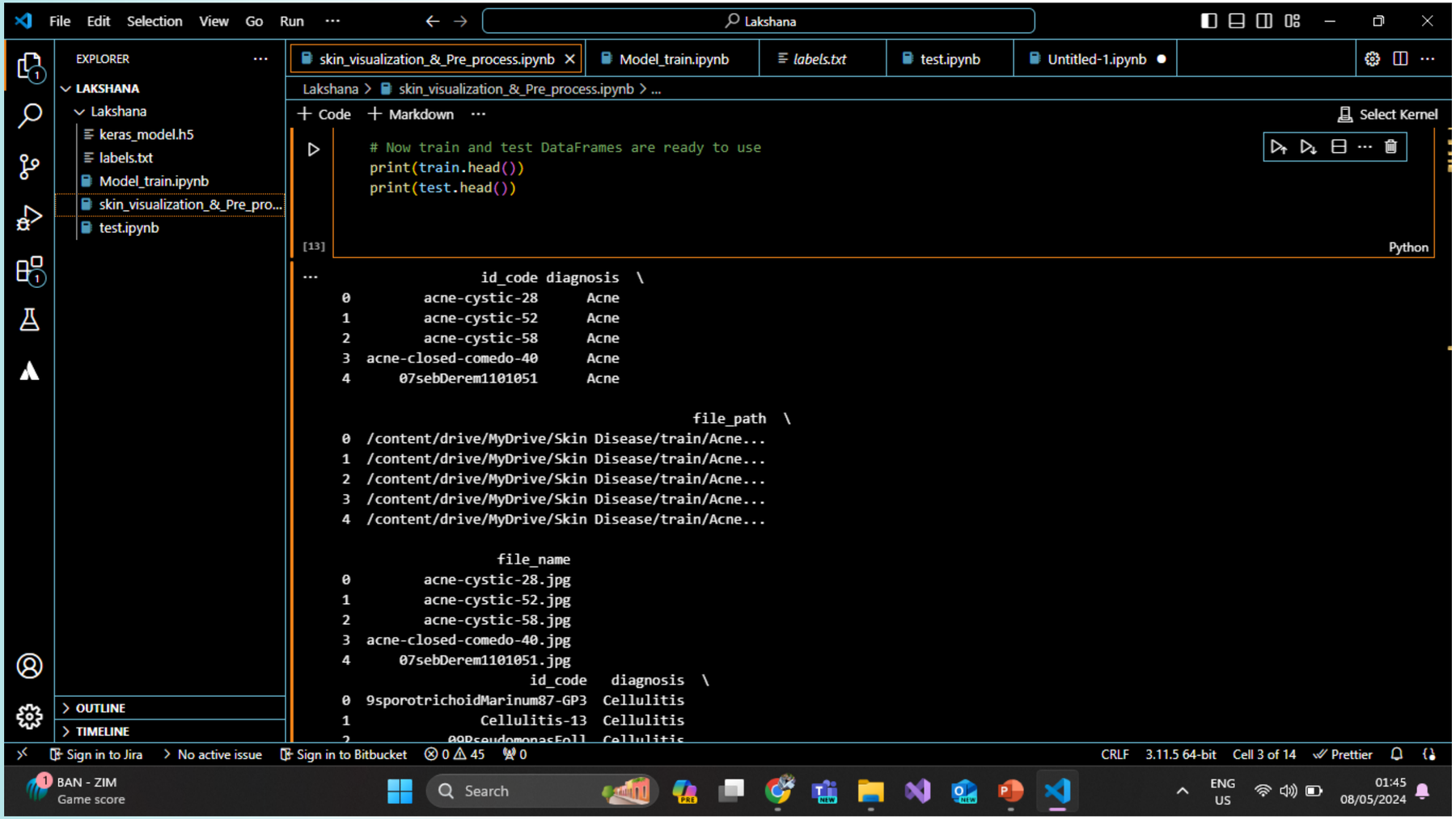
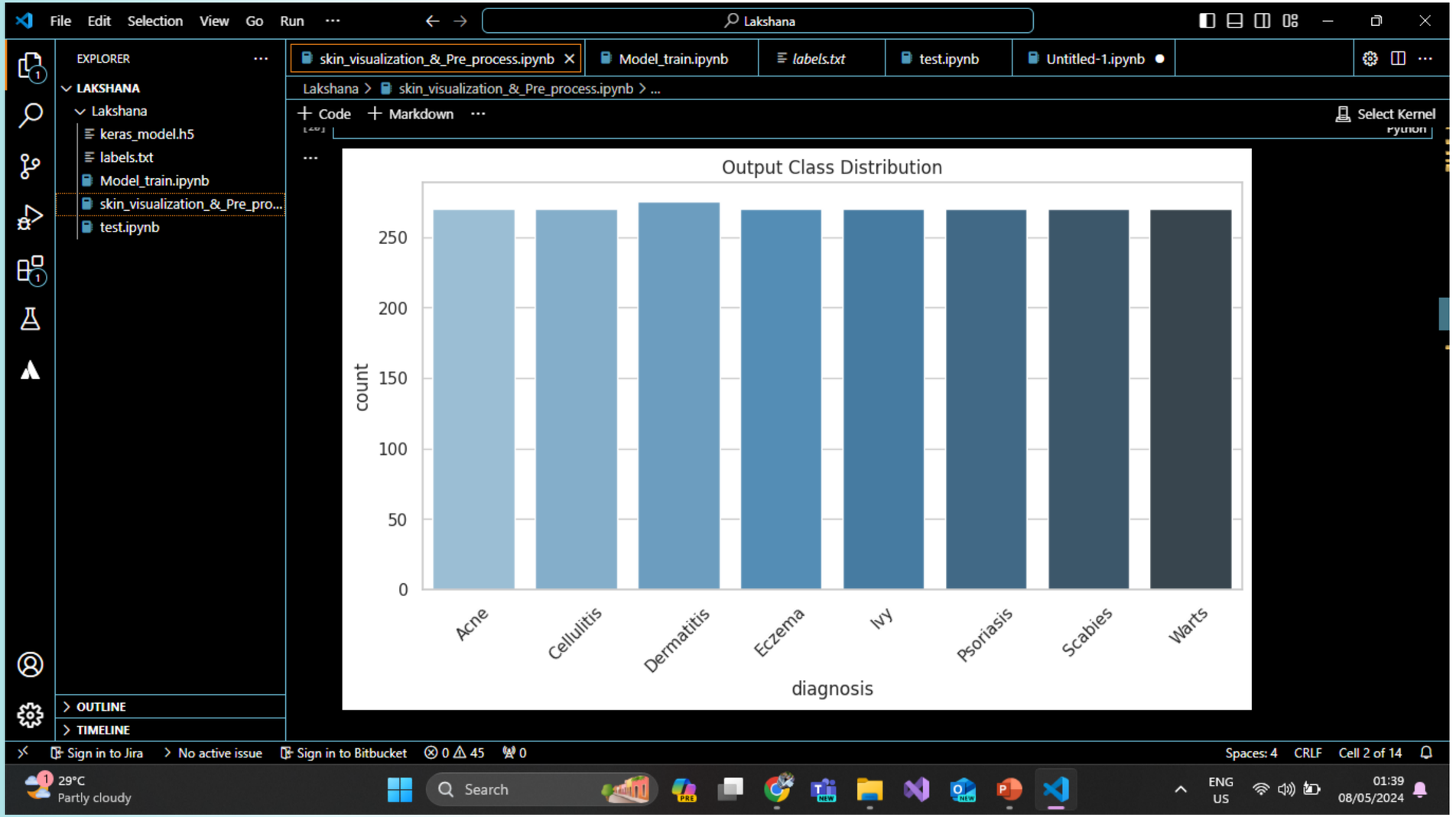


COMPLETION OF CODE



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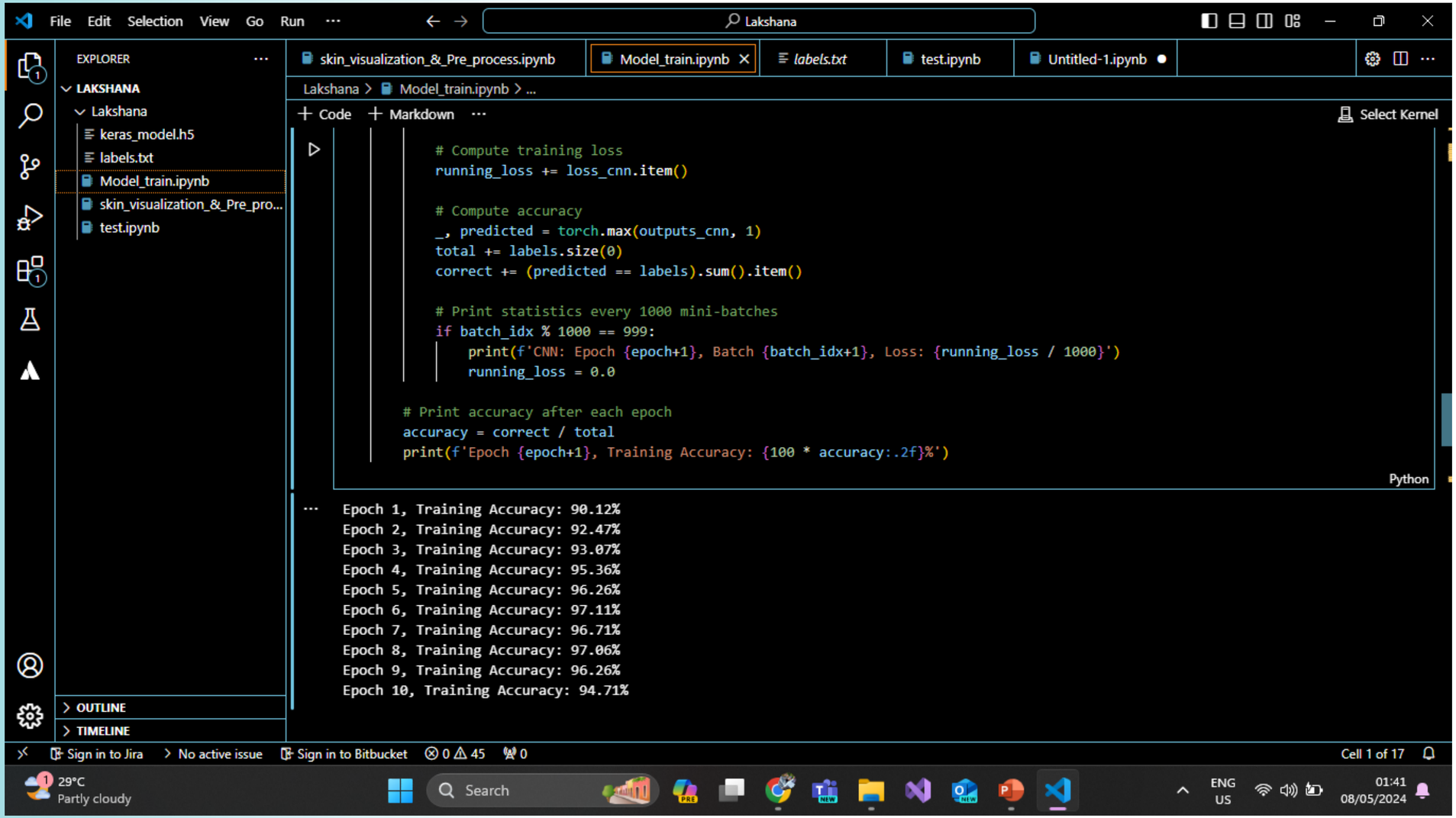

COMPLETION OF CODE

EXAMPLE OF PREDICTED IMAGES

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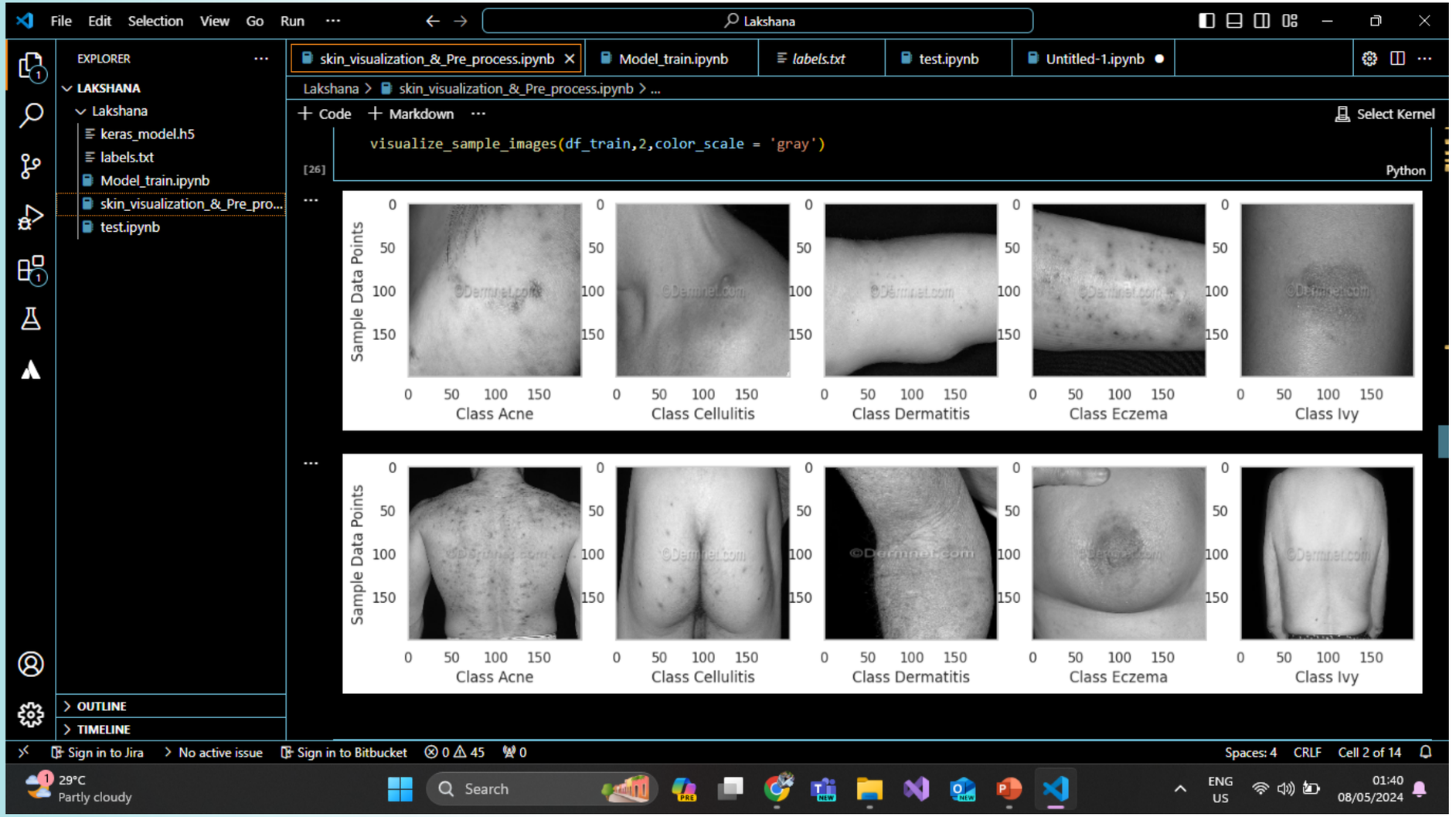
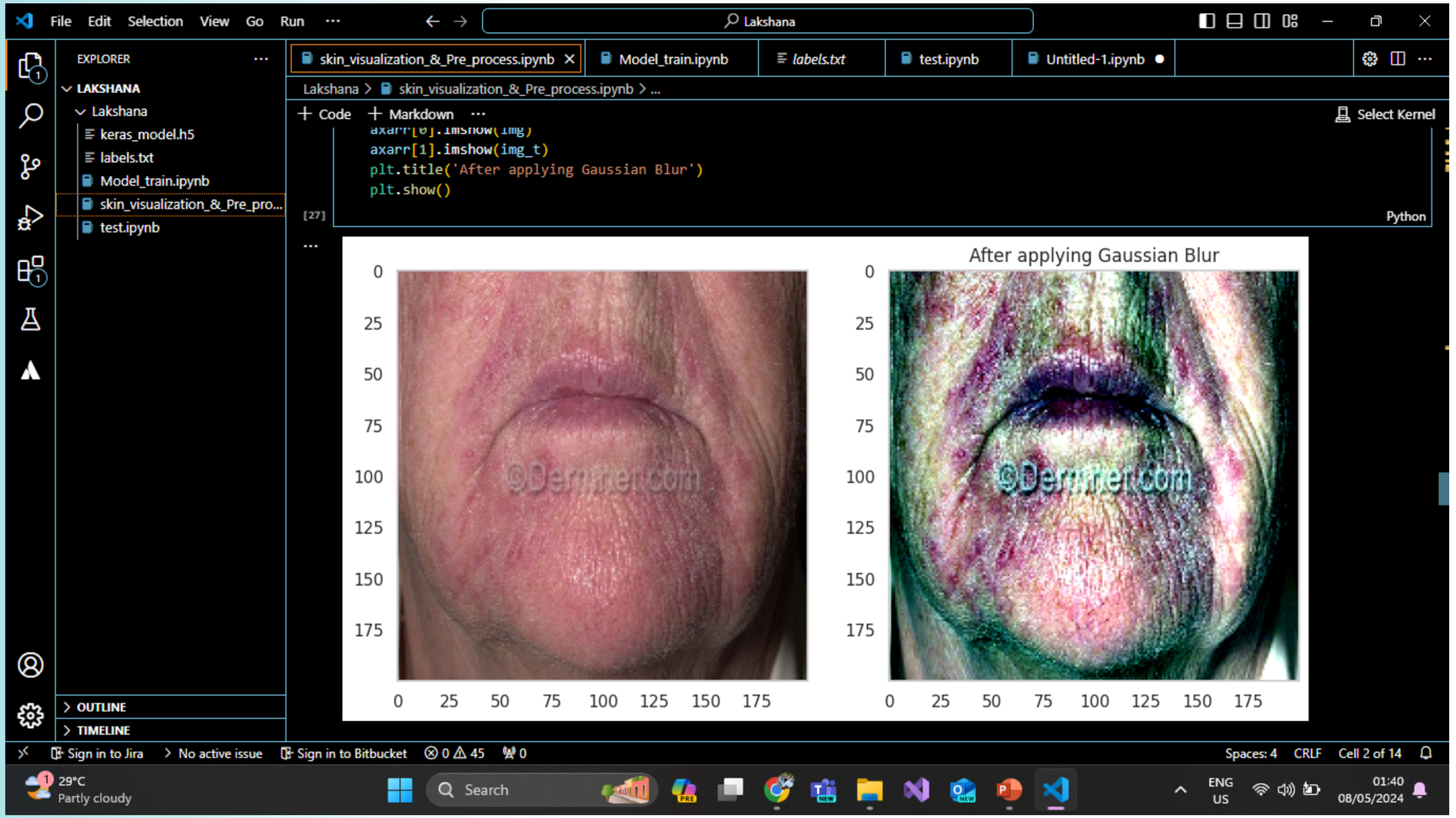


