Research in the Large: Challenges for Large-Scale Mobile Application Research - A Case Study about NFC Adoption using Gamification via an App Store

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ABSTRACT

The adoption of NFC technology has taken longer than expected after its inception in 2004. Several projects on ticketing and payment are gaining momentum. However, the actual state of adoption of NFC is still unclear. As an alternative to consultants’ prediction (which mostly prove wrong), this paper describes a gamification-based approach to motivate users themselves to report on NFC tags they spotted in their environment. As part of a trading card context, users get rewarded with gadgets and points for documenting the existence of NFC technology in their environment. This paper describes the development of this game and the experiences of two release cycles. The paper concludes with lessons learned and provides an outlook on next steps.

Keywords: Gamification, Mobile Applications, Mobile Phones, Near Field Communication (NFC) Technology, Radio Frequency Identification (RFID) Technology

1. INTRODUCTION AND MOTIVATION

In 2004, Nokia, Philips and Sony jointly proposed a wireless communication standard, Near Field Communication (NFC), to establish communication among mobile device by touching or bringing them in close proximity of less than a few centimeters.

As this proposed NFC standard builds upon established standards of wireless smartcards and Radio Frequency Identification (RFID) technology, NFC enabled devices to act both as a smartcard or RFID tag as well as reading smartcards and RFID tags. Thus, NFC enabled mobile phones to connect to a completely new group of users to everyday items and, as such, to

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extend the role of mobile phones by new forms of communication between people and objects.

NFC technology operates at 13.56 MHz (HF Frequency) and comprises two standards. First, the NFCIP-1 standard (approved as ISO/IEC 18092) specifies the air interface and transmission protocol for NFC devices. This standard allows reading wireless smartcards (ISO/IEC 14443). Second, NFCIP-2 (approved as ISO/IEC 21481) enables access to read RFID tags (ISO/IEC 15693) and determines which communication standards are going to be used at the beginning of a communication session.

Since its inception, contactless payment transactions, electronic ticketing, data exchange, and simplified setup of more complex communications such as Wi-Fi or Bluetooth have been proposed. Just recently, Google Wallet has been launched in the US as a first NFC-based implementation allowing consumers to store credit card and store loyalty card information in a virtual wallet and then use an NFC-enabled device at terminals that also accept wireless smartcard transactions. Several local transport companies have trialed NFC ticketing systems for public transport. However, the predicted break-through of NFC technology has not happened yet.

Despite the huge variety of applications based on wireless payment, couponing, ticketing, linking of information to places and things, handset manufacturers have been slow and reluctant to integrate NFC technology into their devices. From the first phone ever produced in serial production with NFC in 2004 (with the Nokia 6131) it took until 2010 when the first smartphone was released with NFC (e.g. the Samsung Nexus S). Finally, a larger number of phones from various manufacturers have become available which could trigger the adoption of this technology. NFC is getting used in a wider range of applications, from gaming consoles like the upcoming Wii U (Engadet, 2012) to payment solutions. Recent versions of the Android SDK and Windows 8 provide libraries that allow easy access to the underlying NFC hardware.

Albeit several approaches from mobile phone and computing equipment manufacturers to push this technology into the market and numerous scientific publications on the technology and potentials for advanced human-computer interaction, the success so far has only been limited in the year 2012. Furthermore, there is still doubt on the potential of NFC to actually be widely applied – Apple therefore refrained from integrating NFC in their current iPhone 5 mobile phone released in September 2012.

With our research, we want to investigate further on the potentials of the NFC technology, and for those having an NFC-enabled mobile device, one question still remains: ‘Where are the NFC tags and what can I do with those?’ As there is no central registry or database of NFC applications or tags, the goal of this project is to capture the current state of deployment of NFC solutions using a crowd-sourced approach. We want to motivate users to collect locations, uses, and picture NFC tags deployed in the real world in order to capture the current stage of adoption and deployment. With this we want to provide an alternative to predictions, expert views and opinions, but rather base maturity of NFC technology on facts and users’ experiences.

To learn about the situation ‘in the wild’, we have released a research app to the public via the Play Store as a proof of concept for capturing the state of NFC deployment by a gamified approach. In the following, we describe the rationale, design, and release of “NFC Heroes” that makes use of the platform’s NFC capabilities and gives users in-game incentives to scan and upload information about deployed NFC tags.

We present the process of publishing the game on Google’s Play Store and how we integrated Facebook as an identity provider. Our goal is to bring a research application to a consumer platform. We share the lessons we learned during that process, both in terms of direct user feedback and number of users our game did attract. We also report on our insights gained from maintaining and updating apps deployed using app stores. We conclude by summarizing our findings and experiences.
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