University of Glasgow

Human Computer Interaction 4

Assessed Exercise

Hide and Seek Mobile Application

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Contents

1 System Analysis

1.1 Aims of the System

1.2 Usefulness of the System

1.3 Similar Systems

2 Design and Testing

2.1 Design

2.1.1 HAPTIMAPS Toolkit

HAPTIMAPS is an open source toolkit which allows developers to simply and easily create applications that offer multi-modal feedback for map based applications. Having previously used the HAPTIMAPS toolkit, I can vouch for its effectiveness and authenticity. This, in fact, was one of the primary reasons that I decided against its usage in the final system. As native android provides sufficient functionality for handling GPS data, it was not necessary to include the HAPTIMAPS toolkit, however, should the app be expanded further (See Section 3.2) I would almost definitly opt to use the toolkit

2.2 Testing

3 More Information

3.1 Working with new Modalities

The challenge of working with new modalities was a fun prospect, what added to this was that I was adament not to use any kind of visual display or feedback, in fact, for the majority of the implementation stage I kept the android default "Hello World" display (this changed as I now put a message here if the GPS is not activated). Android offers reasonably good support for accessing the native vibrate and GPS functions of the mobile device. This meant that applying the application logic to the vibrate and beep features was relatively straightforward.

3.1.1 Working with GPS

One of the initial concerns I had with the system was that of the GPS. Having never used the system before (accompanied by a limited understanding of how GPS actually works), I did not feel like I was in the best position to start developing an application that relied heavily upon it.

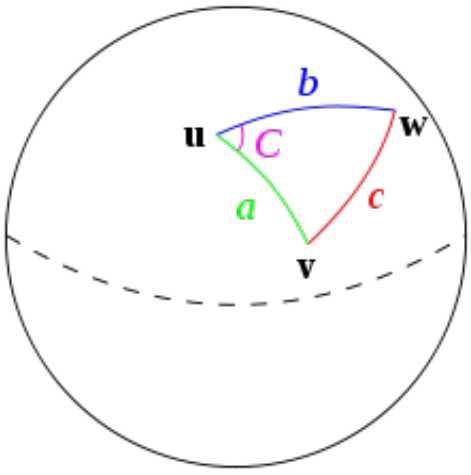

Figure 1: The haversine formula calculating the true distance on the spherical earth

After researching the topic, I quickly discovered that many GPS based systems rely heavily upon maths that is not included as standard in the Java GPS libraries. One such example of this is the haversine formula which solves the issue of GPS triangulation not giving the true distance between two points. In reality this is only relevant when calculating distances which are realistically subject to variation in relation to the curvature of the earth. For instance, calculating distances over a city would provide a negligable discrpency when constrasting the distances gathered using the haversine formula

with distances caluculated without using it. For this reason, the application that I have developed does not perform any complex maths using the haversine formula or any other geo-positioning equations. However, should the app be developed further and used over a geographical scale, then the app would almost certainly have to feature GPS related maths.

3.2 Further development

Although the system itself was reasonably simple to implement, especially when faking (to an extent) some of the back end functionality. What is more interesting here is the broader application of the multimodal feedback that is received whilst using the app. As the user of a broader system would only have limited interaction with a GUI, the importance would then be placed on having a system that accurately conveys meaningful messages via vibration and audio. Currently the feedback received is of a binary nature, that is to say, in the determination of distance or direction you judge your accuracy by the presence or lack of a beep/vibration. Currently, it is the intervals between the beeps and vibrations that indicates to the user their direction and distance. The initial reason for not providing alternative forms of feedback (for instance different intensity of vibrations or different audio signals), was that the primary purpose of the app is that of a game. However, similar systems such as HAPTIMAPS (see above section) allow for users to use a series of common HCI interactivity modes to give feedback to users using map based applications where the user cannot see the screen.

4 Conclusion