EXAMPLE OF PREDICTED IMAGES

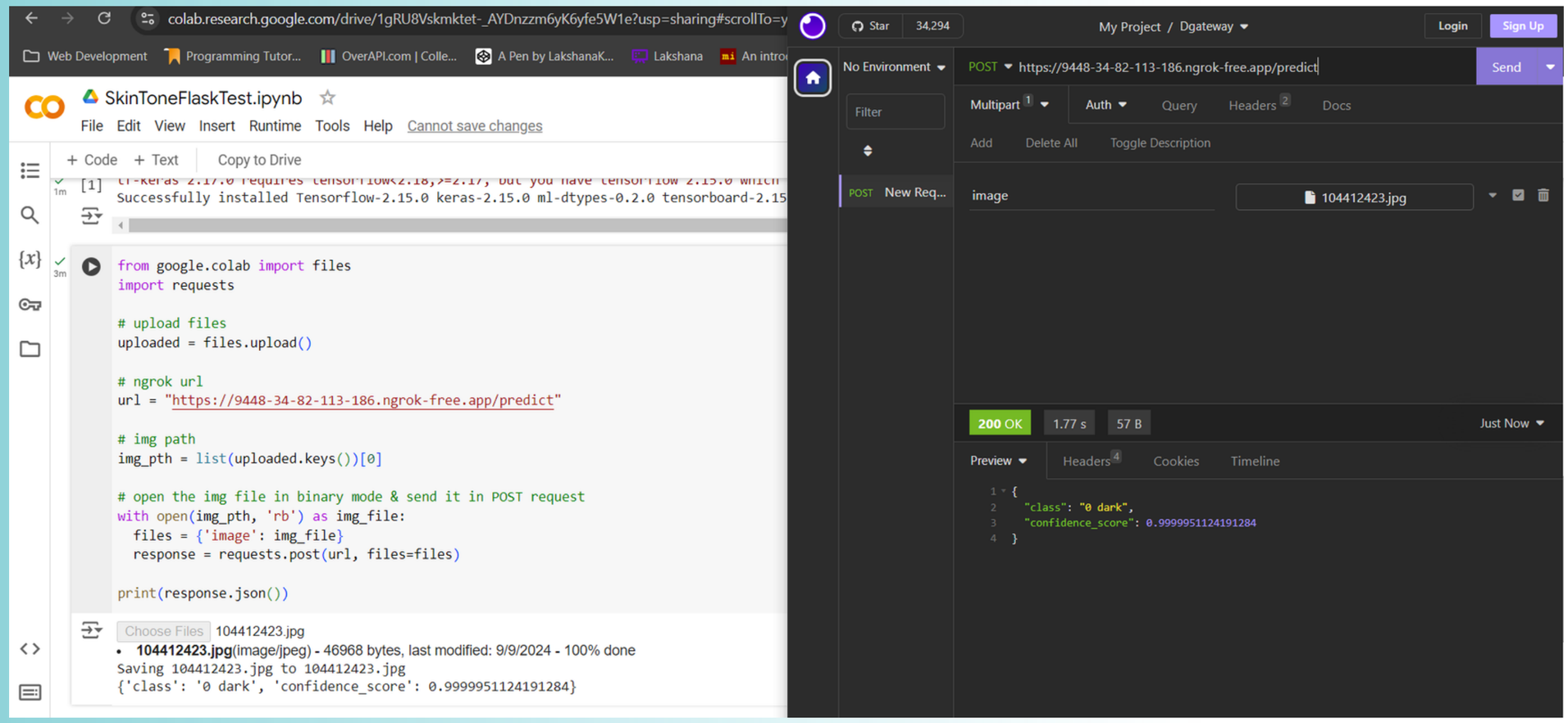


Integration with Flask API


```python
from flask import Flask, request, jsonify
from keras.models import load_model
from PIL import Image, ImageOps
import numpy as np
import io
from pyngrok import ngrok

app = Flask(__name__)

# Load the model
model = load_model('/content/drive/MyDrive/models/skin_tone/skin tone model.h5', compile=False)

# Load the labels
with open('/content/drive/MyDrive/models/skin_tone/skin tone labels.txt', 'r') as file:
    class_names = file.read().splitlines()

# Define a function to preprocess image data
def preprocess_image(image_data):
    # Load image
    image = Image.open(io.BytesIO(image_data)).convert("RGB")
    # Resize and crop the image
    size = (224, 224)
    image = ImageOps.fit(image, size, Image.Resampling.LANCZOS)
    # Convert image to a numpy array
    image_array = np.asarray(image)
    # Normalize the image
    normalized_image_array = (image_array.astype(np.float32) / 127.5) - 1
    # Create the array with the right shape
    data = np.ndarray(shape=(1, 224, 224, 3), dtype=np.float32)
```

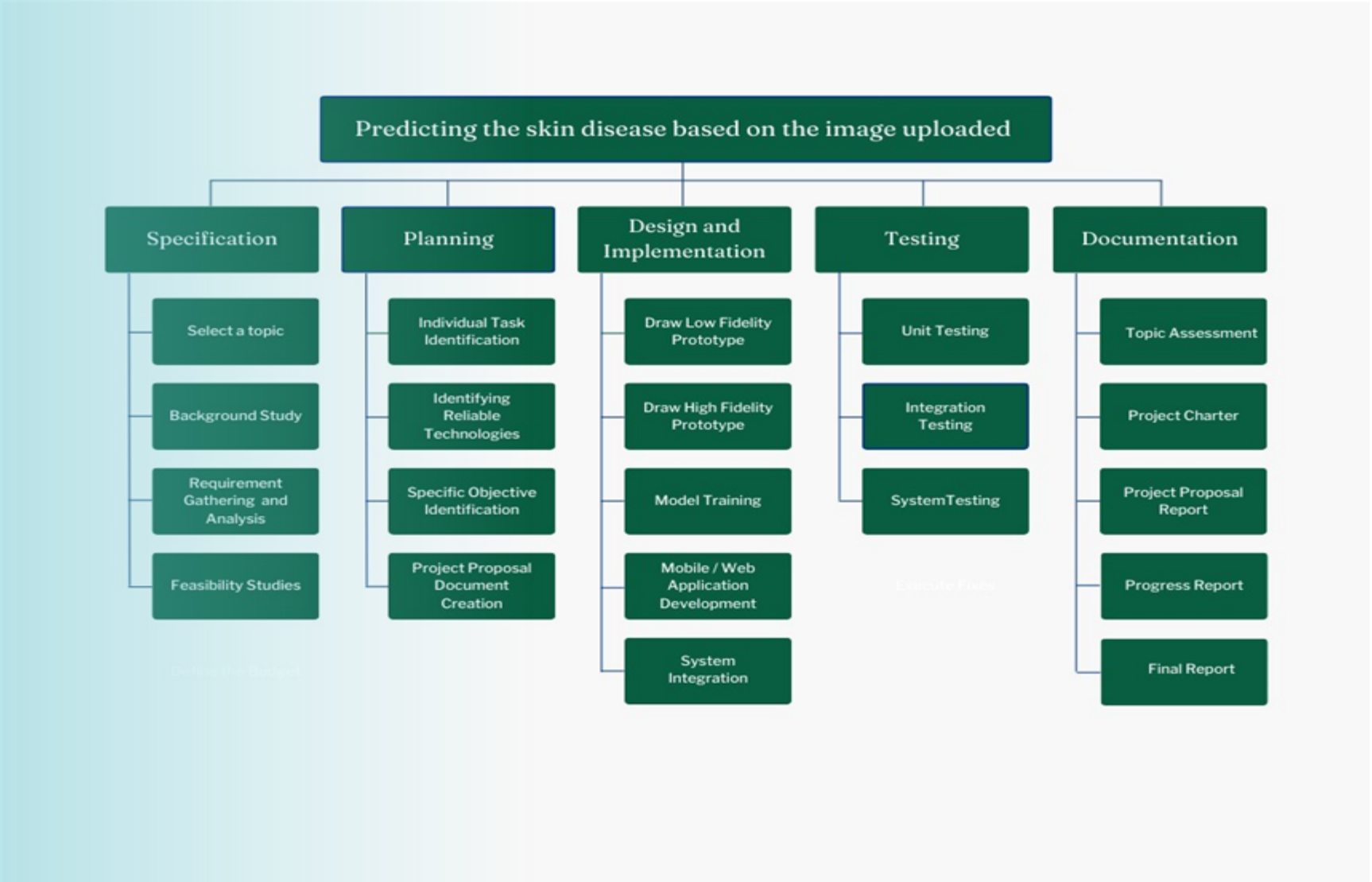
Integration with NGROK

Testing the API



Storing the API URL in Firebase

WORK BREAKDOWN STRUCTURE



Determine the stage of the disease

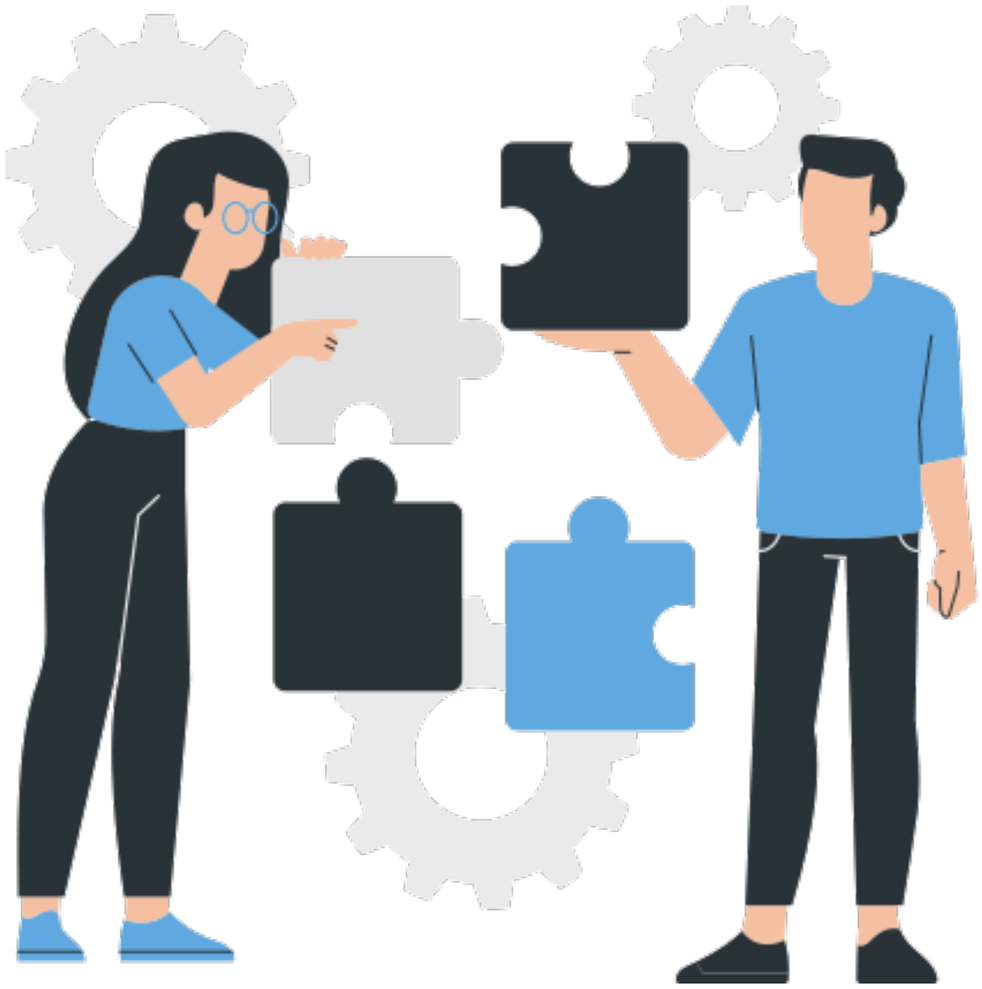
1.INTRODUCTION

My contribution is to develop a model to do Calculation of effective percentage and cure percentage

1. Analyze and clean dataset.
2. Develop a model using the most accurate algorithms.
3. Evaluate the model through testing and outcome prediction.
4. Validate the model's effectiveness.

