**Smart Campus Navigation System**

A web application (Prototype of) developed for the University of Cape Coast to help new students and visitors navigate the campus efficiently using real-time guidance and information about campus facilities.

Prototype of the Smart Campus Navigation System using Flask for the backend and HTML & CSS for the frontend. This prototype includes a # login page, a home page with an interactive map, and a facility information page.

Project Description

The Smart Campus Navigation System leverages computer vision and location-based services to assist users in navigating the University of Cape Coast campus. The application provides real-time navigation, detailed facility information, and a user-friendly interface.

Project Structure

Smart\_campus\_navigation/

|\_\_ myvenv virtual environment

├── app.py main application

├── static/ Contains the static files, eg css, javascript

│ └── styles.css

├── templates/ contains the html files

│ ├── base.html

│ ├── home.html

│ ├── login.html

│ └── facility.html

└── requirements.txt Contains the installations needed to run this application

|\_\_ Readme.md This is the readme file

Features

- Interactive Campus Map: Explore the UCC campus with an interactive map.

- Real-Time Navigation: Get turn-by-turn directions for both outdoor and indoor navigation.

-Facility Information: Access detailed information about campus facilities.

-Search and Filter: Search for specific locations or facilities with filters.

-Notifications and Alerts: Receive notifications about important events and navigation alerts.

-Personalization: Customize the app based on user preferences.

Technology Stack

Frontend: - HTML, - CSS - JavaScript

Backend:- Python (Flask), - SQLite (Database)

Additional Tools and Libraries

- Google Maps API (for map integration)

- OpenCV (for computer vision)

- Firebase (for real-time database and authentication)

**app.py**

from flask import Flask, render\_template, request, redirect, url\_for # type: ignore

app = Flask(\_\_name\_\_)

#Assumed facilities names on campus

facilities = [

{"name": "Sam Jonah Library", "info": "Main library, Sam Jonah Library. Northern Campus opposite the Shuttle bus station; PMB, University of Cape Coast ; 302 21 30952/3 ; library@ucc.edu.gh ; CC-167-5810 ... UCC Journals; Research Guides; Library Policies; Support the Libraries; Library Spaces; Borrowing Materials; Library Services; Library hour. Semester "},

{"name": "UCC main Hospital", "info": "The University of Cape Coast Hospital is located on the campus of the University of Cape Coast. The hospital provides services to both the university and the communities surrounding the university. The hospital has several sections: the outpatient clinic department (OPD), the medical laboratory, the male and female wards, and the children's ward."},

{"name": "Science Market", "info": "Market students"},

{"name": "Institute of Education", "info": "Institute of Education, University of Cape Coast. New Site, Opposite CALC Building Complex ; ioe@ucc.edu.gh Outreach Sandwich Support Lines: 0303956523; 0535560996; 0535410424; 0246337487 (Whatsapp only)"},

{"name": "Auditorium 900", "info": "site"},

{"name": "Sandwich Lecture Theater (SWL)", "info": "Near Science market"},

{"name": "Kwame Nkrumah Hall", "info": "New site, 15 Minute of Campus"},

{"name": "SRC Hall", "info": "Near Cape Coast Sport Stadium"},

{"name": "Valco Hall", "info": "Located at new site, 15 of campus"},

{"name": "New Lecture Theater(NLT)", "info": "Located 10 minute of Sam Jonah Library"},

]

#This this route for home the page of the application

@app.route('/')

def home():

return render\_template('home.html', facilities=facilities)

#This is the route for login

@app.route('/login', methods=['GET', 'POST'])

def login():

if request.method == 'POST':

username = request.form['username']

password = request.form['password']

# User authentication

if username == "admin" and password == "PassWord$12345":

return redirect(url\_for('home'))

return render\_template('login.html')

#This is the route for facility on campus

@app.route('/facility/<name>')

def facility(name):

facility\_info = next((f for f in facilities if f["name"] == name), None)

return render\_template('facility.html', facility=facility\_info)

if \_\_name\_\_ == '\_\_main\_\_':

app.run(debug=True)

**base.html**

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Smart Campus Navigation</title>

