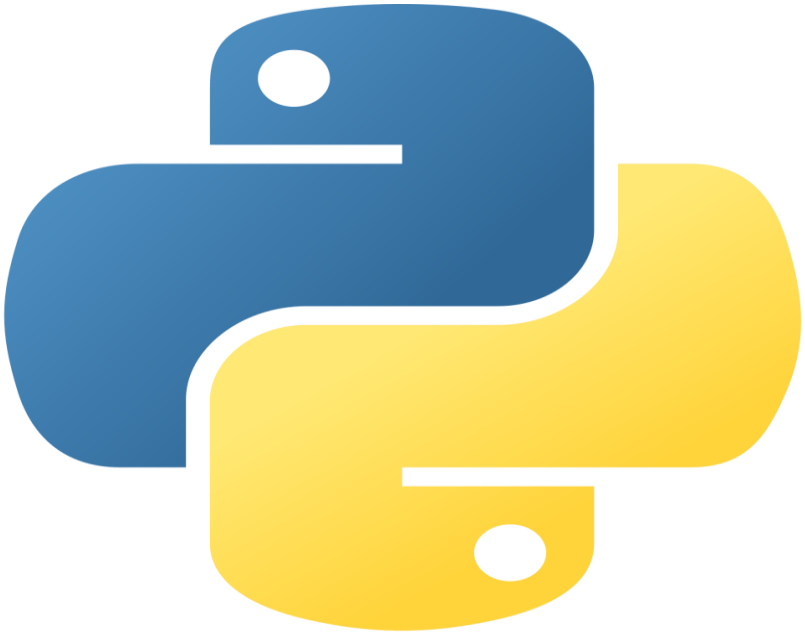
AMITY UNIVERSITY

AMITY INSTITUTE OF INFORMATION TECNOLOGY ,PATNA

CETPA Summer Training 2024



python™

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Amity University Attendance Portal Documentation

Introduction

This Streamlit application serves as an attendance portal for Amity University. It allows users to mark attendance, view attendance records, and capture images from a webcam. The application utilizes Python with libraries such as Streamlit, OpenCV (cv2), Pillow (PIL), and os for image handling and data management.

Key Features

1. Mark Attendance:

- **Users can input student details (enrollment number, first name, last name) and mark their attendance.**
- **Attendance details are recorded in a CSV file (attendance_records.csv) along with timestamped entry.**
- **Offers the option to capture an image of the student using a webcam, which can be saved and optionally modified or deleted.**

2. View Attendance:

- **Displays a table of recorded attendance from the CSV file.**
- **Allows editing or deleting specific attendance records directly from the UI.**
- **Provides interactive options for managing attendance data effectively.**

3. Capture Image:

- Enables users to capture an image using the webcam, displaying it in the UI.
- Users can save the captured image and optionally modify it (rotate) or delete it directly from the UI.

Components and Functions

- **Streamlit UI Components:**
  - Uses Streamlit for creating a user-friendly web interface.
  - Includes navigation sidebar (st.sidebar) for menu options and main content area for displaying different functionalities (st.header, st.info, st.button, st.table, etc.).
- **Functions:**
  - mark_attendance(enrollment_number, first_name, last_name):
    - Records attendance by appending details to attendance_records.csv.
    - Captures an image from the webcam, allowing for modification and deletion.
  - capture_image():
    - Provides functionality to capture an image using the webcam.
    - Options to save, modify (rotate), or delete the captured image.

- view_attendance():
  - Reads attendance records from attendance_records.csv and displays them in a tabular format.
  - Allows editing or deleting attendance records based on user selection.

Usage

1. Mark Attendance:
   - Enter student details and click "Mark Attendance" to record attendance.
   - Optionally capture an image of the student using the webcam.
2. View Attendance:
   - Navigate to "View Attendance" to see a table of recorded attendance.
   - Edit or delete specific attendance records as needed.
3. Capture Image:
   - Select "Capture Image" to capture an image using the webcam.
   - Save, modify (rotate), or delete the captured image interactively.

Dependencies

- Streamlit: For creating the web-based user interface.
- OpenCV (cv2): For webcam access and image capture.