Research Problems

Identify the skin dieses stages initial & Chronic



Research Gap

Identify the skin disease stages

1.initial

2.Chronic

OBJECTIVES

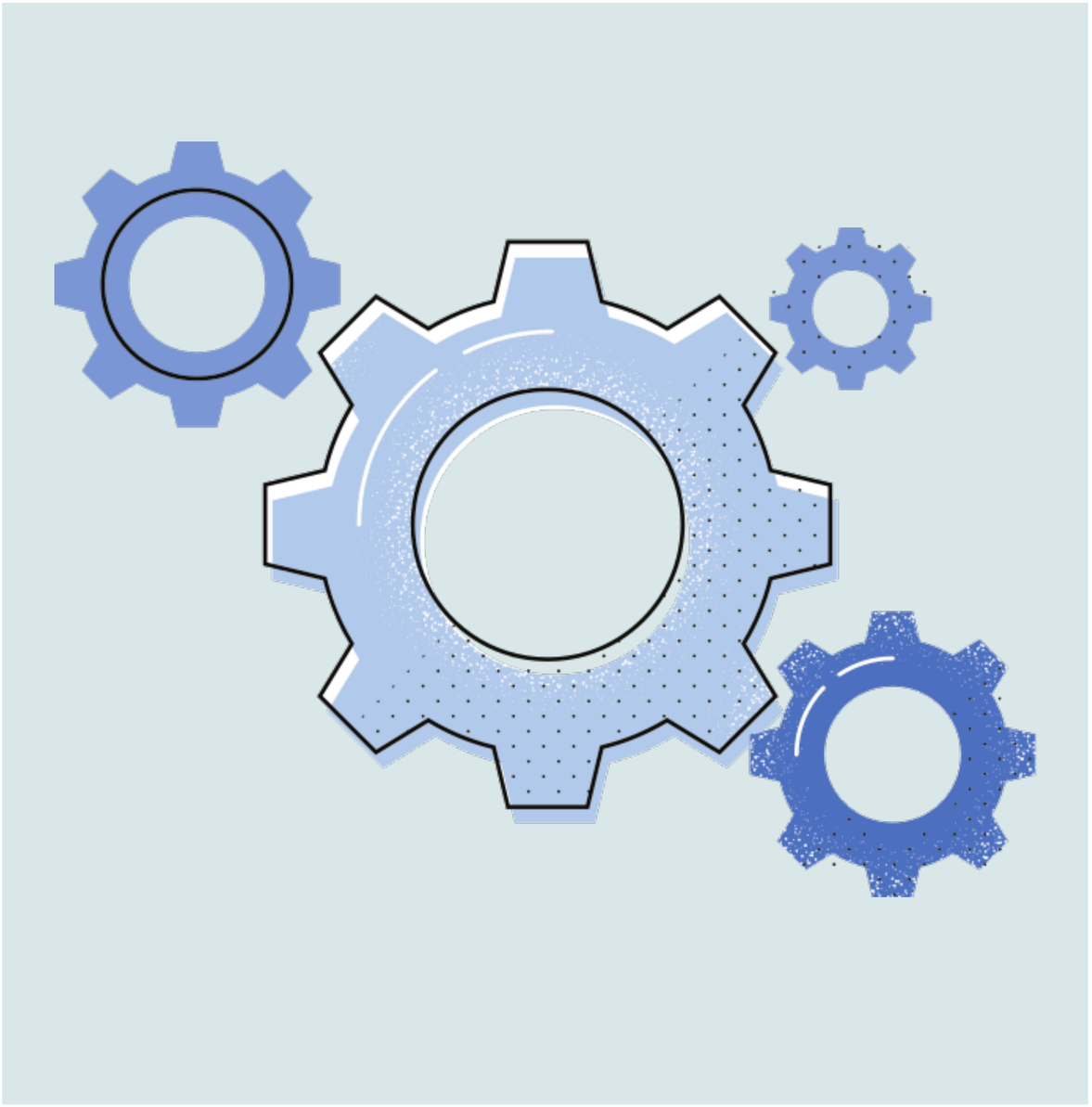
Main Objectives

Disease Identification

Stage Classification

Sub Objectives

Add validation



METHODOLOGY

Data Collection

Image Preprocessing

Machine Learning Model Training

Feature Extraction

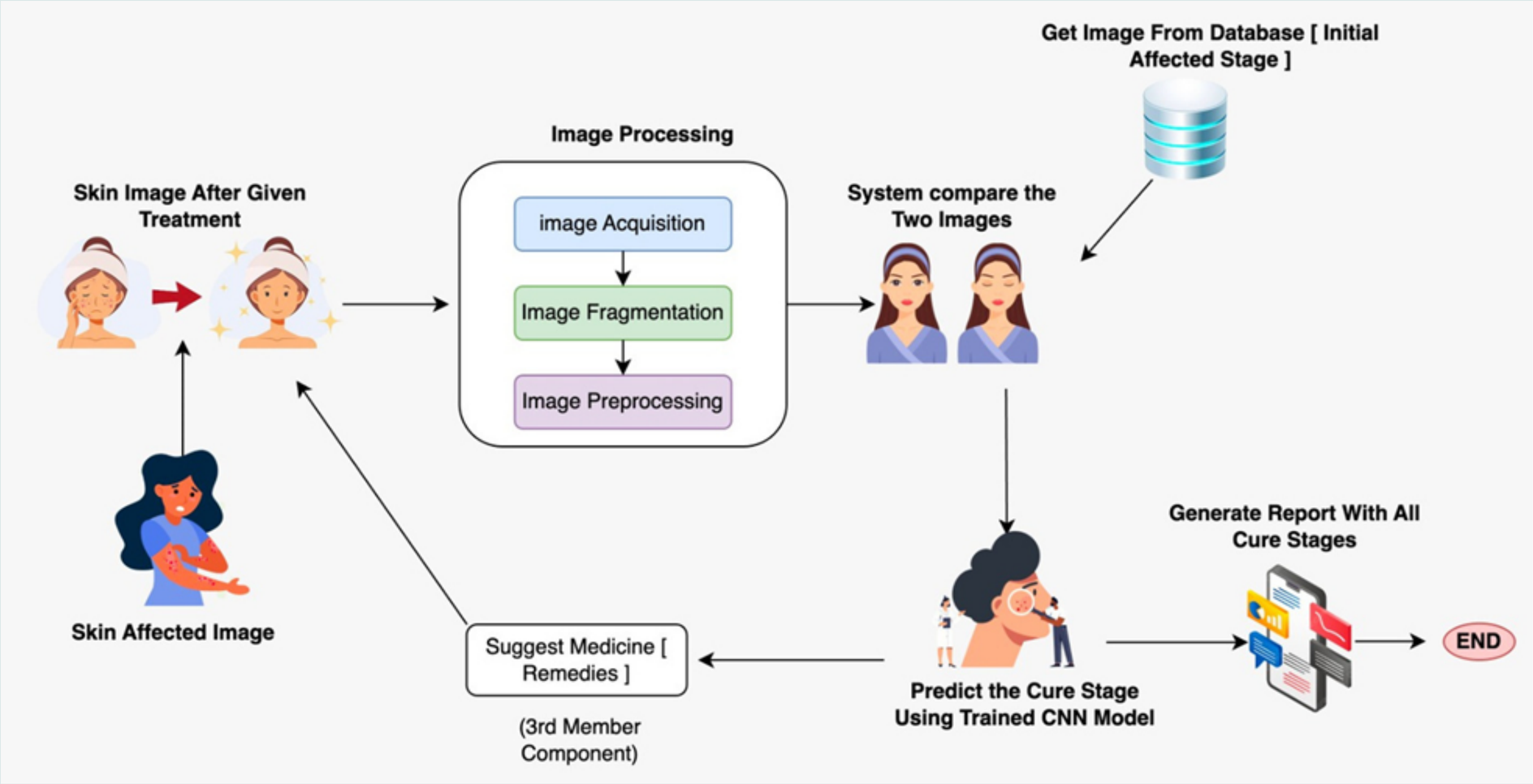
Model Integration

User Interface Design

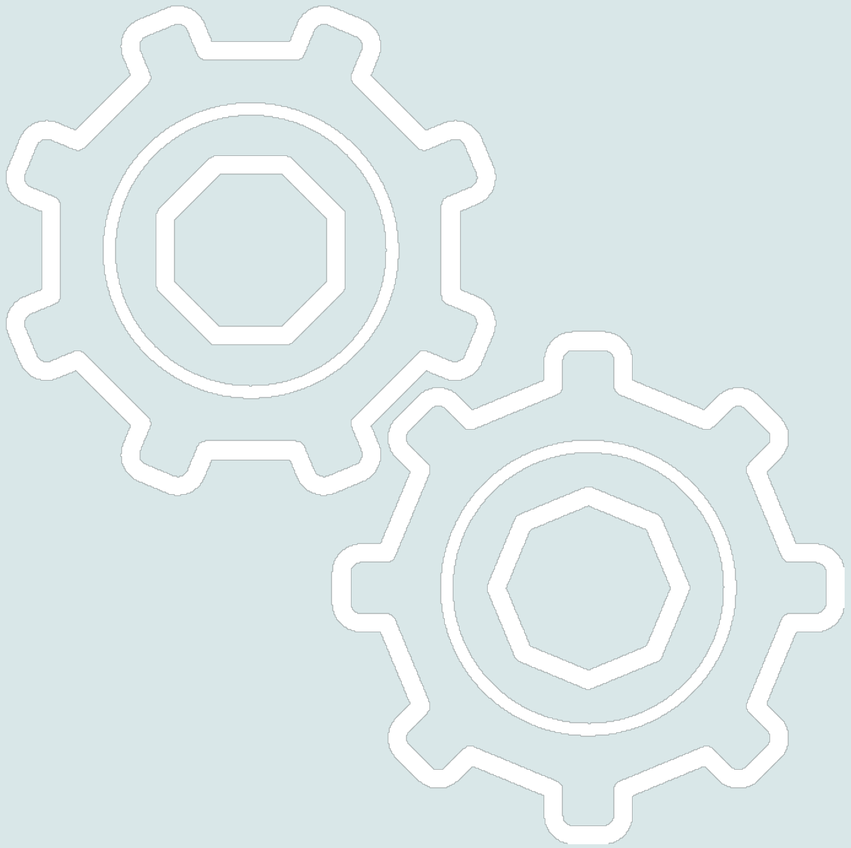
Deployment and Maintenance

Validation and Testing

INDIVIDUAL SYSTEM ARCHITECTURE



TOOLS & TECHNOLOGY

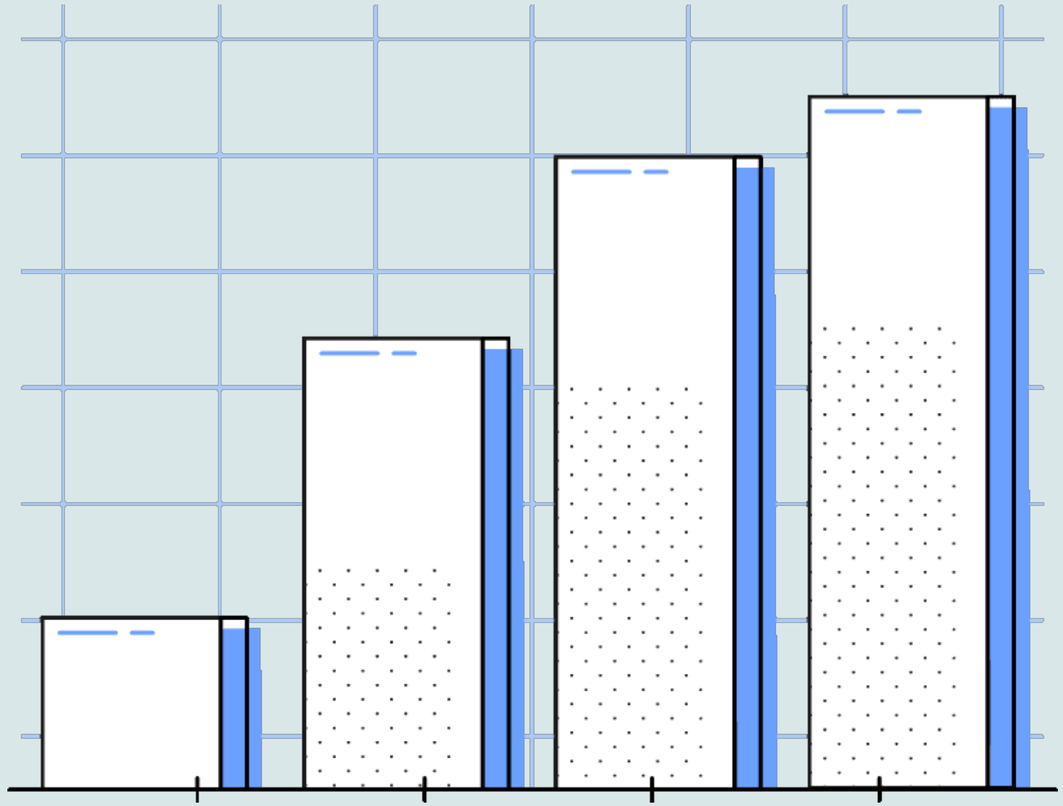


1. Tensorflow
2. Python
3. Numpy
4. Google drive
5. Git
6. Image augmentation
7. Flutter

CURRENT PROGRESS

1.data collection(process)

2.model training
(Dermatitis Chronic & Tenia Chronic & Binary Validation)

