**‘Surf Safari’ Senior Project Plan**

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**Problem and Motivation**

There exists a subset of surfers interested in studying and traveling to remote, unmapped surf locations around the world. This is evident in many surf films, from the classic ‘Endless Summer’ by Bruce Brown in 1965 (which followed a group of surfers chasing Summer around the globe and discovering new surf spots, most notably Cape Saint Francis) to the more recent film ‘Cold Water Journal’ (where a group of surfers visit surf spots that were scouted out using Google Earth and weather data) by San Luis Obispo local Chris Burkard. More evidence of this subset of surfers is evident from the Google Earth contest in 2007 by Surfing Magazine which led to the discovery of the world-class surf spot ‘Skeleton Bay’ in South Africa. These surfers are in need of a program that combines satellite imagery, weather information, and other surf specific information into one intuitive interface.

**Existing Solutions**

Surf forecasting websites such as ‘Surfline’ and ‘Magic Seaweed’ exist and largely satisfy the casual surfer’s need for surf related knowledge when it comes to well established surf spots. However, they lack the flexibility to allow surfers to explore unmapped, remote locations around the world and asses their surf potential.

‘Windy’ is another website that solves some aspects of this problem. Windy is a world weather forecasting website that displays on an interactive map very detailed weather information, swell information, webcams for select locations, information useful for traveling to selected locations such as a weather forecast along the route and elevation changes, and more. However, Windy is not made specifically for the purpose of identifying new, unmapped surf spots, so some features are lacking. It does not use satellite imagery (which is useful in identifying how a wave breaks at a specific location), and because of the general use of the website, there are a lot of features which make it intimidating and hard to use at first. With a specific focus on identifying remote surf locations, Surf Safari can be more tailored to that use.

**My Solution**

This project, ‘Surf Safari’, aims to satisfy the need in the surf community for a tool designed for discovering unmapped surf locations. It will have many features that will allow users to get deep insights into the geography and weather of beaches all around the world.

**Personal Goals**

I hope through this project to learn how to take in raw buoy data from NOAA and display it in an easily readable way on an interactive map displaying swells. I want to improve my abilities in full stack development, with AWS products such as Lambda, and overall improve my abilities in all stages of the creating a project including research, planning, and development.

**Features**

I have divided my list of features into two groups, ‘basic features’ and ‘stretch goal features’. The ‘basic features’ are the bare minimum features I need to be able to consider this a complete project. The ‘stretch goal features’ could add a lot of great functionality to the project and will be implemented if I am able to complete my other work on time.

*Basic Features*

1. Live swell information (height, period, and direction) for any coastal point using the NOAA API
2. Interactive map with satellite imagery
3. Topology data overlayed on map
4. Display of wind, air temperature, and water temperature (if available) at locations picked on map
5. Tide information
6. Ability to calculate distance between points
7. Ability to save marked spots on map with names and descriptions
8. Ability to download a report of all saved surf spots, or individual spots
9. Ability to share information about a surf spot discovered (will include a satellite image of spot, the user’s given name and description for the spot, and current swells hitting the spot)
10. Ability for users to create accounts
11. Search bar to jump to locations on the map, including a surf spot found and marked by the user (user’s give spots names)

*Stretch Goal Features*

1. Forecast of surf at specific coastal point
2. An overlay of the map showing all swells with their power and direction in the ocean
3. An overlay of the map showing wind currents
4. Displaying webcams located near the ocean using the Windy API for webcams
5. Ability to see satellite images of a specific location at a specified date using the NASA Earth API
6. Seafloor topology overlayed on map
7. Information about dangerous ocean life or hazards specific to locations (sharks, jellyfish, unclean water, etc)
8. Flight and/or drive time and cost estimates to travel to a discovered location from current location
9. Make known popular surf spots visible on map with information about their ideal weather conditions

**Assessment of Building Options for Project**

*Map API*

A major feature of this application will be an interactive satellite map. It is essential that I be able to overlay this map with weather and geographical data that I retrieve from other sources.

After reviewing several other options including Leaflet, TomTom, and Maxar I have decided that by far the most well-established map API that has all the functionality I need in terms of satellite imagery and customizability is MapBox GL JS.

*Front end*

My main choices for the frontend are React and Angular (because I am most familiar with these tools, and I will be able to develop the fastest with one of them). Both are widely used and well established, but I have decided to use React because of personal preferences (I prefer React’s one-way data binding and use of JSX and JavaScript instead of Angular’s two-way data binding and use of HTML templates and TypeScript).

*Back end*

I will use AWS API Gateway, AWS Lambda, and AWS DynamoDB for my backend because I want the simplicity of not worrying about managing a server and so that I can improve my skills in cloud computing.

**Timeline for Quarter 1**

I structured my timeline so that roughly every 10 days, I have a new deliverable due. In addition to the below deliverables, I will also be continuously reaching out to people experienced in surf forecasting and in discovering remote surf spots to see if new features are required or if certain features need adapting.

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| --- | --- |
| **Goal** | **Deadline** |
| Complete plan for quarter 1 | 1/20 |
| Figma demo of project | 1/30 |
| A MapBox map is setup to toggle between satellite images and topology information | 2/10 |
| Finished all React components for frontend. All backend code is stubbed. | 2/20 |
| Implement ability to create accounts and save user information about marked locations on map | 3/1 |
| AWS Lambda setup in backend to retrieve swell data from NOAA, and return it to the website in a way it can interpret | 3/10 |

**Goals for Quarter 2**

Once all the frontend work is finished and some of the backend is complete in Quarter 1, I hope in Quarter 2 to:

1. Finish the backend code for retrieving weather conditions
2. Setup the backend code for registering/logging in users
3. Setup a database in AWS to store user account information and data associated with accounts
4. Create a test suite for all my backend code to test edge cases and automatically detect errors before I release updates
5. Implement as many of the stretch-goal features as I can before the end of the quarter