Rumble: An Ambient Awareness Platform for Urban Infrastructures

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TEI 2010, January 25 - 27, 2010, Boston, MA, USA

Abstract
Location-aware mobile applications almost always require the user's involvement to "pull" information from the platform. I propose Rumble, an ambient location-aware system designed to provide background notifications to users when they are near a particular kind of urban resource (for example, on top of a subway line or near free wireless access). After describing the differences in approach between Rumble and existing applications that attempt to make the user feel more like a "local" in a city, I outline several possible types of resource that might be suitable to the platform. I conclude with a summary of future work to further explore the concept.

Keywords
Urban exploration, tacto-location, ambient notifier, wearable computing, smart garment, persuasive technology, tactile augmented reality, tactile navigation

ACM Classification Keywords
H5.1. Multimedia Information Systems: Artificial, augmented, and virtual realities.

Introduction

To be one of the "locals" in a city is a matter of knowing: knowing its character, its resources, and its secrets. With this knowledge comes a fluid and efficient understanding of how to navigate based on these characteristics. In contrast, a visitor in the city is at the mercy of a multiplicity of wayfinding systems, many of which may be in competition with each other.

You gradually learn a city's sights and sounds simply by walking around, but other elements like bus routes, risk of crime, and wifi availability require more effort and attention to learn. Despite their hidden nature, we call upon these resources as often, if not more, than those in plain sight.

It is these invisible dimensions that we will reveal with the *Rumble* platform, named in reference to the feeling of standing over an active subway line. Rumble is an always-on mobile system that will gently alert its user when he or she is standing near a particular resource like subway tracks or a public restroom. The platform aims not to answer a one-time request for information, but rather to gradually reveal these sites of opportunity to the user in a manner that helps him or her to internalize the resource's locations.

Background and Approach

Rumble's approach combines the in-the-background computational strategy of an ambient device with the tactics of immersive language-learning. While several researchers have investigated the limitations of various tactile wayfinding devices, we can sidestep such complications by reducing the dimensions of information such an output must support[1][2]. Quite simply, Rumble's output is binary: the user is either near the resource or he/she is not.

Implementation

My approach will use data and GPS information from a mobile phone to actuate a Bluetooth-enabled wearable peripheral (for example, a hoodie whose sleeves and waist vibrate on cue, or a bracelet that gently squeezes your wrist). Activation occurs whenever the user's location is sufficiently near a point of interest.
augmented clothing and a bracelet that gently tightens to squeeze your wrist.
The software on the mobile device will periodically check the user's current location against a file containing map coordinates of the places of interest.

Citations

[1] Buchmann, V., Billinghurst, M., Cockburn, A. Directional Interfaces for Wearable Augmented Reality. In *Proc. CHINZ 2008*, ACM Press (2008), 47-54.

[2] Heuten, W., Henze, N., Boll, S., Pielot, M. Tactile Wayfinding: a non-visual support system for wayfinding. In *Proc. Of the 5th Nordic Conference on HCI 2008.* ACM Press (2008), 172-181.