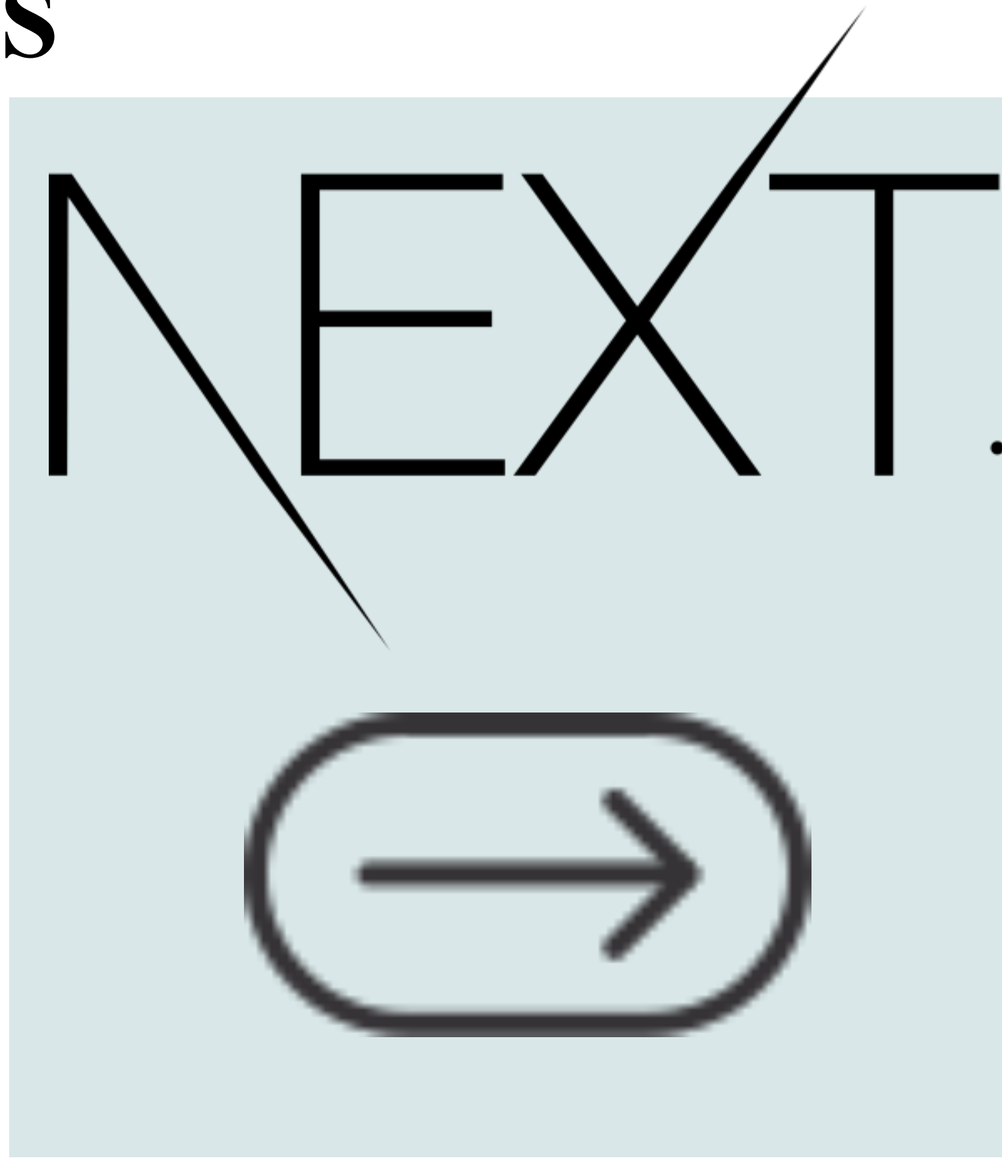


NEXT EXPECTED PROGRESS

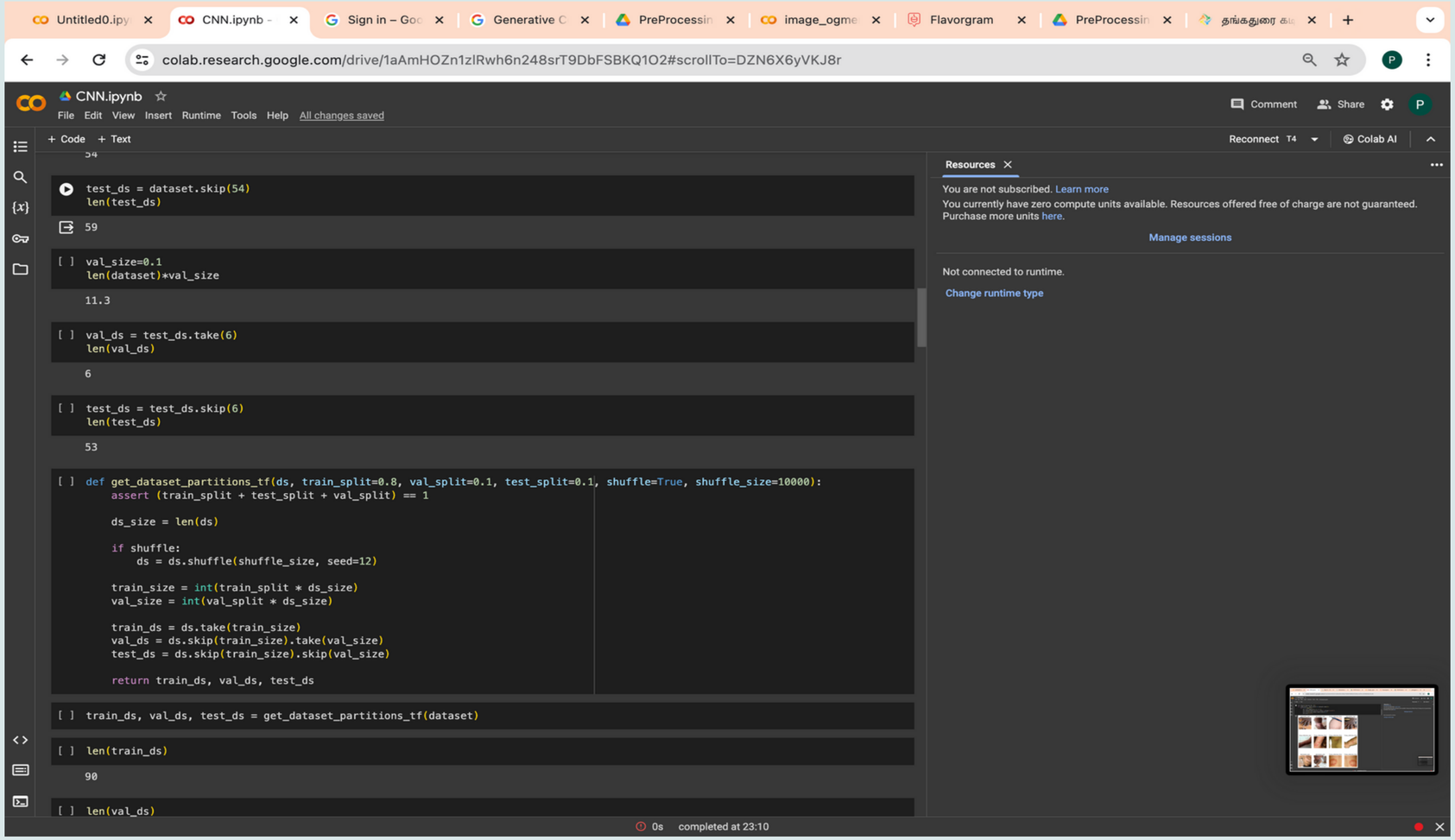
Diployment

UI design

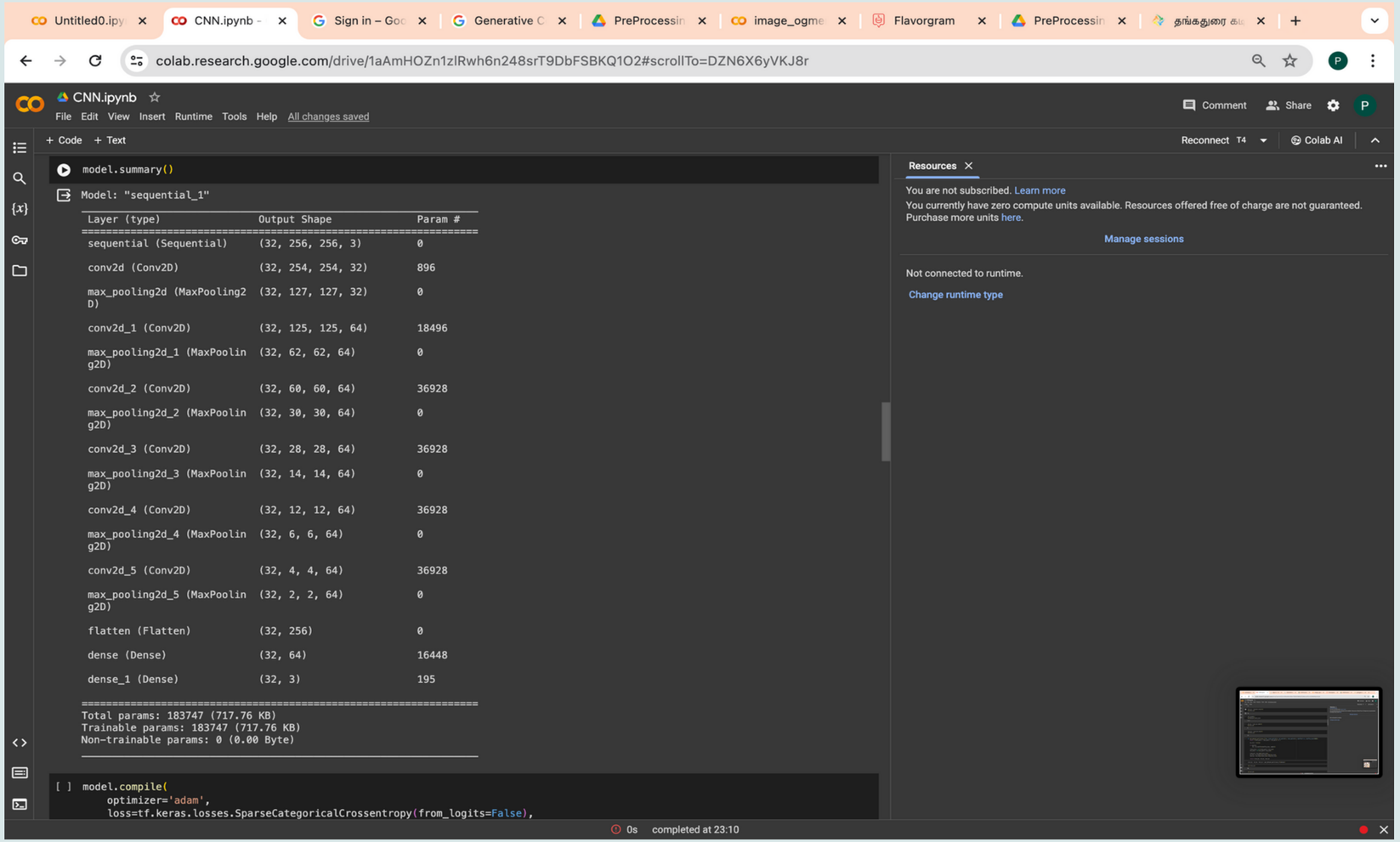
binary validation to increase accuracy



Model Training Code



Model Training Code



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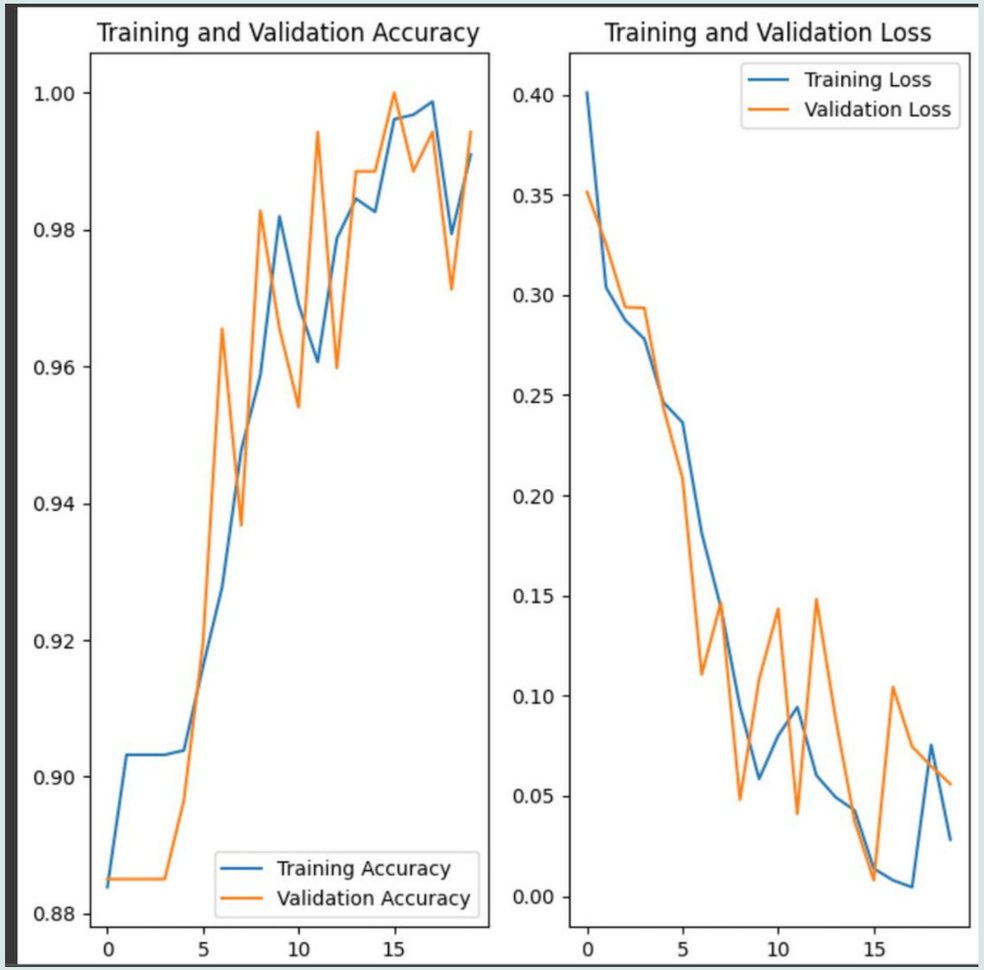


