

WaveWatch, an Ambient Information System Displaying Real-time Web Traffic Data

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Declaration of Originality

I declare that the work presented in this thesis is, to the best of my knowledge, original and my own work, or otherwise as acknowledged in the text. The material submitted in this thesis has not been submitted, either in whole or in part, for a degree at this or any other university.

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Abstract

This thesis observes the design, development and evaluation of a novel Ambient Information System, the WaveWatch. The WaveWatch utilises high-definition (1920x1080), pre-rendered 3D graphics to display real-time web traffic data. Specifically, the WaveWatch utilises the metaphor of an ocean wave to visualise web traffic volumes. The WaveWatch's metaphor is simple, if web traffic is high the display's ocean becomes larger and more turbulent and if web traffic is low the display's ocean becomes calm and flat. This research investigates both the feasibility of building such a display and the effectiveness of conveying real time information through the novel medium of a dynamic ocean.

The WaveWatch display was developed through an iterative design process, with a number of prototypes being developed before the deployment and evaluation of the final design. Overall it was found that creating an Ambient Information System that utilises 3D graphics and an ocean wave metaphor was technically feasibility. However, building the display was a complicated and lengthy process taking around 200 man-hours. This process was complicated by a number of design challenges including the creation of an aesthetically pleasing scene, the time for each scene to render, the creation of a real-time dynamic looping ocean animation and the limitations of current video playback technology. Despite these technical difficulties it was possible to combine existing technologies to create the novel Ambient Information System known as WaveWatch.

An instrumental case study was performed, where the WaveWatch display was deployed in a real life office environment for a period of two weeks. After this two-week evaluation period, participants who worked in the area were given the chance to complete a questionnaire related to the utility and perceived ease of use of the display. The key finding from this instrumental case study was that the majority of respondents found the novel wave metaphor for peripheral information visualisation to be a useful tool for generating interest in the underlying data source, where the metaphor itself was perceived to be both intuitive and easy to understand.