- **Pillow (PIL): For image manipulation and saving.**
- **os: For file operations such as image deletion.**

File Management

- **attendance_records.csv: Stores attendance records with columns for enrollment number, first name, last name, and timestamp.**

Notes

- **Ensure the webcam is correctly configured and accessible to capture images.**
- **Modifications to attendance data (edit/delete) are reflected immediately in attendance_records.csv.**

Conclusion

This application provides a robust solution for managing attendance records and capturing student images interactively. It leverages modern Python libraries and Streamlit's capabilities to offer a user-friendly experience for both recording and viewing attendance data.

Code:-

```
import streamlit as st
import csv
from datetime import datetime
import cv2
from PIL import Image
import numpy as np
import os

# Function to mark attendance and save to CSV
def mark_attendance(enrollment_number, first_name, last_name):
    # Append attendance record to CSV file
    with open('attendance_records.csv', 'a', newline='') as file:
        writer = csv.writer(file)
        writer.writerow([enrollment_number, first_name, last_name, datetime.now().strftime('%Y-%m-%d %H:%M:%S')])
    st.success(f"Attendance marked for {first_name} {last_name} (Enrollment: {enrollment_number})")

    # Option to capture image from webcam
    st.header("Capture Image from Webcam")

    # Initialize webcam capture
    cap = cv2.VideoCapture(0)

    if st.button("Capture Image", key='capture_button'):
        if cap.isOpened():
            ret, frame = cap.read()
```

```
        if ret:
            # Convert frame from BGR to RGB
            frame_rgb = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB)

            # Convert to PIL Image
            pil_image = Image.fromarray(frame_rgb)

            # Display captured image
            st.image(pil_image, caption='Captured Image',
use_column_width=True)

            # Save image to disk (optional)
            image_path =
f"captured_image_{datetime.now().strftime('%Y%m%d%H%M%S')}.jp
g"
            pil_image.save(image_path)

            st.success(f"Image captured and saved as {image_path}")

            # Option to delete or modify the captured image
            delete_option = st.checkbox("Delete Image")
            modify_option = st.checkbox("Modify Image")

            if delete_option:
                os.remove(image_path)
                st.warning("Image deleted.")

            if modify_option:
```

```
        # Provide options to modify the image (example: rotate, resize, etc.)
                rotation_angle = st.slider("Rotation Angle", -180, 180, 0)
                if st.button("Apply Rotation"):
                    modified_image = pil_image.rotate(rotation_angle)
st.image(modified_image, caption='Modified Image',
use_column_width=True)
                    modified_image.save(image_path)  # Save modified image

    # Release the webcam
    cap.release()

# Function to capture image from webcam and save
def capture_image():
    st.header("Capture Image from Webcam")

    # Initialize webcam capture
    cap = cv2.VideoCapture(0)

    if st.button("Capture Image", key='capture_button'):
        if cap.isOpened():
            ret, frame = cap.read()
            if ret:
                # Convert frame from BGR to RGB
                frame_rgb = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB)

                # Convert to PIL Image
                pil_image = Image.fromarray(frame_rgb)
```

```
            # Display captured image
            st.image(pil_image, caption='Captured Image',
use_column_width=True)

            # Save image to disk (optional)
            image_path =
f"captured_image_{datetime.now().strftime('%Y%m%d%H%M%S')}.jp
g"
            pil_image.save(image_path)

            st.success(f"Image captured and saved as {image_path}")

            # Option to delete or modify the captured image
            delete_option = st.checkbox("Delete Image")
            modify_option = st.checkbox("Modify Image")

            if delete_option:
               os.remove(image_path)
               st.warning("Image deleted.")

            if modify_option:
               # Provide options to modify the image (example: rotate, resize,
etc.)
               rotation_angle = st.slider("Rotation Angle", -180, 180, 0)
               if st.button("Apply Rotation"):
                  modified_image = pil_image.rotate(rotation_angle)
                  st.image(modified_image, caption='Modified Image',
use_column_width=True)
                  modified_image.save(image_path)
```