EXAMPLE OF PREDICTED IMAGES

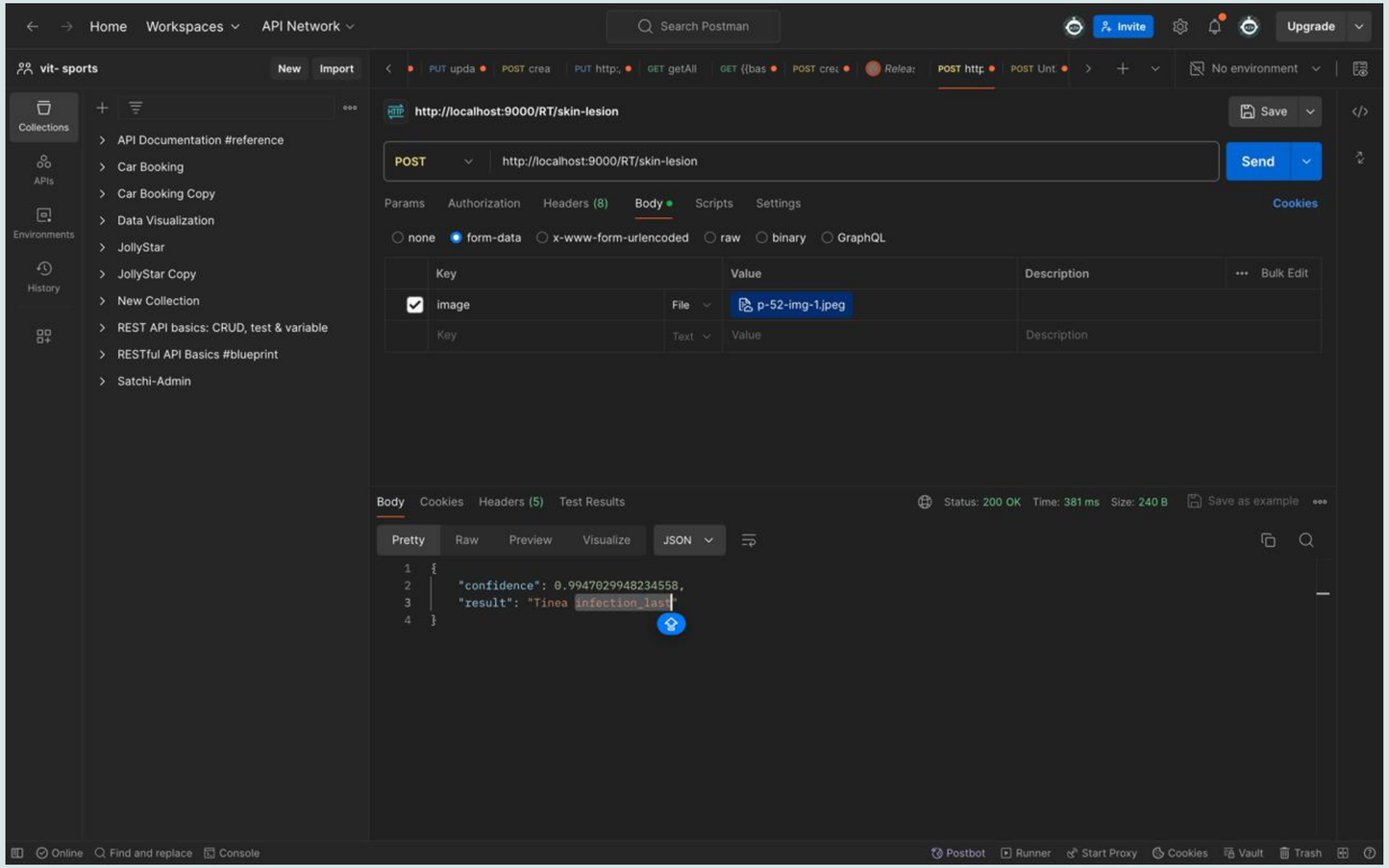
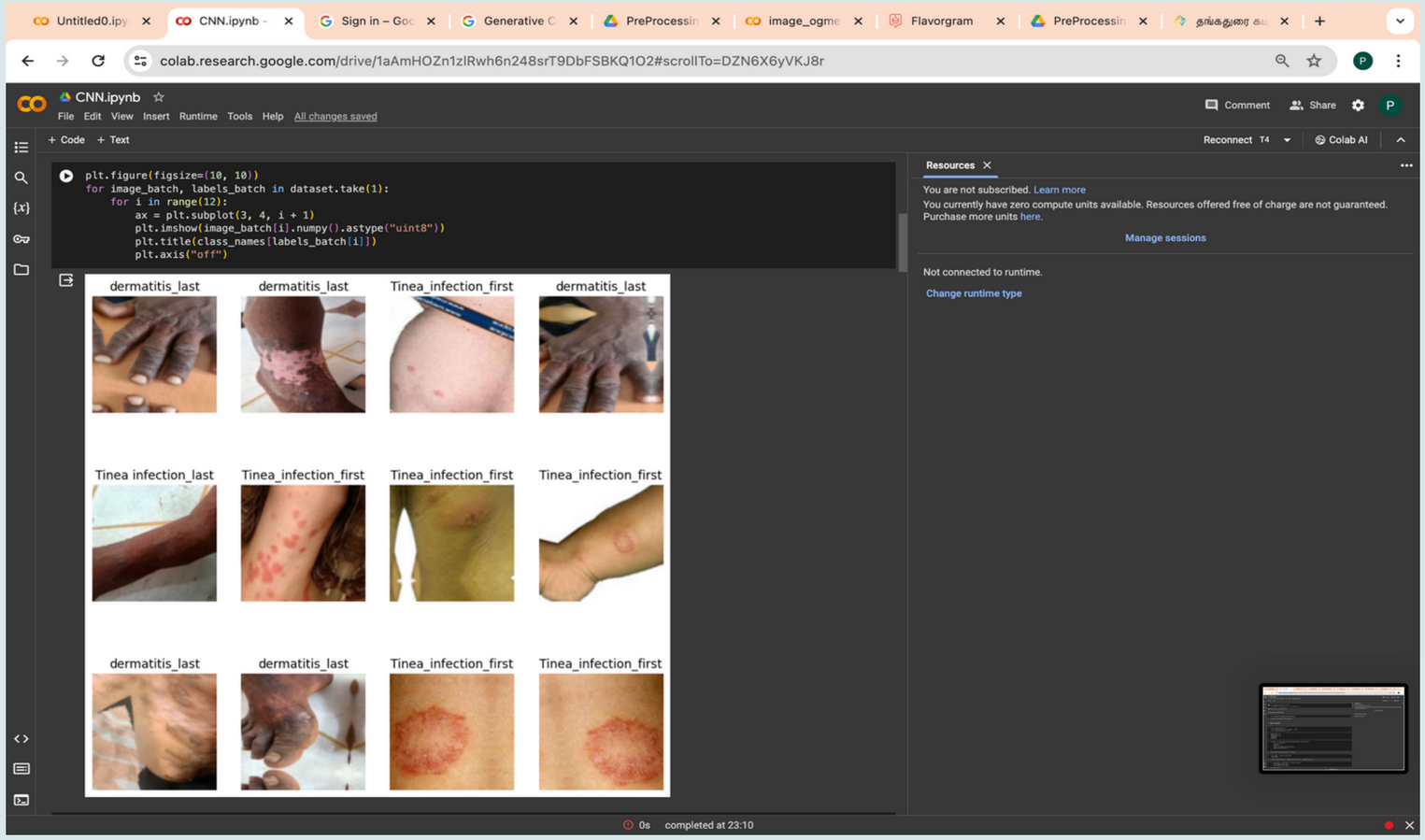


Image Augmentation



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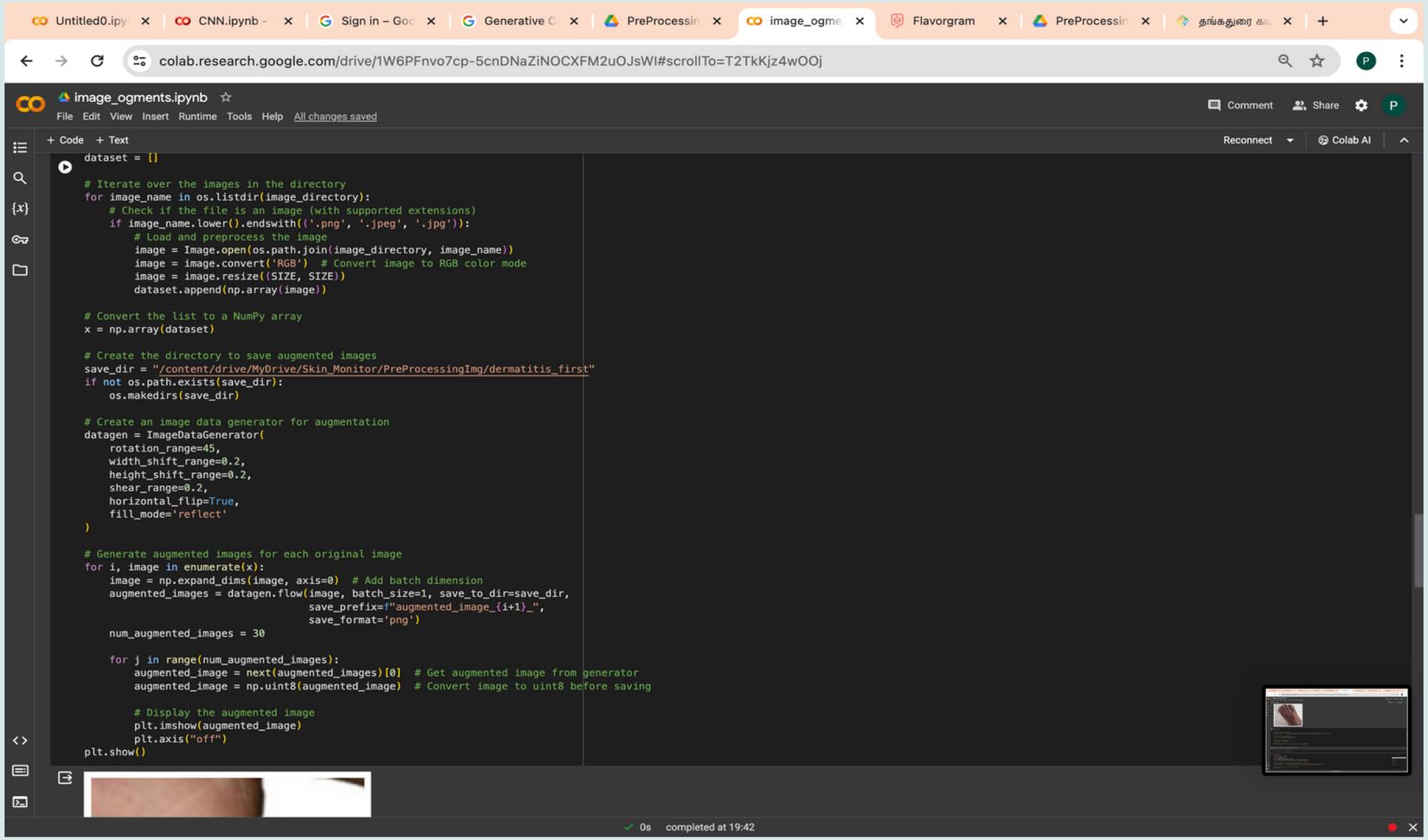

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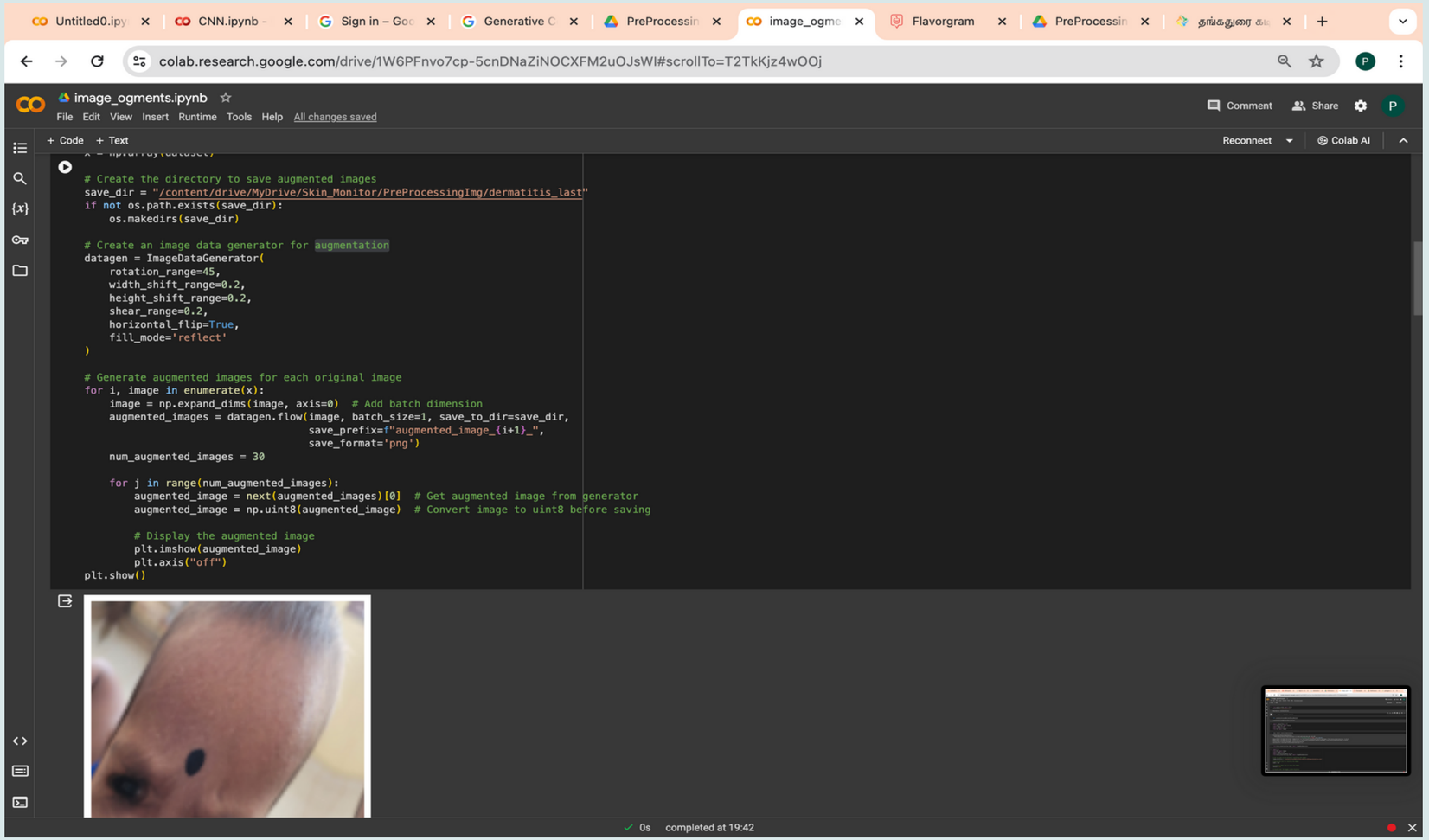

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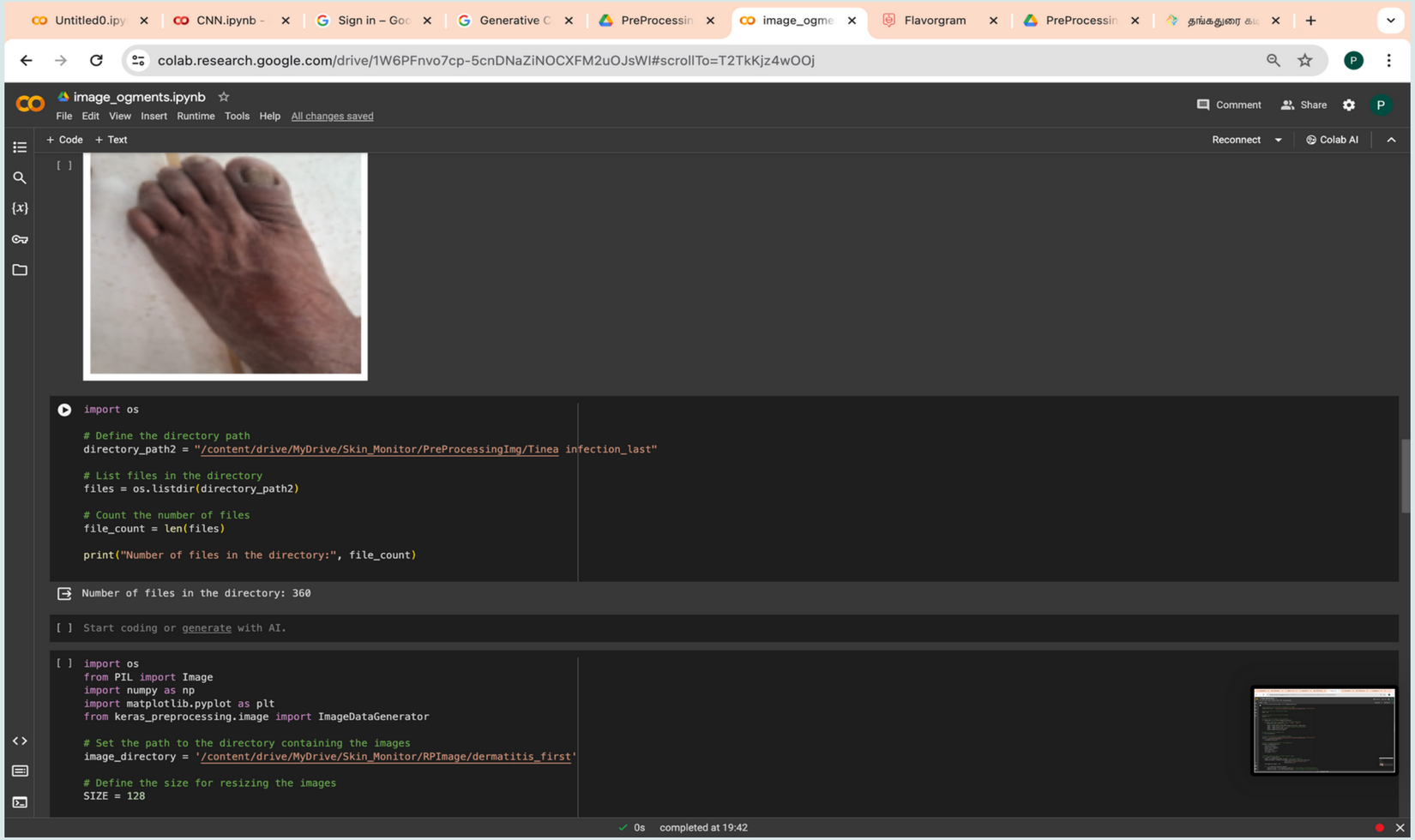

