

HEURISTIC EVALUATION

CS 5760—HUMAN COMPUTER INTERACTIONS AND USABILITY

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APPLICATION DESIGN:

- Home Page: Home page of the application consists the brief overview of the application and instructions on how to use the application.
- Enter Location: Application would be able to obtain geographical location either from the phone's GPS user or the user can manually enter the location.
- Query Database: Once the application receives the location, it can query the Michigan Tech's database to obtain soil information and slope.
- User Inputs: After getting the information about the soil and slope, users can now select desired climate, enter an estimate of slope length, ground cover percentage and type.
- Prediction: Based on the user inputs, the Application can then use Distributed WEPP model to predict potential erosion and runoff.
- Updating Data: If the users finds any new information about the location, they can update, which is sent to the scientist for approval and on approval it gets submitted to the database and available for view by other users

UI DOMAIN:

The Application can be identified as mobile based online web application which would be accessible to the users through various web browsers and on different devices as well. A preexisting model known as WEPP, would be used to analyze the risks of soil erosion. The Primary users of this application will be Forestry Managers and Citizen Scientists who are interested in using the WEPP model for various purposes such as education and research. The main purpose of this application is to collect data from the affected location and predict the soil erosion and runoff. The Application can also be used by the users for updating the information of any location with their new findings, however it need to approved by the scientist before it gets submitted to the database and is available for view for other users. The Application can obtain the location using GPS of the user's phone or the user can manually enter the location. On submitting the data to the application's server, the application query the Michigan Tech's database and retrieve information related to the soil information and slope of that location. Users can then inputs informations like desired climate, enter an estimate of slope length, ground cover percentage and type. Using Disturbed WEPP model , application can predict potential erosion and runoff to the users. The UI for such an application should be highly user friendly, efficient and should contain clear information on the usage methods because the users may not be highly knowledgeable about the physical features of the locations.

HEURISTIC USABILITY PRINCIPLES FOR THE DESIGN'S UI DOMAIN:

Canonical list of heuristics as defined by Jakob Nielsen applies to UI domain of WEPP application are given as below:

- **Visibility of system status:**

The Users should always be informed about what is going on inside the system, through appropriate alert and feedbacks.

In the WEPP application, the users should be notified every time when their data has been successfully submitted. In case the internet connection is lost, they should be notified of that and when the connection is up again, they must be able to submit the data. Also, when the scientist analyzes the data and approves/rejects the changes, the users must be alerted of the same.

- **Match between system and the real world:**

The Application should use words, phrases and concepts that are familiar to the user, rather than technical terms.

In the WEPP application, the words and phrases used in the form for taking user inputs should be clear and unambiguous. As the users may not be field experts, it should not use technical terms to define the features of the location, instead it should use words that can be easily understood by the naive user.

- **User control and freedom:**

The Users should have full control over the application. Application should allow redo or undo of any task done by user.

In the WEPP application, user should be allowed to make changes to the information they have entered, anytime before submitting it to the scientist to review. Application should ask the users to confirm before exiting. This allows to prevent loss of information entered by the user if they have clicked on the exit button by mistake.

- **Consistency and standards:**

The Application should follow standard conventions and should be consistent throughout.

Buttons or Input Fields with same name should do same actions.

- **Error prevention**

The Application should prevent error that might occur during the processing of the application.

In the WEPP application, users may give wrong GPS Location, the application should promptly detect the error and alert the user before they commit.

- **Recognition rather than recall**

The Application should ensure that the information provided by the user in the initial pages are remembered throughout the application

In the WEPP application, Once they select the location, if they have to submit multiple data for same location, the location must be automatically obtained from the previous pages rather asking the user to select the location for every time they try to enter a new information.

- **Flexibility and efficiency of use**

The Application must be very efficiently designed and should not have any lag when a new information is entered by the user or whenever data is viewed by the scientist to analyze the findings.

- **Aesthetic and minimalist design**

The colors must be very clearly used. The submit buttons, request to query the database etc should be highlighted using strong colors.

- **Help users recognize, diagnose, and recover from errors**

The Application should use proper Error messages should be used for the users to identify the error.

In WEPP application, the users must be notified if the internet connection is lost and the partially entered data should be saved, to be submitted later when the connection is up again. The user should also be notified after the data gets submitted to the server and if some errors occurs while submission.

- **Help and documentation**

The Application should have complete documentation that guides the user on how to use the application. It should use language that can be easily understood by the naive users and should avoid technical terms.

USABILITY CONCERNS AND SUGGESTIONS:

Below are some of the usability concerns specific to WEPP application that need to taken care of :

- If the user chooses the wrong location the application must be able to handle it before the data is submitted. Proper error message must be shown to the user.
- The Application should notify the user if the connection is lost while the user is entering the data. Partial data should be saved and submitted to the server once the connection is up again.

- The words and phrases used in the web forms should not be technical. For example the naive user may not be able to understand the difference between “Request Input” and “Query Input”. Either the buttons with intuitive text can be used or each page can have instructions for the user on how to use the application/Page to enter their data.
- The user should also be notified through email when they submit the completed form and the form is forwarded to the scientist for approval and they should also be notified when the scientist approves/rejects their changes. Scientist should also be notified about the changes made so that they can review them.
- Once the Scientist approves the changes, it should be immediately updated in the database and when another user tries to query, it should show the updated information, even if the user is logged in before the changes were approved

CRITICAL USABILITY CONCERNS:

Among the Usability Concerns mentioned, some of the critical concerns that must be given priority are as below:

- If the application loses connectivity while user is entering data, user should be notified immediately and the partial data entered should be saved. If the developer chooses to support the application offline, then user should be notified once their information gets successfully submitted to the application server.
- Once the data is changes and submitted by the user, scientist must be notified to take proper actions and the user should be notified if their changes get accepted/rejected. Once the scientist approved it should be immediately reflected in the database.

CRITICAL USABILITY CONCERNS: SCENARIOS

- 1) **Allan Wake** is environmental scientist at Michigan State University since last four years. He is determined to pursue his research about the topographical study of different regions in Michigan. He decided to navigate through the WEPP application, while going through the details of different regions, he noticed that he has some new finding for a particular region, he decided to update the information. After entering all the information and just before submitting the form, he lost internet connectivity. The page got reloaded and Allan lost all the information which he entered.
- 2) In the second attempt, Allan was successful in submitting the data, however he did not got any notification whether his data was submitted or not. He wasn't sure whether to resubmit the information or not.

- 3) Thomas Cromwell is a scientist who reviewed Allan's changes on WEPP application and approved it, however Allen was not notified of this as well and he decided to reenter the data without knowing that the data has already been updated.