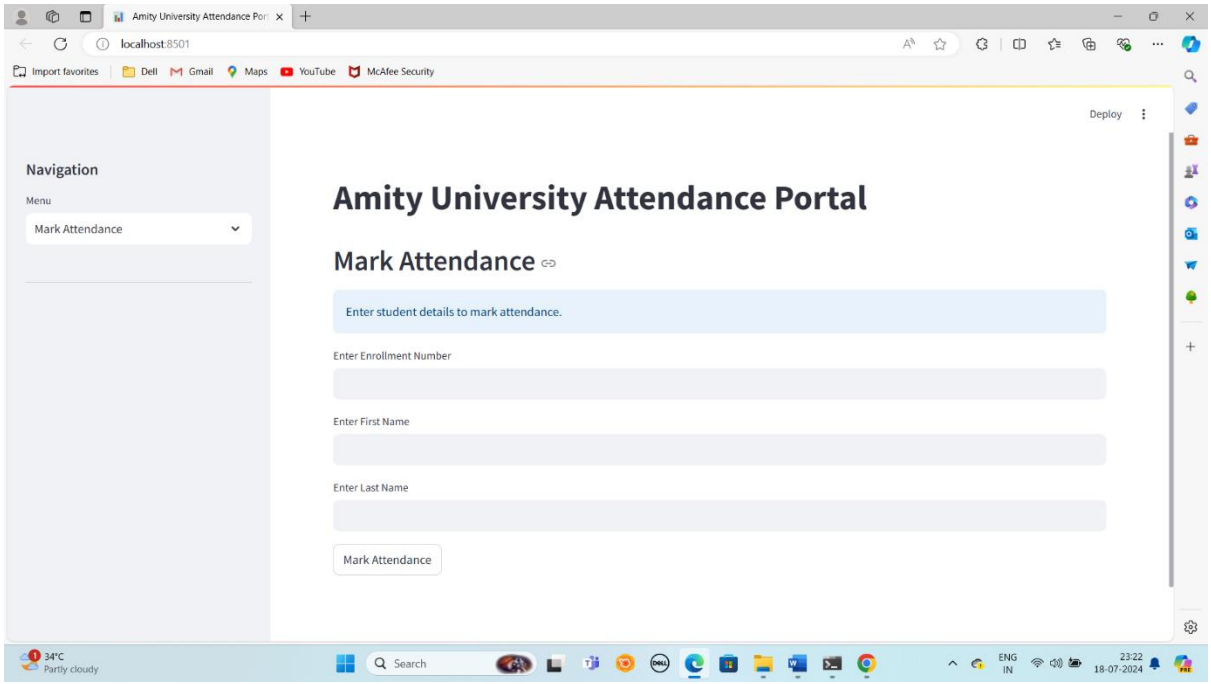
```
# Save modified image

    # Release the webcam
    cap.release()

# Function to view attendance records from CSV
def view_attendance():
    try:
        with open('attendance_records.csv', 'r') as file:
            reader = csv.reader(file)
            attendance_records = list(reader)

        # Display attendance records in a table
        st.write("### Attendance Records")
        if attendance_records:
            # Format data for table display
            formatted_records = []
            for record in attendance_records:
                formatted_record = {
                    "Enrollment Number": record[0],
                    "First Name": record[1],
                    "Last Name": record[2],
                    "Date & Time": record[3]
                }
                formatted_records.append(formatted_record)

            # Display as a table
```

