The Ambient Loo - Caught Short when Nature Calls?

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Hamed Haddadi
Royal Veterinary College
University of London

Tristan Henderson
School of Computer Science
University of St Andrews

Jon Crowcroft
Computer Laboratory
University of Cambridge

ABSTRACT

On numerous occasions, trips to the facilities coincide with an important mobile phone call. Due to the sleek and polished nature of modern phones, attempting to promptly deal with such calls can occasionally lead to the phone sliding through the owner's hands, surrendering to the force of gravity and flying down the hole. This is a disaster, and often an expensive incident. It can also be a health and safety hazard, with the owner desperately attempting to retrieve their phone and re-using it.

This paper provides a first attempt at a cell phone recovery system using the modern functionalities of Toto Japanese toilets.[1] In our approach, the phone is *calmly* recovered, sanitized and retrieved by the user. This can all happen without the call even being dropped, with possibility of secure back-up of the user data by embedded sensor and Wi-Fi network connectivity in the toilet. We envision that such an approach will increase the collaboration between Japanese, European and American mobile operators, network researchers and hardware manufacturers.

Categories and Subject Descriptors: J.4 [Computer Application]: Social and Behavioral Sciences

General Terms: Human Factors.

1. INTRODUCTION

It is time for the pervasive and ubiquitous computing community to stop spending funds on imaginary products and invest in some decent technology. Many papers in this field are based around cell phones and a range of strange applications on them. Yet the most basic problems in using such devices remain unresolved. Cell phones are expensive and insurance policies do not cover inconvenient drops. This induces users to perform a hand dive for the phone in muddy waters, attempting to retrieve it in presence of hazardous chemicals and substances. The user then attempts to use water, soap (if available) and eventually a blow dryer to recover the phone.

In this paper we perform the first attempt at solving this problem using sensor networks. The *ambient loo* provides a safe environment for recovery of a phone that has slipped out of the owner's hands or pocket, while at the same time sanitizing the phone. In fact, we believe the ambient loo provides an incentive for users to intentionally drop their phones down the bowl in order to sanitize it from daily use and bacteria.

[1] `http://www.toto.co.jp/`

2. CELL PHONE RETRIEVAL STRATEGY

We leverage technology from Toto (we know, we know we are not in Kansas anymore) to create the ambient loo, to stop the overly-frequent loss of cell phones caused by dropping them into the water when they are insecurely perched in shirt pockets etc, or while they are being used on the commode. Accelerometers, as featured in most current smartphones, beacon activity to a sensor embedded in the loo. On receiving accelerometer readings which indicate rapid movement, the loo quickly swaps the water out of the way, exploiting U-virtualisation and fast migration, and turns on the blow dryer, to gently lower the phone on to the porcelain, allowing the user to retrieve it safely and cleanly. In the mean time, sanitizing spray is blown on the phone in order to remove bacteria and germs. This simple technology will provide a first line of defense against financial loss, social isolation and depression caused by drawning cell phones.

3. FUTURE DIRECTIONS

We are at the first stages of prototype development for the ambient loo. Since this is Japanese technology, we believe we are obliged to add karaoke to the mix in order to ensure a successful product. If the user starts singing a song while sat on the loo, the ambient loo connects to a content distribution network to find the nearest MP3 player/stereo/server with the correct song on it, and then starts spraying the water and blow dryer in time to the music (bass drum and cymbal respectively). The tune and rendition by the singer are cached on the phone for later replay.

Problems arising due to accidentally dropping the phone to the floor while actually using the loo are left as exercises for the reader. Another open avenue for research is privacy as users do not always wish to be available in toilets or to be tracked there.

The ambient loo will ensure the NSF and EU funding agencies that calm, seamless, persuasive, secure and private ubiquitous computing is alive and well, and that collaborations between Japan and the UK are being taken very very seriously.

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