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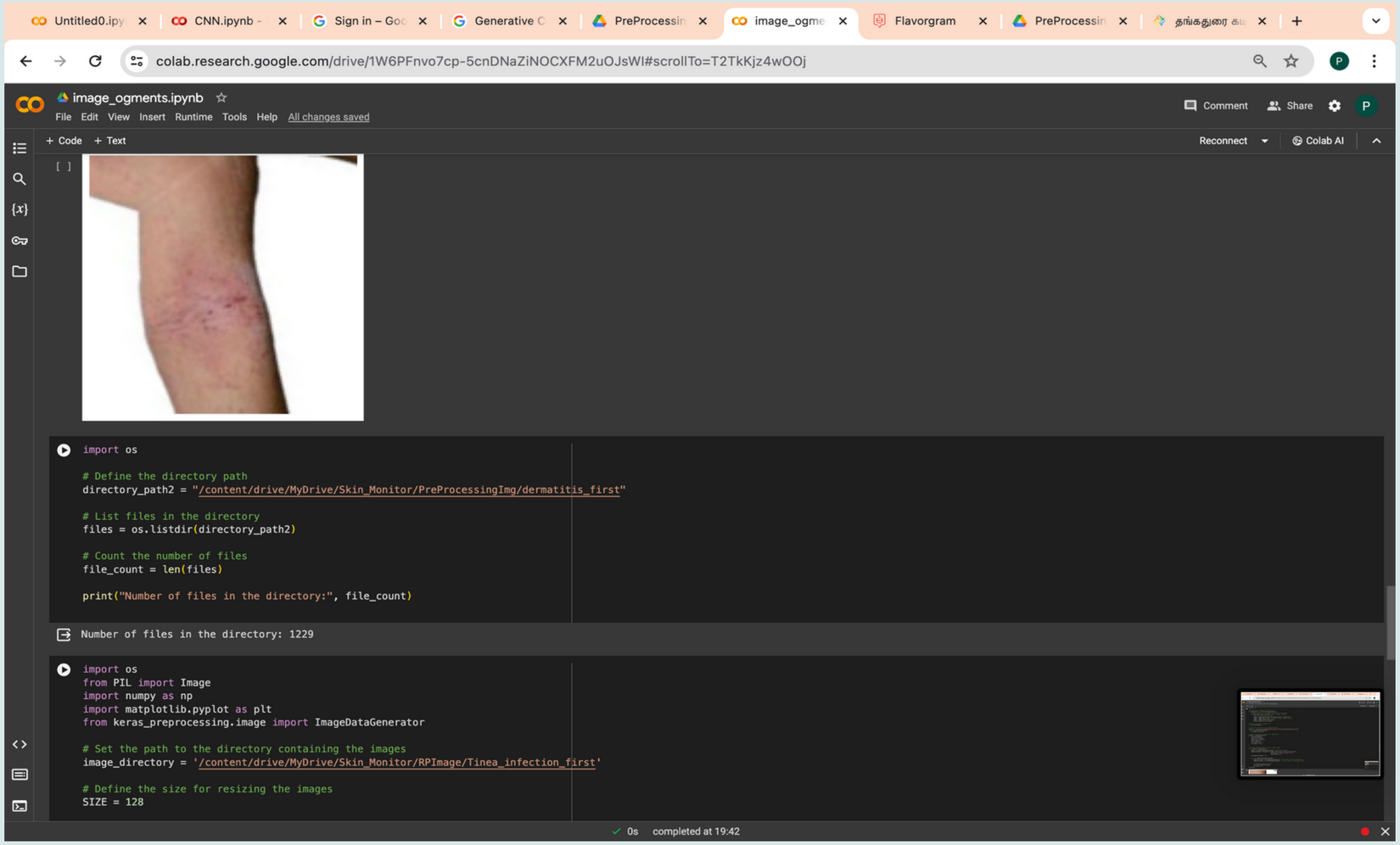

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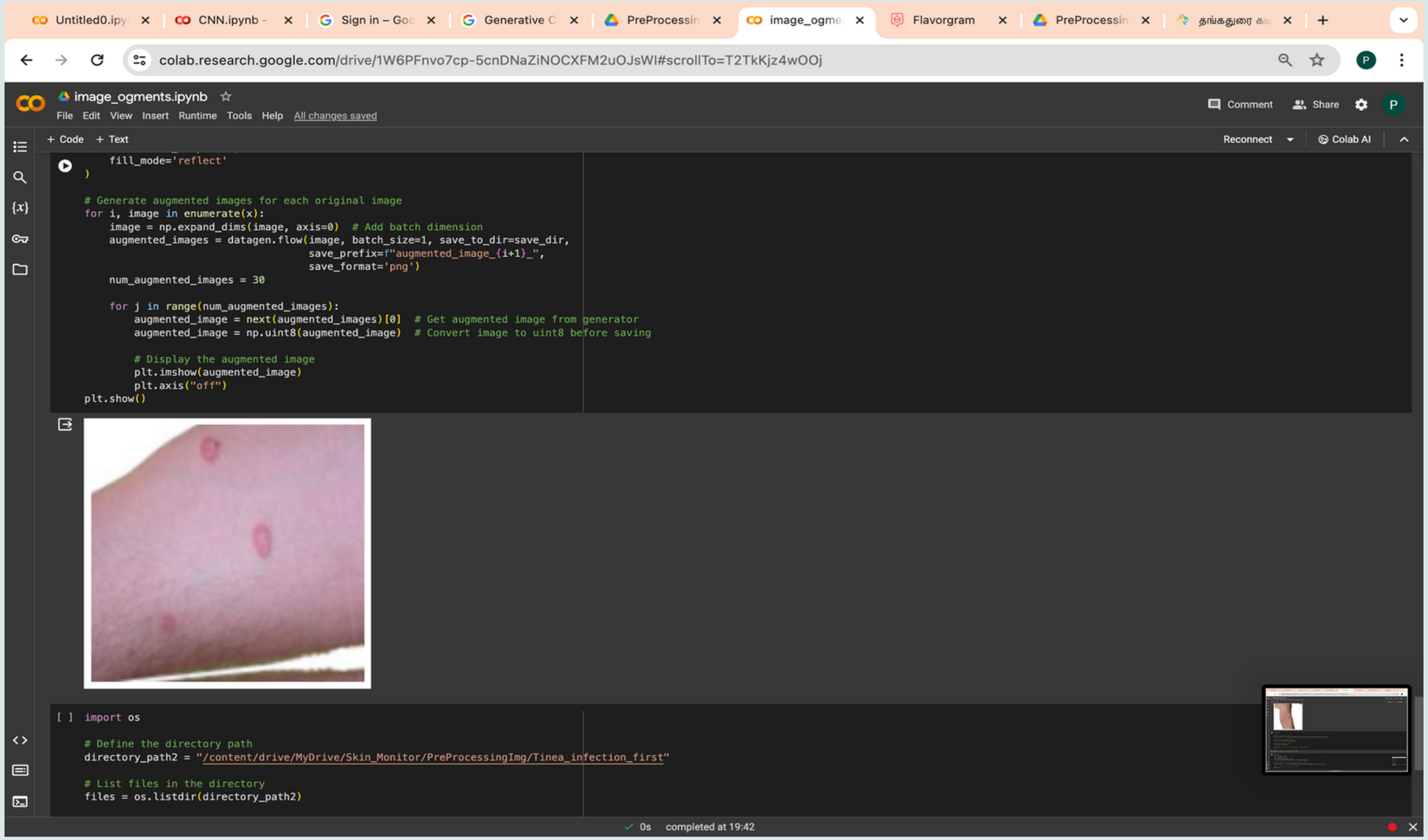

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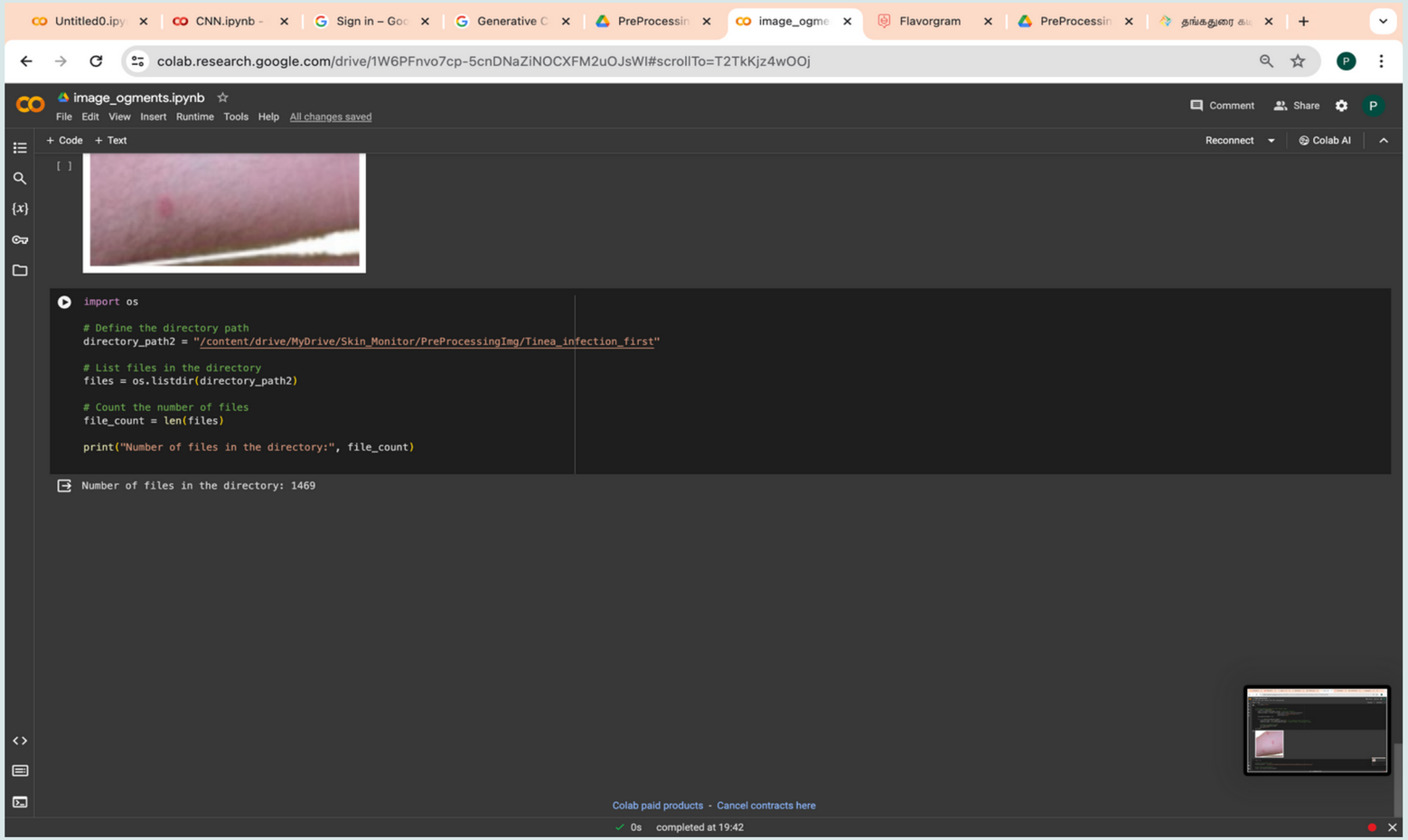

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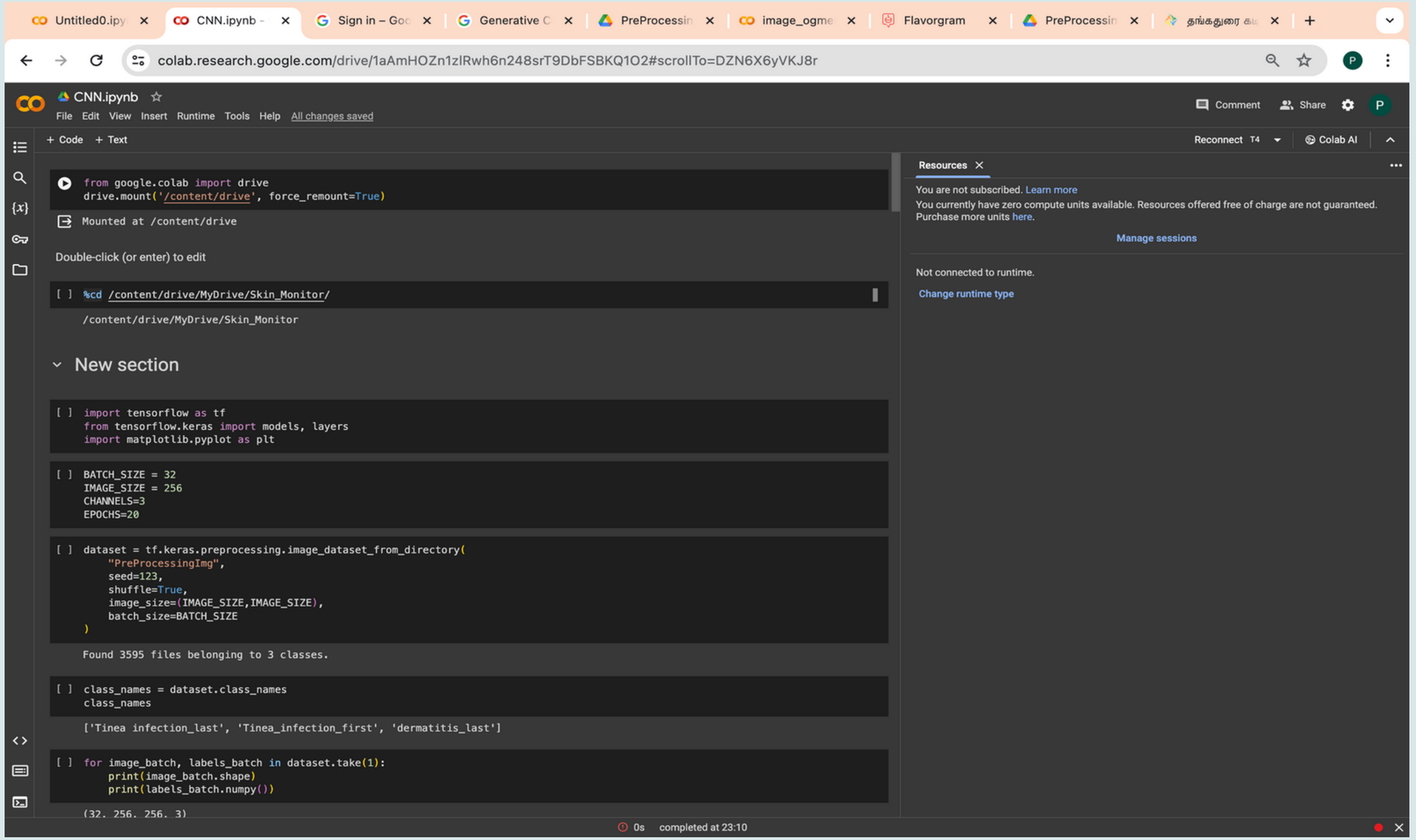
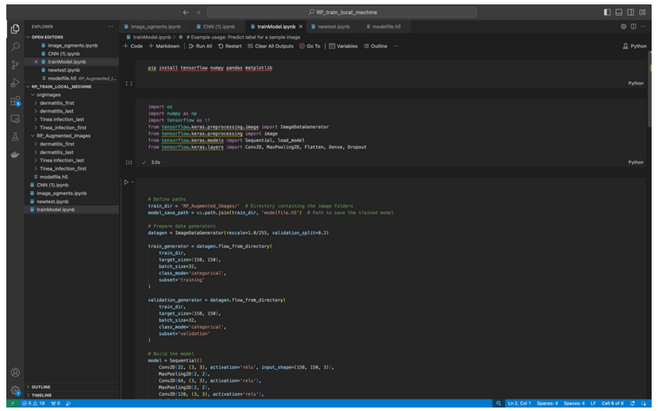
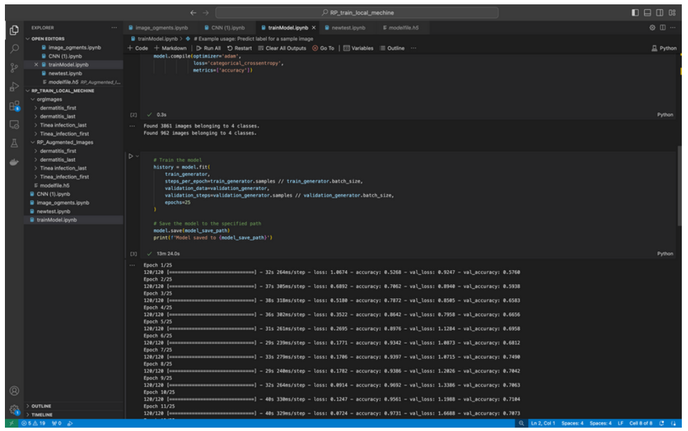
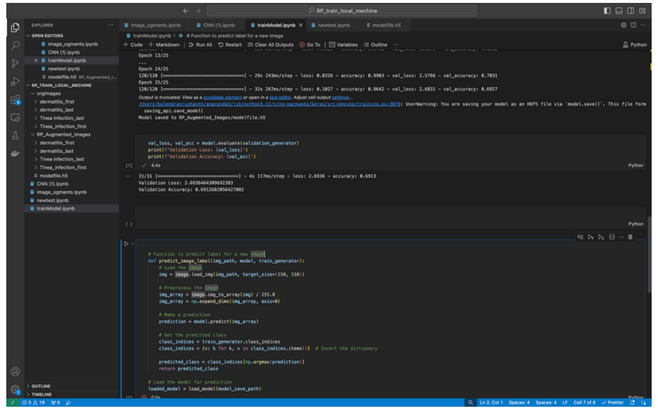