<link rel="stylesheet" href="{{ url\_for('static', filename='styles.css') }}">

<link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.3/dist/css/bootstrap.rtl.min.css" integrity="sha384-dpuaG1suU0eT09tx5plTaGMLBsfDLzUCCUXOY2j/LSvXYuG6Bqs43ALlhIqAJVRb" crossorigin="anonymous">

</head>

<body>

<header class="fixed-top">

<nav >

<a href="{{ url\_for('home') }}">Home</a>

<a href="{{ url\_for('login') }}">Login</a>

<a href="{{ url\_for('profile') }}">Profile</a>

</nav>

</header>

<main class="container"> {% block content %}{% endblock %}</main>

<footer>

<div class="footer-container">

<div class="footer-section">

<h3>About Us</h3>

<p>Smart Campus Navigation helps new students and visitors find their way around the University of Cape Coast campus with ease.</p>

</div>

<div class="footer-section">

<h3>Quick Links</h3>

<ul>

<li><a href="{{ url\_for('home') }}">Home</a></li>

<li><a href="{{ url\_for('login') }}">Login</a></li>

<li><a href="{{ url\_for('facility', name='library') }}">Library</a></li>

<li><a href="{{ url\_for('facility', name='cafeteria') }}">Cafeteria</a></li>

</ul>

</div>

<div class="footer-section">

<h3>Build by Ayamba Sumaila</h3>

<h3>Contact Us</h3>

<p>Email: support@uccsmartnav.com</p>

<p>Phone: +233 24 123 4567</p>

</div>

<div class="footer-section social-media">

<h3>Follow Us</h3>

<a href="https://www.facebook.com" target="\_blank">Facebook</a>

<a href="https://www.twitter.com" target="\_blank">Twitter</a>

<a href="https://www.instagram.com" target="\_blank">Instagram</a>

</div>

</div>

</footer>

</body>

</html>

**Home.html**

{% extends "base.html" %}

{% block content %}

<br><br><br><hr>

<div class="container">

<h1>Welcome to Smart Campus Navigation </h1>

<h3>Your Hassle Free Application</h3>

<h4>Search for Available Locations on Campus ... </h4>

<ul class="facilities-list" style="list-style-type: none;">

{% for facility in facilities %}

<li class="facility-item"><a class="facility-link" href="{{ url\_for('facility',

name=facility.name) }}">{{ facility.name }}</a></li>

{% endfor %}

</ul>

</div>

<p><iframe src="<https://www.google.com/maps/embed?pb=!1m18!1m12!1m3>! 1d3973.919362315415!2d-1.2935693265807848!3d5.

11669729486036!2m3!1f0!2f0!3f0!3m2!1i1024!2i768!4f13.1!3m3!1m2!1s0xfddf9348ffeba9f %3A0x55ab185bf1eabb4d!2sSam%20Jonah%

20Library!5e0!3m2!1sen!2sgh!4v1722139394469!5m2!1sen!2sgh" width="1010" height="600" style="border:0;" allowfullscreen=""

loading="lazy" referrerpolicy="no-referrer-when-downgrade"></iframe>

</p>

{% endblock %}

**facility.html**

{% extends "base.html" %}

{% block content %}

<h1>{{ facility.name }}</h1>

<p>{{ facility.info }}</p>

<a href="{{ url\_for('home') }}">Back to Home</a>

{% endblock %}

**login.html**

{% extends "base.html" %}

{% block content %}

<div class="container">

<br><br><hr>

<h1>Welcome to Smart Campus Navigation </h1>

<h3>Your Hassle Free Application</h3>

<h1>Please Login</h1>

<form action="{{ url\_for('login') }}" method="POST">

<label for="username">Username:</label>

<input type="text" id="username" name="username" required>

<br>

<label for="password">Password:</label>

<input type="password" id="password" name="password" required>

<br>

<button type="submit">Login</button>

</form>

</div>

{% endblock %}

**userprofile.html**

{% extends "base.html" %}

{% block content %}

<div class="container">

<ul><li>Name:</li> <li>Age :</li> <li>Name:</li> <li>Phone</li> <li>Email:</li>

<li>Location history</li>

</ul>

</div>

{% endblock %}