Towards Trustworthy Spatial Messaging

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Abstract

Spatial messaging is a term that defines the virtual publication of data in physical places. Generally, anyone in the neighborhood of such a publication point gets the message. Frameworks allowing the users to publish freely spatial messages already exist. However, the experiences realized with volunteers showed that there is only little interest in posting such notes. To our view, the main reason is that there are currently no trust and security mechanisms that inform about the trustworthiness of the messages, thus preventing any serious application. Filling this gap will promote the success of spatial messaging and the growing success of localization and mobile techniques will provide a good support for this concept. This paper describes the spatial messaging services that we are in the process to deploy with our new spatial messaging framework, which includes trust and security mechanisms.

Keywords: spatial messaging, tag, trust, security

1   Introduction

Spatial messaging, also called digital graffiti, air graffiti, or splash messaging, allows a user to publish a geo-referenced note so that any other user that attends the same place can get the message.

There are many reasons to believe that spatial messaging will become a wide spread concept in a nearby future. Today, people use the connection capabilities of their mobile phone mostly in one way, to download information. But in the same way that people passed from television to Internet, the next generation of user will probably become *active* and publish information. If we remember how fast the computer power and the communication capabilities of these devices improve, and the fact that there are today more modern mobile phones (with Internet connection) than desktop computers in the world, we can easily paint a glorious future for mobile technology. This assertion can be confirmed by the growing interest for location awareness. The success of Mobile Mappy [9], a service that allows you to download

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maps on your mobile phone as well as POIs (Points Of Interest) wherever you are, is an indicator of this growing interest. And Mobile Mappy is not alone. There are more and more applications or Internet services for mobile users that provide maps and other information related to your current position.

Based on previous deployment of spatial messaging prototypes, we argue that the trust and security aspects are the main barrier for wide user adoption of spatial messaging prototypes. For example, an analysis of a GeoNotes [11] log made during a real-use study shows that 6% of the messages were signed using someone else's identity. At the end of the 6-month deployment of E-Graffiti [1], it came out that it was possible to post notes about online websites rather than related to the positions of the notes and that the users used it only 7.6 times in average. We believe that there are scenarios where users would really participate if trust and security are guaranteed. For example, when John was on holidays at Sunny Beach, he took some pictures, added comment about his tourist experience and then defined that all the people in his address book marked as friends should have access to it, and finally posted the whole at his current position. One year later a friend of John that chose the same place for his holiday finds the pictures and can read John's notes; he learns among other things that the expensive restaurant so recommended by the tourist guides actually is not worth it. Section 2 presents related spatial messaging attempts that still miss to fulfill these trust and security requirements detailed in Section 3. The end of the paper presents an overview of our spatial messaging framework in Section 4, which includes trust and security, as well as implementation and deployment details about identity management in Subsection 4.2, trust management in Subsection 4.3 and contextualized evidence format in Subsection 4.4. Finally, we discuss future work and conclude.

2   Related work

The following projects focus on spatial messaging.

E-Graffiti [1] is a spatial messaging application that allows a user to read and post geo-localized notes. These notes can be either public or private, meaning that only the set of people defined by the author are able to read the note. E-Graffiti has been designed to study the social impacts on spatial messaging. 57 undergraduate students were given a laptop with E-Graffiti for a semester. All their activity has been logged and studied. And the results are far from encouraging. At the end of the semester, it came out that a user logged into the system only 7.6 times in average (std dev: 12.6), and that actually most of the user stuck to initial test messages. Another disappointment was that most of the posted notes were not related to their position. For example, a number of people posted notes to advertise a website. The system was designed so that the user could only get messages available at his current position, but it was possible to post a new message at any place from anywhere. Technically, the position of the user is determined by the wireless access point to which the device is connected. The precision is therefore limited to the building in which the user is.