Binary Validation







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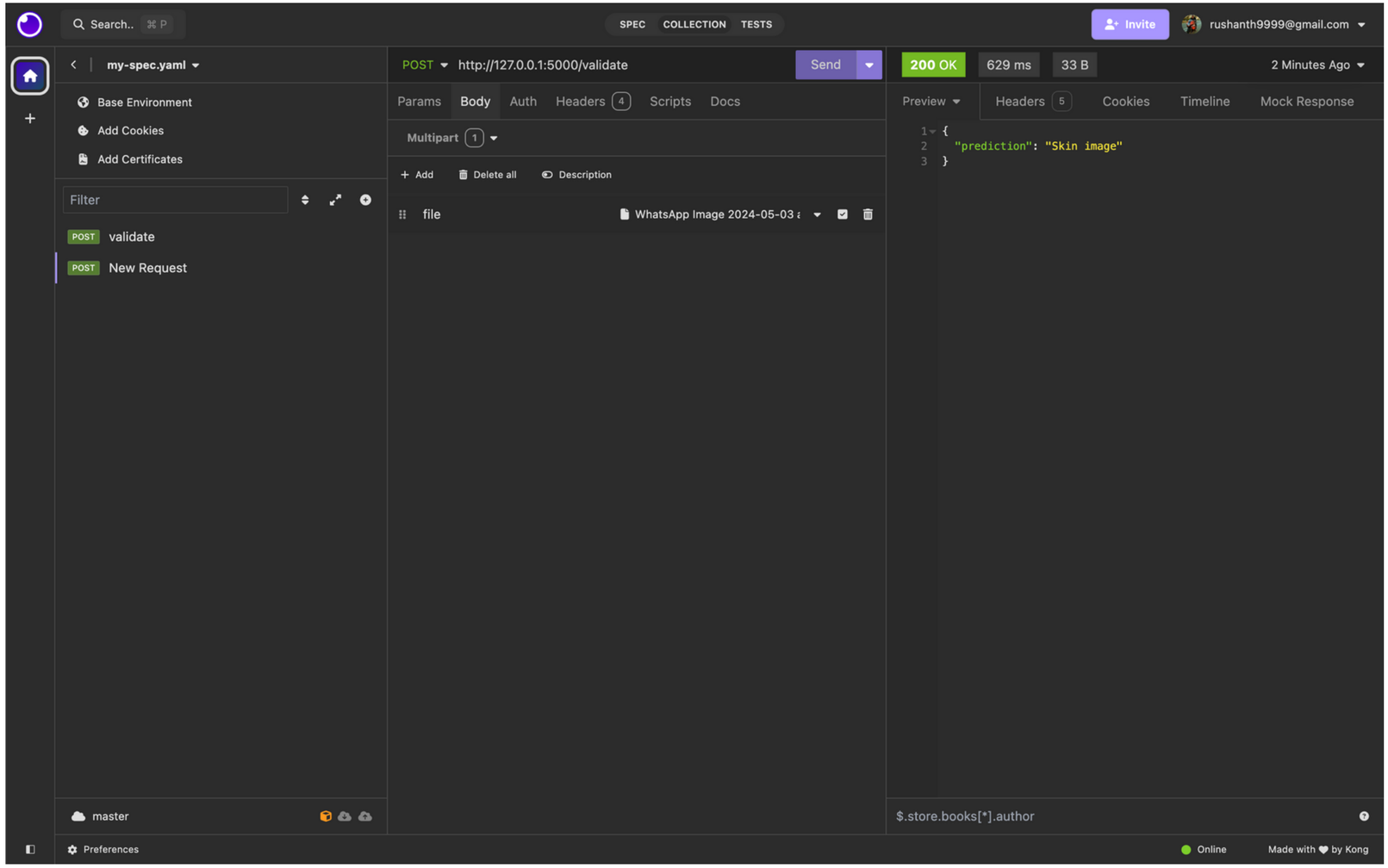
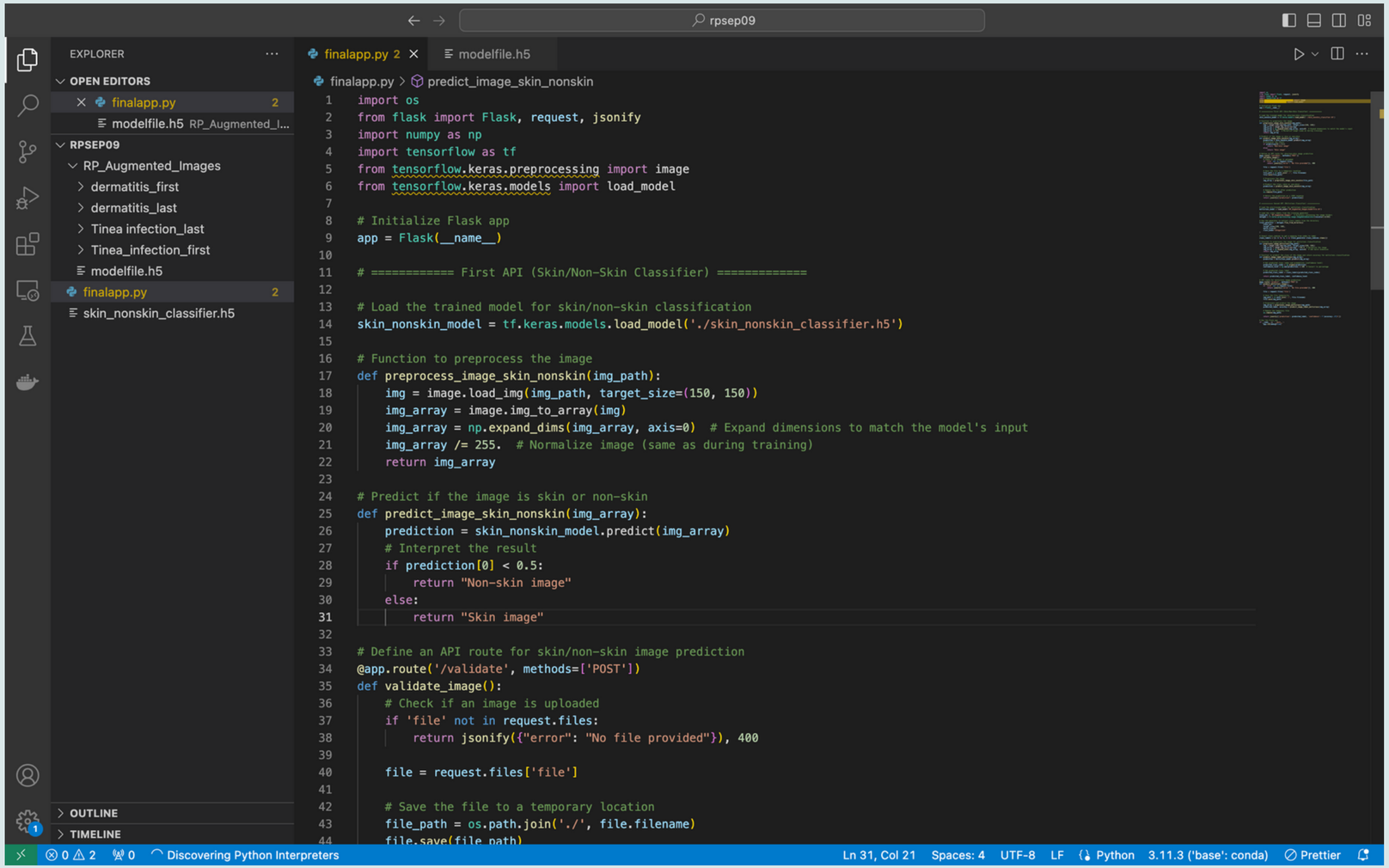
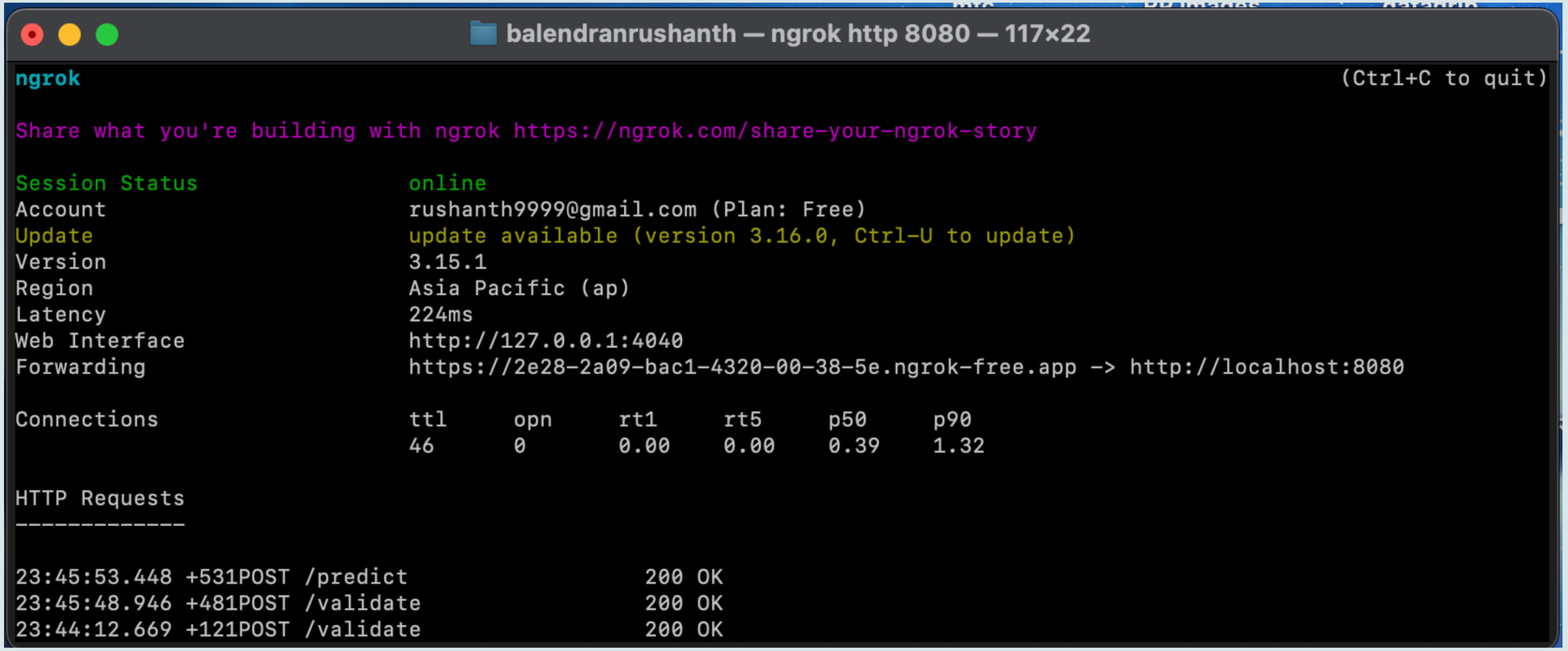


Integration with Flask API



Integration with NGROK



Dataset Collection

Patatient conformation form

Title of Project: Health Skin Monitoring: Detection and Early Intervention for Skin Issues
Principal Investigator: Dr.Anushan

Purpose of the Study:
The purpose of this research project is to study and analyze various skin diseases to enhance our understanding of dermatological conditions and develop improved treatments.

Procedure:
As part of this study, photographs of the affected area(s) of your skin will be taken using a digital camera or other imaging device. These photographs will be used solely for research purposes and may be included in research publications or presentations. Your identity will be kept confidential, and the photographs will not be used for any other purpose without your explicit consent.

Potential Risks:
There are minimal risks associated with participating in this study. The photographs may reveal personal information about your health condition, which will be kept confidential to the best of our ability.

Benefits:
By participating in this study, you will contribute valuable information that may help improve the diagnosis and treatment of skin diseases, benefitting both current and future patients.

Voluntary Participation:
Participation in this research project is entirely voluntary. You have the right to refuse or withdraw from the study at any time, without any penalty or loss of benefits to which you are otherwise entitled.

Confidentiality:
All information collected during this study, including photographs and personal data, will be kept strictly confidential. Your identity will be protected, and only authorized personnel involved in the research project will have access to the data.

Contact Information:
If you have any questions or concerns about the study, you can contact the Principal Investigator at [insert contact information].