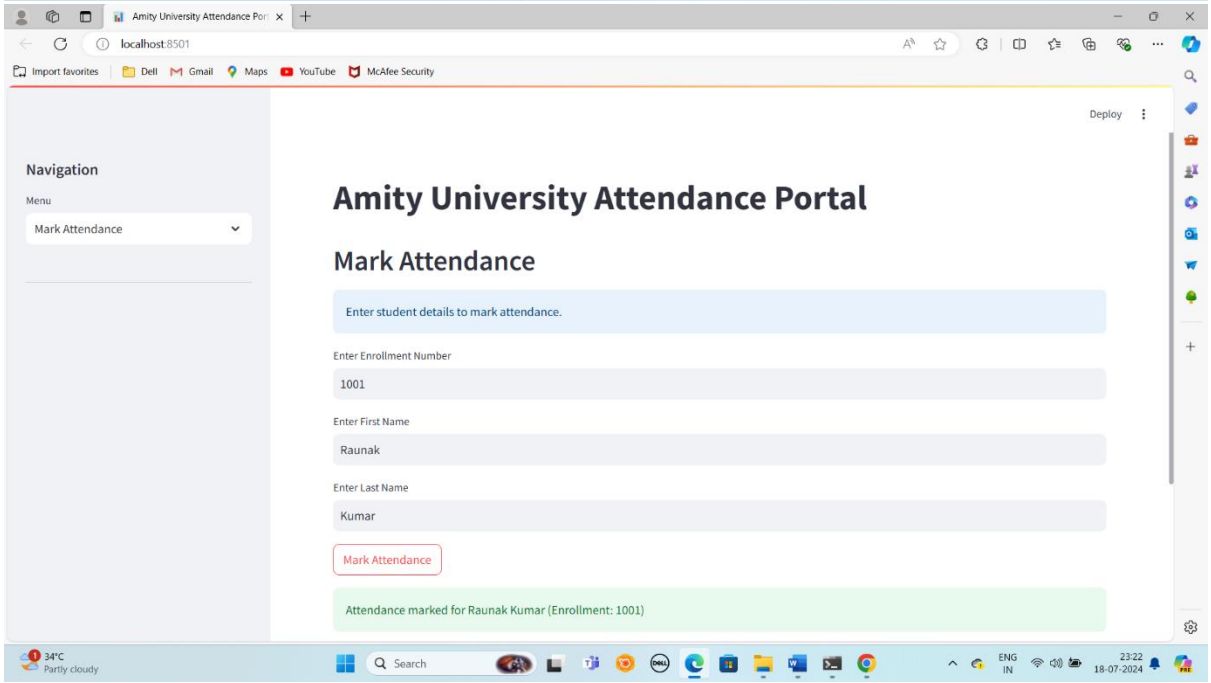
```
        st.table(formatted_records)


        # Modify attendance option
        modify_option = st.selectbox("Select an option", ["", "Edit Attendance", "Delete Attendance"])
        if modify_option == "Edit Attendance":
            edit_index = st.number_input("Enter the index of the record to edit", min_value=1, max_value=len(attendance_records))
            if st.button("Edit"):
                edit_record = attendance_records[edit_index - 1]
                st.write(f"Editing record: {edit_record}")
                # Provide fields to edit (if needed)
                # Example: You can update the attendance data structure based on requirements
        elif modify_option == "Delete Attendance":
            delete_index = st.number_input("Enter the index of the record to delete", min_value=1, max_value=len(attendance_records))
            if st.button("Delete"):
                deleted_record = attendance_records.pop(delete_index - 1)
                # Rewrite the CSV file without the deleted record
                with open('attendance_records.csv', 'w', newline='') as file:
                    writer = csv.writer(file)
                    writer.writerows(attendance_records)
                st.warning(f"Deleted record: {deleted_record}")
                st.success("Attendance record deleted successfully.")


    else:
        st.write("No attendance records found.")
```

