INITIAL PLAN

ANDROID TIDES APPLICATION

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Module CM3203 One Semester Project (40 Credits)

Project Description

The aim of this project is to design, develop and create an Android application to allow the user to attain tide predictions at different locations across the UK. The tidal data would be collected and collated from Admiralty Easy Tides (http://easytide.ukho.gov.uk) as the basis for this application. The main outcome of this application would be to provide up to date tidal information in an intuitive and instinctive layout, all the while achieving this by obtaining a very accurate prediction of the user's location.

Nearly all android phones in our time have quite useful location APIs that can be combined with web-scraping to provide the foundation for the application. Location data can be very sensitive especially if personal information is to be captured and held on the device also.

Furthermore the user should be allowed the option to select a location to retrieve and display tidal data about other selectable locations to prevent limitation and add functionality to the application whether the location be selected from a list, map or from multiple suggestions based on the user's location or recent searches.

Ideally the application would determine the user's location from the phone and use this to predict the location of the station needed for the tide information. In order to retrieve the user's location permission is going to have to be explicitly granted by the user. The majority of the processing and web-scraping I hope to be achieved on a server with the application sending queries and doing as little processing conceivable to keep the application running as quick as possible.

As someone who did not know where to find or even whether there was any tidal data that existed, this project offers an accessible, mobile solution for those that would need to use the latest available data information. For example casual surfers, sailors and fishermen etc. would benefit from a fast, easy to use application as opposed to the existing alternative of having to access it slowly via browser

Project Aims and Objectives

Assumptions

For this application to work, it is assumed that the android application is going to be developed for use on very recent phones and for latest version of android (Version 4.4 “kitkat”). Furthermore it is assumed that the user will have a network connection to use the application as it relies heavily on recent, accurate gathering of data whether it be via wi-fi or mobile data.

Core Functionality (Essential Options)

- Application must be able to locate current location of the user and provide list of nearby tidal stations.
    - This method relies on the assumption that the user is on the app somewhere within a reasonable distance of a tidal station, if not no station will be suggested.
- User should be able to pick a place from a chosen place by selecting a list populated with the UK stations.
    - All stations will be divided into categories and sub-categories and sorted I.E. Southampton’s tidal station will be found under ‘South’ from the categories.
- Application should provide an interactive map where use can choose the tidal station from here with a populated list of tidal stations plotted on the map.
- After selecting a tidal station, application must display relevant tidal data within a date range
    - This data includes both the high and low tides of that day, at which time (UTC) the high and low tide are predicted and the height of the tides (metres) at these points.
    - Data for the current day should be the default shown data on initial viewing of a station’s data, but should be given the offer to view data as far as the tidal predictions go (up to 7 days from the current day).

Advanced Functionality (Desirable options)

- To get the application to display graphs of the tidal data in a readable manner when viewing tidal data.
- Aim to get an accurate means of prediction through an algorithm between two tidal stations that takes into account shape of the coastline and distance between points to try and output an accurate prediction of the spot closer to the user’s location.

Design Notes

Throughout the application design and development I will try to keep all parts of the application looking consistent as possible while trying to keep good usability and accessibility while trying to maximise efficiency.

Work Plan

In addition to everything on the work plan detailed below, I will be meeting Professor Ralph Martin on a weekly basis to discuss plans for next week in addition to progress made earlier. In terms of software development cycle, I will be using a waterfall approach as I feel my product will benefit from a sequential development process and it allows me to set specific targets to reach by points in time.

Week 1 23rd - 31st January

- Initial Plan Meeting
- Research and investigation into background material
    - Test and investigate some similar style applications and weigh up what they do well, what they do poorly
    - Research on tides and gain background knowledge about the subject of the application.
- Goal: Submit Initial Plan by 31st January

Week 2 1st - 7th February

- Learn android development thoroughly via the official Android programming course
- Investigate location API and legal, social and ethical reasons surrounding this data and ways to ensure sufficient handling of this data
- Goal: Be fluent with the Android SDK and be confident implementing an android application

Week 3 8th - 14th February

- Begin and finish sketches of the front end User Interface and detailing the HCI about how the application works
    - Include also a diagram of how the flow of the application works
- Begin implementing the front end objects on the android application without functionality
- Goal: Have a clear HCI UI design plan to adhere to within the application

Week 4 15th - 21st February

- Have the interactive map drawn and be able to select tidal stations from the map
- Goal: Have fully working map displayed and be able to select a tidal station from it.

Week 5 22nd - 28th February

- Implement being able to select a tidal station from a list populated from the Admiralty tides list
    - Aim is to have these sorted into categories which allows the user to more easily find the station they wish
- Goal: Be able to manually select a tidal station from a list as well as from a map

Week 6 29th - 6th February - March

- Implement a way to actually retrieve the tides (for the given day) and display the tidal information in the form of tabular data
    - This data will include the tide height, time of the tide and type of tide
- Not only implement the tide retrieval for the current day, but up to 7 days ahead
- Supervisor meeting to review progress
- Goal: Have a working way of displaying correct and recent tidal data
- Goal: In the meeting with the supervisor to ensure i'm on track and doing well to meet all targets and get guidance if needed

Week 7 7th - 13th March

- Use Android location API to attain the user's location from the application
- Find a way to use the location retrieved to predict the nearest stations to the user at the given point (providing they are within a certain distance of any place with a tide)
- Goal: Be able to retrieve the user's location and use this information to accurately predict the closest station(s)

Week 8 14th - 20th March

- Begin extended research on algorithm for prediction of tides based on location
    - This may involve first hand research of geographical experts or someone who has more domain specific knowledge
        - If there already exists a way to predict tides based on coastal factors will just need to encode this into an algorithm and then utilise it.
- Find the best possible computational solution to achieve an accurate prediction.
- Goal: Discover a reasonable pseudo-solution to prediction of tides in between stations

Week 9 21st - 27th March

- To help prediction find and implement an algorithm to pinpoint nearest coastal location.
    - Must be within a certain distance to somewhere with a tide
    - If not within a reasonable distance

Week 10 28th - 3rd March/April

- Find a reasonable solution to predict a tide, if not accurately, within a certain bounds of error and output this information to the user
- Goal: Have a method available to the user to find and predict a tidal location

Week 11 4th - 10th April

- Take the tidal data that's been retrieved and being to implement a graph with a 'line of best fit' which can be displayed to the user to give a reasonable estimate of tide height at different times of the displayed day.

Week 12 11th - 17th April

- Supervisor meeting to review progress
- Should have all core functionality implemented and running correctly, hopefully some/all of the advanced requirements (If not, continued extended work on this)
- Produce testing plan for all areas covered so far
- Goal: In the meeting with the supervisor to ensure i'm on track and doing well to meet all targets and get guidance if needed

Week 13 18th - 24th April

- Testing and evaluation of application in all parts begin and should be finished in this week
    - Will aim to get some user reviews of the application; what it does well, what it could do better

Week 14 25th - 1st April/May

- Final report writing and finalisation
- Goal: Make significant process writing up all so far

Week 15 1st - 6th May

- Final Report Writing and finalisation
- Goal: Complete the final report by the 6th

References

[1] - EasyTide - on-line tidal predictions from the UKHO (Easytide) - Most Comprehensive tidal prediction service on the web http://www.ukho.gov.uk/easytide/EasyTide/index.aspx