PROJECT PROPOSAL

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Project Title

The proposed research project name is: ***Mobile Visualisation Techniques for Large Datasets***.

Problem Statement

Mobile phones are increasingly becoming an integral tool in our society. Advances in both desktop and mobile computing and internet access are making information quick to produce and its availability easy. The result is information overload.

While various techniques for visualising information on the desktop are available, the mobile platform has very limited resources to cope with information, for example, due to the size and computing capacity of devices used in that platform. It is therefore necessary to explore what developments already exist and are underway in the computer science field that could be used to develop visualisations of large datasets.

Objective

The objective of the project is to develop mobile visualisations which will be suitable for display of large datasets on smartphones.

Data coming from the end users (members of society, using MobiSAM - [1]) will eventually span years of point data resulting in large datatsets. Additional data will possibly be produced from results of mining for patterns in the data supplied. The visualisations are aimed at smartphones due to their improvements in hardware (for example, processor speed) and recent developments in the mobile applications area.

Literature survey

The visualisations to be developed are specific to an already existing project implemented in the Makana Municipality, which is based on a paper by Thinyane and Coulson [1]. This paper puts forth the rationale for the use of

mobile phones in the context of local government, for social accountability and monitoring in South Africa.

Another paper for consideration in the literature review is titled *Visualising Information on Mobile Phones* by Luca Chittaro [2]. The paper discusses various aspects to consider during design and implementation of mobile visualisations. It also gives classes of visualisations on which more research is done.

Several papers listed below were reviewed and more will used in the project.

- The challenge of Mobile Devices for Human Computer Interaction [3].
- Visualisation Design Repository for Mobile Devices [4].
- Visualisation by Information type on mobile devices [5].
- ZoneZoom: Map Navigation for Smartphones with Recursive View Segmentation [6].
- MobiVis: A Visualisation System for Exploring Mobile Data [7].
- Introducing Sapelli: A mobile data collection platform for non-literate users [8].

Project Progression Timeline

Start Date	Activity
Mon 3 Mar	Literature review
Mon 3 Mar	Explore visualisation techniques in detail
Mon 31 Mar	Write up of Literature Review and Plan of Action
Mon 2 May	Start design & prototype interface
Mon 2 Jun	Start coding
Mon 25 Aug	Start user test
Mon 15 Sep	Start analysis of results
Tue 30 Sep	All coding and testing completed
Fri 31 Oct	Deadline for writeup

Approach/Methodology

The methodology used in the project will follow appropriate guidelines used for developing *Human Computer Interaction* related applications. Java or C# will be used during the implementation of the project as more expertise and resources lie with them in mobile platforms.

It is necessary to understand the various types of smartphones used so that visualisations are developed targeting types that are more prominant. Visualisation techniques will be explored to find out what already exist and what developments are underway in the mobile computing in order to determine which ones to adopt and integrate within project.

Expected Results

- The expected results are mobile visualisations targeted to high-end phones.
- Evaluation
- Write-up of findings

Possible Extensions

More visualisations will be developed if time permits, targeted to ordinary mobile phones. Various platforms will also be considered/catered for with regard to the developed visualisations. R will be explored to see what features it could suit best, particularly for visualisations targeted to ordinary phones.

Bibliography

[1] H. Thinyane and D. Coulson, "MobiSAM: Mobile Social Accountability Monitoring in South Africa," 2010.

[2] L. Chittaro, "Visualizing Information on Mobile Devices," 2006.

[3] M. Dunlop and S. Brewster, "The Challenge of Mobile Devices for Human Computer Interaction," *Personal and Ubiquitous Computing*, vol. 6, no. 4, pp. 235–236, 2006.

[4] V. Paelke, C. Reimann, and W. Rosenbach, "A Visualisation Design Repository for Mobile Devices," 2003.

[5] H. Y. Yoo and S. H. Cheon, "Visualisation by information types on mobile device," in *In APVis '06 Proceedings of the 2006 Asia-Pacific Symposium on Information Visualisation*, pp. 143–146, Australian Computer Society, Inc., 2006.

[6] D. C. Robbins, E. Cutrell, R. Sarin, and E. Horvitz, "ZoneZoom: map navigation for smartphones with recursive view segmentation," in *In AVI 04: Proceedings of the working conference on Advanced Visual Interfaces*, pp. 231–234, ACM Press, 2004.

[7] Z. Shen and K. Ma, "MobiVis: A Visualisation System for Exploring Mobile Data," 2008.

[8] M. Stevens, M. Vitos, J. Altenbuchner, and M. Haklay, "Introducing Sapelli: A mobile data collection platform for non-literate users," 2013.