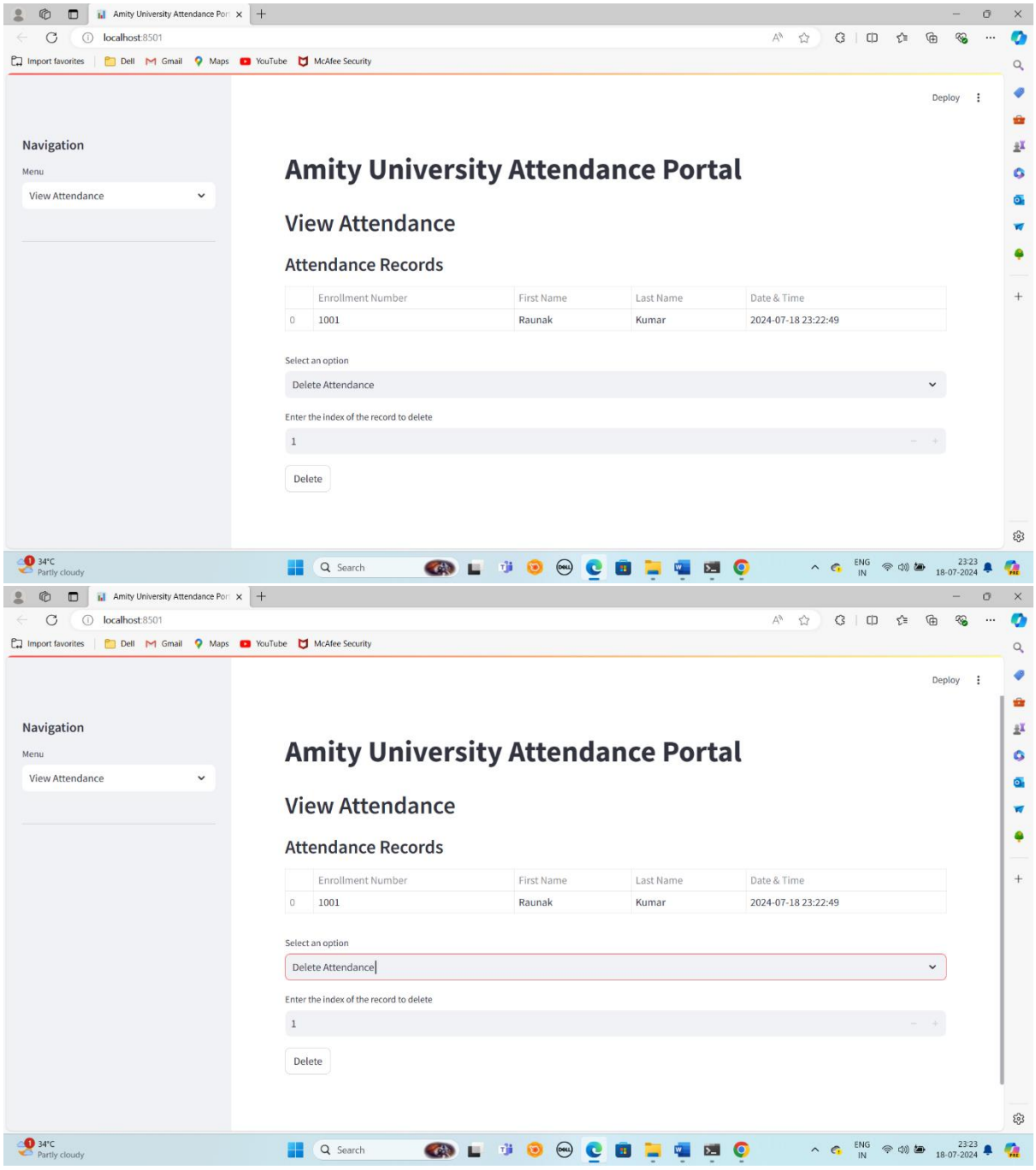
```
    except FileNotFoundError:
        st.write("No attendance records found.")

# Streamlit UI code
def main():
    st.set_page_config(page_title="Amity University Attendance Portal", page_icon=":bar_chart:", layout='wide')

    st.title("Amity University Attendance Portal")
    st.sidebar.header("Navigation")
    menu = ["Mark Attendance", "View Attendance", "Capture Image"]
    choice = st.sidebar.selectbox("Menu", menu)

    st.sidebar.markdown("---")

    if choice == "Mark Attendance":
        st.header("Mark Attendance")
        st.info("Enter student details to mark attendance.")
        enrollment_number = st.text_input("Enter Enrollment Number")
        first_name = st.text_input("Enter First Name")
        last_name = st.text_input("Enter Last Name")
        if st.button("Mark Attendance"):
            mark_attendance(enrollment_number, first_name, last_name)

    elif choice == "View Attendance":
        st.header("View Attendance")
        view_attendance()
```

```
    elif choice == "Capture Image":
        capture_image()

if __name__ == '__main__':
    main()
```

