

Problem Statement 1656:-

Development of a mobile application to provide recreational suitability information of beach locations across India.

Description:-

Background: Coastal tourism is one of the priority areas highlighted in the Draft Blue economy policy of India. As such, use of technology to improve the tourism and related sectors is the need of the hour. Given the expected increase in the coastal tourism of our country, there is a need to ensure safety of the tourists. In this regard, a mobile application indicating the suitability of beaches for recreational activities (based on the current ocean state like wave heights/ocean currents, meteorological parameters like wind, water quality etc.) will be a useful value addition to the coastal tourism sector. Description: **The proposed app should be able to provide tourism suitability (say suitable/not suitable based on various parameters) at a particular point of time across various beaches in India. Create locations of different beaches across the country. Different parameters to be considered to determine suitability of a coastal location for recreation activities like Ocean alerts (High Wave/Swell Surge/Ocean Currents/Storm Surge/Tsunami), Winds, Water quality assessments. These parameters will be available via INCOIS (Indian National Centre for Ocean Information Services) API. The application should devise a method/algorithm to use the above parameters and make the safety/suitability decision at the different locations. Visualization using geospatial maps and colour codes based on suitability of locations. Based on the current location of the user, alert notifications to be provided in case of any alerts in the coastal location of the user) to be provided** Expected Solution: Design and development of a mobile application which identifies suitability of coastal tourism sites based on the current weather and oceanic conditions. This can help to save lives and better plan the coastal tourist/recreational activities for the user.

Objective:-

The goal is to develop a mobile application that provides real-time suitability assessments for beaches across India. The app will help users determine whether it is safe and suitable to visit a particular beach based on various oceanic and meteorological parameters. The application will use data from INCOIS (Indian National Centre for Ocean Information Services) to assess parameters such as wave heights, ocean currents, wind conditions, and water quality.

Key Features:

- 1. Real-time Suitability Assessment:**
 - The app will assess the suitability of beaches for recreational activities using parameters like wave heights, ocean currents, winds, and water quality.
 - It will provide a simple "suitable/not suitable" decision based on these factors.
- 2. Geospatial Visualization:**
 - Beaches will be displayed on a map with color codes indicating their current suitability status.
 - Users can view the safety status of various beaches at a glance.
- 3. Location-Based Alerts:**
 - The app will send push notifications to users when they are near a beach that has been flagged with an alert (e.g., high waves, poor water quality).
- 4. User Interaction:**
 - Users can select a beach to see detailed information on the current conditions.
 - The app will provide forecasts and allow users to plan trips based on future conditions.

Technology Stack:

- 1. Frontend:**
 - **Mobile Development:** Flutter or React Native (cross-platform, suitable for both Android and iOS)
 - **UI/UX Design:** Figma or Adobe XD for design and prototyping
 - **Mapping & Geospatial Visualization:** Mapbox or Google Maps API for displaying beaches and suitability information
- 2. Backend:**

- **Backend Framework:** Node.js with Express or Django (Python) for API development
 - **Database:** PostgreSQL with PostGIS extension for handling geospatial data
 - **Real-time Data Integration:** INCOIS API integration for oceanic and meteorological data
 - **Cloud Hosting:** AWS or Google Cloud for scalable backend services
3. **Algorithms:**
- **Data Processing:** Python for processing and analyzing real-time data from INCOIS.
 - **Suitability Algorithm:** A custom algorithm to assess beach suitability based on predefined thresholds for each parameter.
 - **Alert System:** A rule-based system to trigger alerts when certain conditions are met.
4. **Security:**
- **Authentication:** OAuth 2.0 for user authentication
 - **Data Encryption:** TLS for secure data transmission
 - **Push Notifications:** Firebase Cloud Messaging (FCM) for alert notification

Dataset Link:-

The oceanic alerts information will be available via REST API. Water quality assessment is available from https://incois.gov.in/portal/wqns/water_quality.jsp

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