I have read and understood the information provided above, and I agree to participate in this research project.

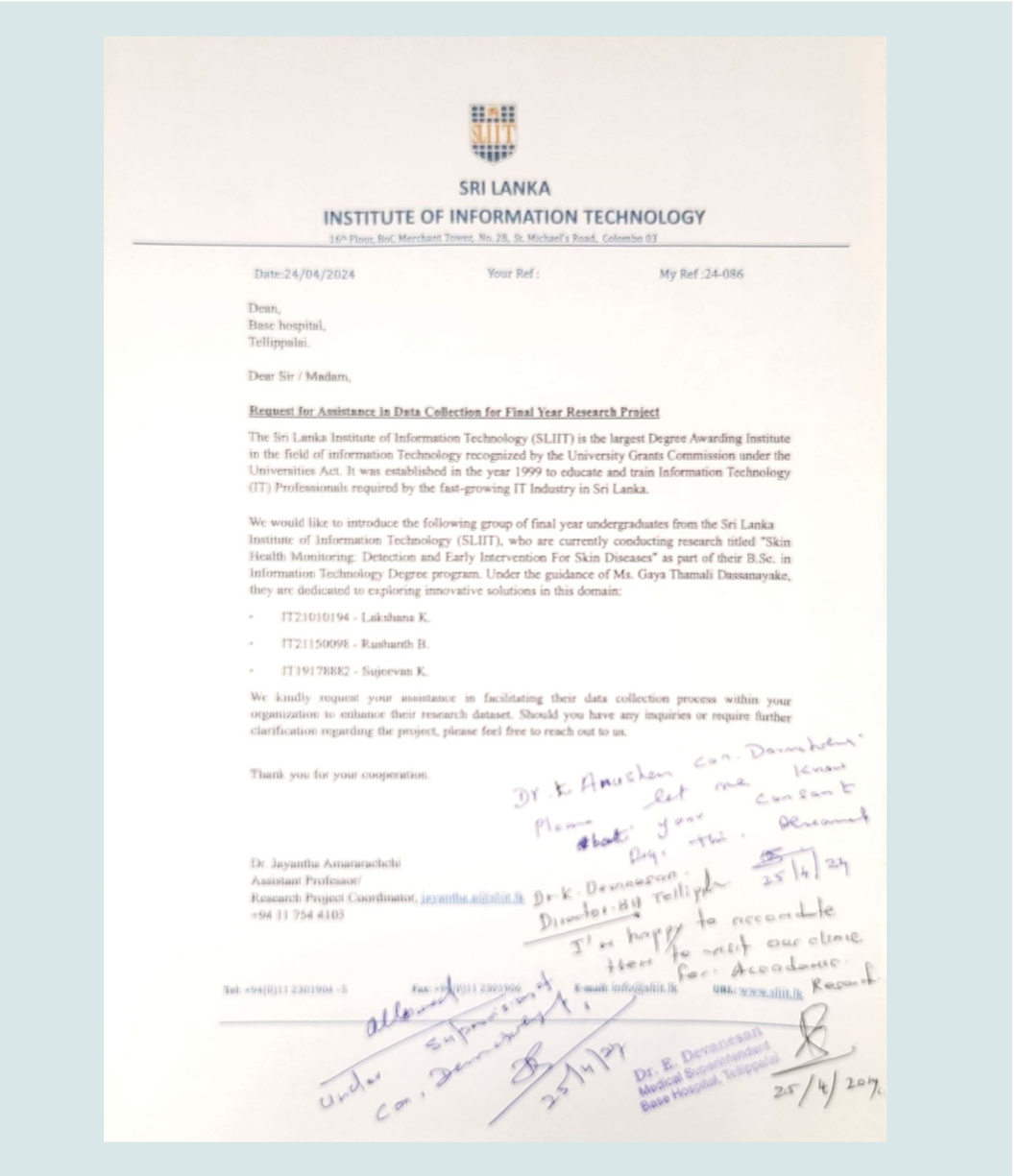
Patient Name (Printed): _____

Patient Signature: _____

Date: _____

Dataset Collection

Deal approval



SRI LANKA
INSTITUTE OF INFORMATION TECHNOLOGY
16th Floor, BoC Merchant Tower, No. 28, St. Michael's Road, Colombo 03

Date:24/04/2024 Your Ref : My Ref :24-086

Dean,
Base hospital,
Tellippalai.

Dear Sir / Madam,

Request for Assistance in Data Collection for Final Year Research Project

The Sri Lanka Institute of Information Technology (SLIIT) is the largest Degree Awarding Institute in the field of information Technology recognized by the University Grants Commission under the Universities Act. It was established in the year 1999 to educate and train Information Technology (IT) Professionals required by the fast-growing IT Industry in Sri Lanka.

We would like to introduce the following group of final year undergraduates from the Sri Lanka Institute of Information Technology (SLIIT), who are currently conducting research titled "Skin Health Monitoring: Detection and Early Intervention For Skin Diseases" as part of their B.Sc. in Information Technology Degree program. Under the guidance of Ms. Gaya Thamali Dassanayake, they are dedicated to exploring innovative solutions in this domain:

- IT21010194 - Lakshana K.
- IT21150098 - Rushanth B.
- IT19178882 - Sujeevan K.

We kindly request your assistance in facilitating their data collection process within your organization to enhance their research dataset. Should you have any inquiries or require further clarification regarding the project, please feel free to reach out to us.

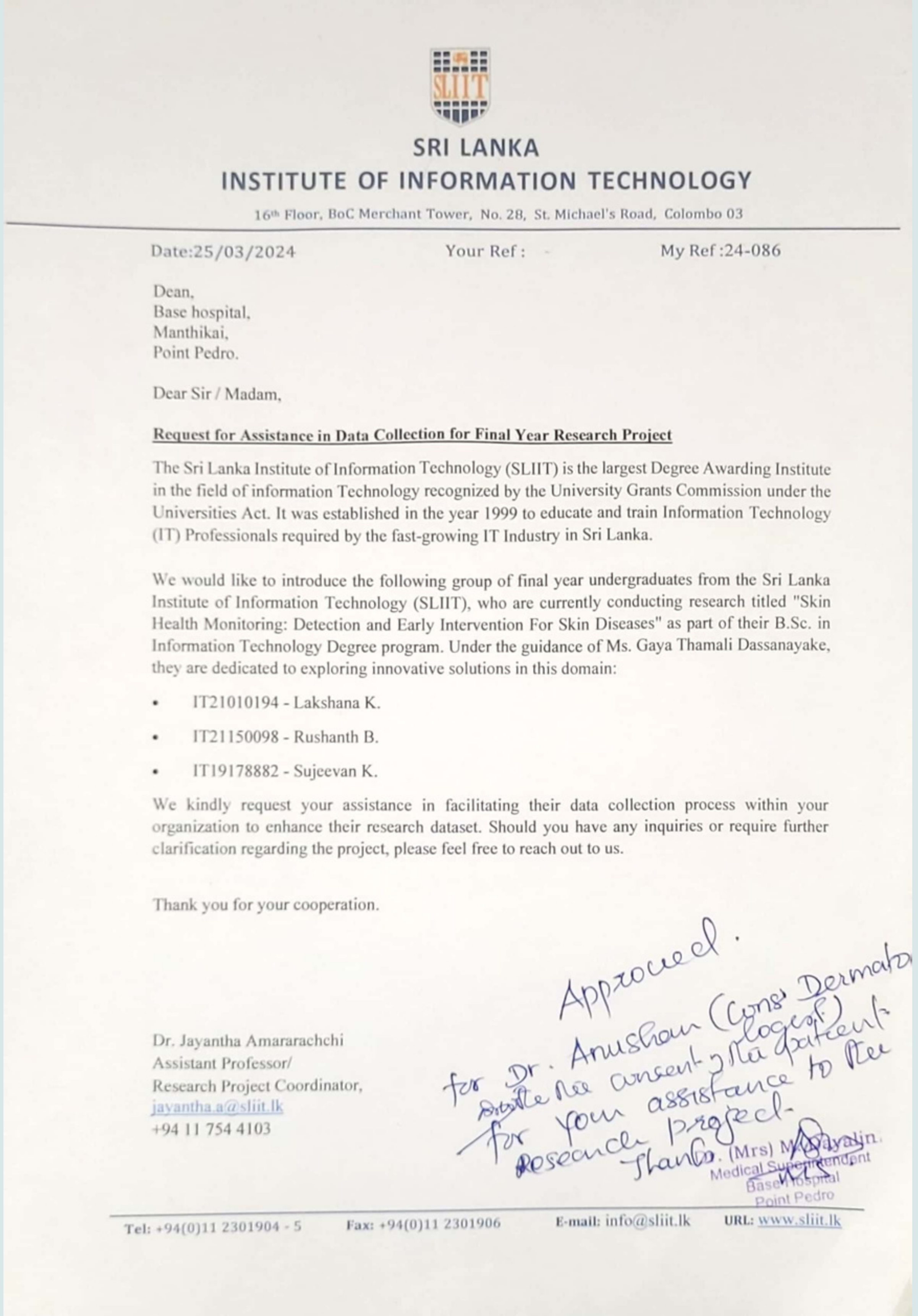
Thank you for your cooperation.

Dr. Jayantha Amararachchi
Assistant Professor/
Research Project Coordinator, jayantha.a@sliit.lk
+94 11 754 4103

Dr. K. Amuthan Con: Dassanayake
Please let me know about your consent Reg: this Research
Dr. K. Devanesan 25/4/24
Director (BH) Tellippalai
I'm happy to accordate them for our clinic for Accadamic Research
Under Supervision of Con: Dassanayake
25/4/24
Dr. E. Devanesan
Medical Superintendent
Base Hospital, Tellippalai
25/4/2024

Dataset Collection

Deal approval



SRI LANKA
INSTITUTE OF INFORMATION TECHNOLOGY
16th Floor, BoC Merchant Tower, No. 28, St. Michael's Road, Colombo 03

Date:25/03/2024 Your Ref : - My Ref :24-086

Dean,
Base hospital,
Manthikai,
Point Pedro.

Dear Sir / Madam,

Request for Assistance in Data Collection for Final Year Research Project

The Sri Lanka Institute of Information Technology (SLIIT) is the largest Degree Awarding Institute in the field of information Technology recognized by the University Grants Commission under the Universities Act. It was established in the year 1999 to educate and train Information Technology (IT) Professionals required by the fast-growing IT Industry in Sri Lanka.

We would like to introduce the following group of final year undergraduates from the Sri Lanka Institute of Information Technology (SLIIT), who are currently conducting research titled "Skin Health Monitoring: Detection and Early Intervention For Skin Diseases" as part of their B.Sc. in Information Technology Degree program. Under the guidance of Ms. Gaya Thamali Dassanayake, they are dedicated to exploring innovative solutions in this domain:

- IT21010194 - Lakshana K.
- IT21150098 - Rushanth B.
- IT19178882 - Sujeevan K.

We kindly request your assistance in facilitating their data collection process within your organization to enhance their research dataset. Should you have any inquiries or require further clarification regarding the project, please feel free to reach out to us.

Thank you for your cooperation.

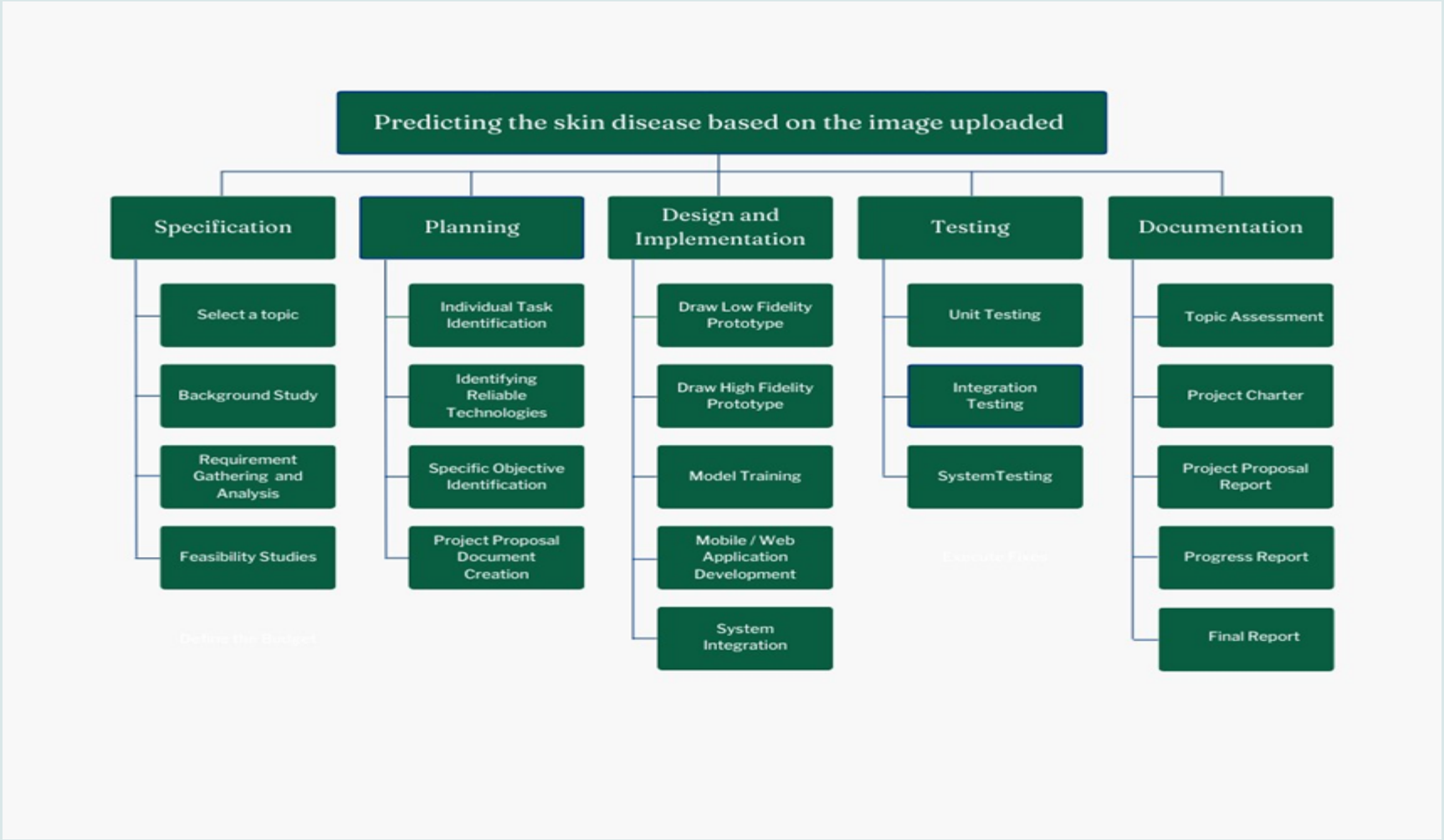
Approved.
for Dr. Anushan (Cons Dermatologist)
the consent of the patient
for your assistance to the
Research project.
Thanks.

Dr. Jayantha Amararachchi
Assistant Professor/
Research Project Coordinator,
jayantha.a@sliit.lk
+94 11 754 4103

Dr. (Mrs) M. ...yalin.
Medical Superintendent
Base Hospital
Point Pedro

Tel: +94(0)11 2301904 - 5 Fax: +94(0)11 2301906 E-mail: info@sliit.lk URL: www.sliit.lk

WORK BREAKDOWN STRUCTURE



COMMERCIALIZATION


Thank You