Output:-






Amity University Attendance Portal
localhost:8501
Import favorites
Dell
Gmail
Maps
YouTube
McAfee Security
Deploy
Navigation
Menu
View Attendance
Amity University Attendance Portal
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Attendance Records
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Last Name
Date & Time
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Select an option
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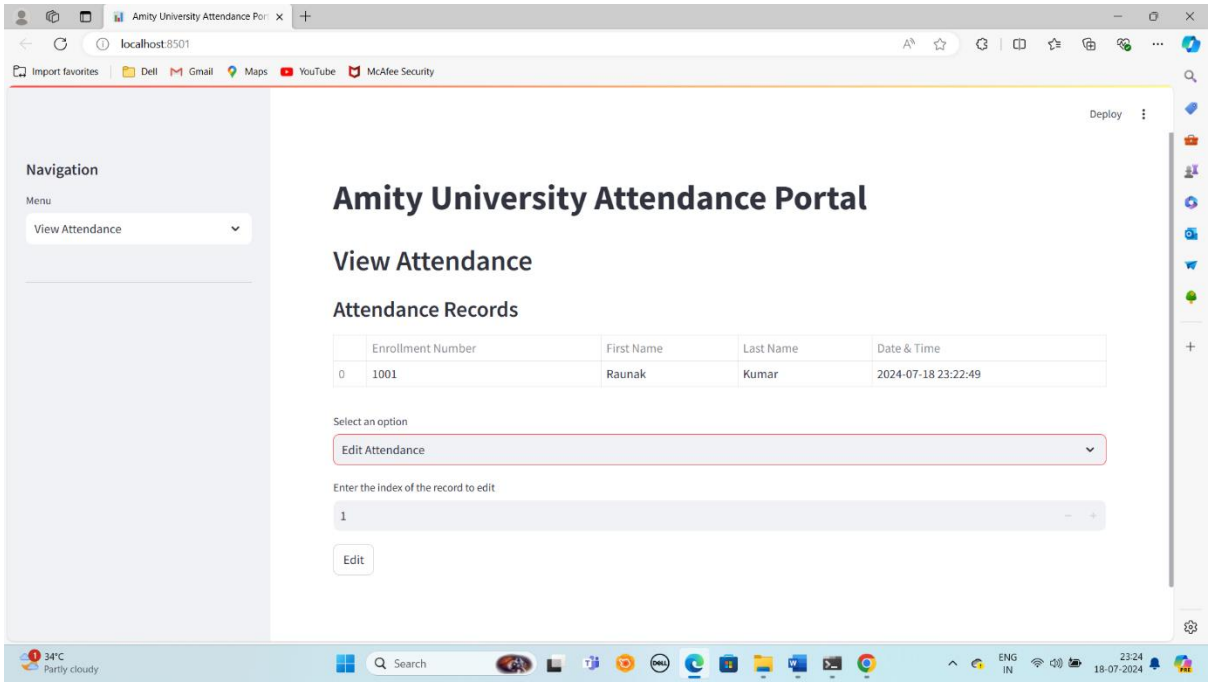
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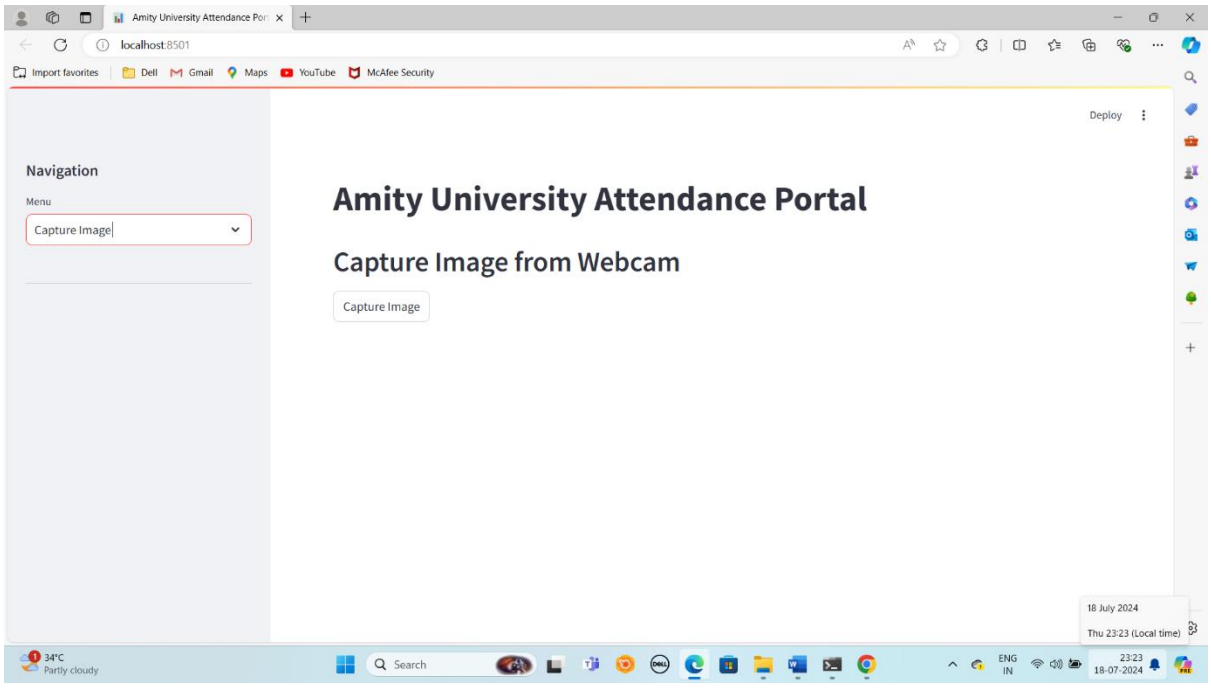
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Capture Image from Webcam
Capture Image
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