TOWARDS NFC AND RFID COMBINATION TO AUTOMATIC SERVICES

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Abstract

The technological advancement is being part of our needs to express how important can be the detection of objects, which transmitted the identity as well as features via wireless communication, the target of ubiquitous computing is the perception computer as an invisible helper and for which we present in this paper a comparison of these two technologies in which visualize the advantages and disadvantages of radio frequency identification (storage system and remotely retrieving data using devices called tags, cards, transponders or RFID tags) and NFC (wireless communication technology, short-range high frequency that enables Exchange of data between devices)

Keywords: Ambient Intelligence, RFID, NFC

1. INTRODUCTION

This currently have an exact definition of ambient intelligence is so difficult to be a broad concept that may arise in the context where people have interaction with the digital environment and are supported in their tasks intelligently shape, where the term is based on intelligence that people receiving welfare system, and the environment is understood to be the environment where the person is located and the system.

This has developed an introduction to the area of "Ambient Intelligence" (AmI):
"A digital environment that proactively, but sensibly, supports people in their daily lives" [1]

Ambient Intelligence The term began to be used to describe environments that offer flexible and easy to adopt smart with the main point interactivity, Weiser [2] " indicated that if the team knew who and what was in their surroundings, could be adapted and provide services without requests you to realize that for these services". (AmI) is aimed at minimization effort interactivity with users.

Today this area (AmI) is defined in the work in the area and its development is focusing on problems of everyday life, so based on this development is mentioned, [3] "The most profound technologies are those that disappear. They are woven into the fabric of everyday life until they are indistinguishable from it "

This concept explains that any technology to have a degree of success must be fully integrated into our daily activities.
In previous work, we study the adaptation of the technology of radio frequency identification aiming at perception and identification of inputs (RFID) without the user having to perform any specific activity,

Current work focuses on the search for an additional advantages offered by RFID near field communication (NFC), offering examples and analyzing both communication systems all under a concept of emotional interaction within a scenario context of a conference giving it our conclusions.

2. AMBIENT INTELLIGENCE INTERACTION

Ambient Intelligence represents a vision of the future in which we are surrounded by environments with devices equipped with certain capacities intelligent and sensitive people who react to them

Technologies relating to Ambient Intelligence combine concepts of ubiquitous computing and intelligent systems of ambient intelligence emphasize

three characteristics: Ubiquity, which will accompany the user wherever you are (home, school, transportation, hospital, moving down the street , etc.), Invisibility by the ability to pass unnoticed in the physical environment and Intelligence for its ability to adapt to the preferences of the individual.

With a humanistic perspective, front common technological determinism reach to target of Ambient Intelligence requires new forms of interaction. The traditional interaction requires continuous interventions user to tell the system every little action to take, an approach that contradicts the computing milestone invisible.

Although Weiser mentioned the importance of knowing who is in the surroundings of the computer, it was not until the mid nineties that the concept of "context aware" arose [4] [5].

Dey defines this as "Any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves" " [6].

A fundamental characteristic of context aware systems is not only that they react to the user input, but that they also respond to contextual events that happen in the user's environment [7] [8].

It is important to find new ways of approaching natural interaction as much as possible to an implicit interaction, which is unnecessary explicit dialogue with the computer.

3. RFID and NFC

Ami as is an environment that interacts with sensitivity by detecting people according to their characteristics and preferences, in an easy, intuitive, you do not need a learning process [9] [10]. The activities of the AMI, our work will focus on two groups: users) Receive / Location, and b) that provides user services.

Our activity is to provide a sensitivity to the environment by means of a combination of active RFID and NFC. We are going to provide users with active RFID tags and NFC cell phones .. The modes of operation of these technologies generate perceive two different ways: user perceives RFID and NFC locates them.

3.1 RFID

RFID system generally consists of tags, antennas, readers and communication infrastructure. Generally, an RFID transponder or tag attached to an object. [fig 1]

This technology is usually used to identify objects, but its benefits make adaptability to use AmI possible.

RFID technology to capture information from the environment in an implicit manner, without any user effort, offering also implicitly? [11] [12] [13].

The RFID transponder or tag can be active (with battery and proactively emitting a radio frequency signal) or passive (non-powered and responds by emitting a radio frequency signal). An RFID reader is bound by a signal to the transponder or tag to identify the object that is responding transponder or tag. The transponder or tag has information about the object to be identified, depending on the need
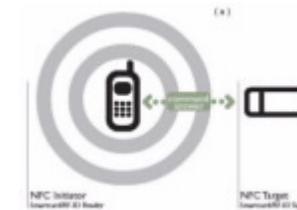

Figure 2

RFID tag (also called a transponder) is a microprocessor Consisting of an integrated chip with memory circuit. In general, the RFID tags can be grouped into basic categories: type, frequencies, or by capabilities
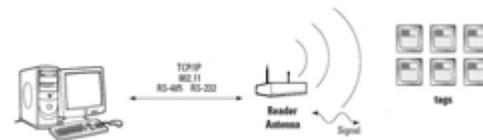

Figure. 3, RFID elements

RFID systems have basically two elements?[14]
•   The tags or transponders, which as packaged, in such a way that it can be installed in an object, also has a unique serial number.
•   Readers or interrogators contain one or more antennas, which emit radio waves and signals from the label recepcionan. The "interrogation" of the active signal all tags that are within reach.

RFID has several defined at various frequencies and protocols for numerous applications, as shown in Fig. The 18,000 standard measurement procedures described control structures RFID. [15][16][17]

3.2 NFC

NFC (Near Field Communication). is a short range wireless technology used in mobile environment.
Approved as an ISO standard in 2003, their use is underway in bank identification cards, keys for cars, identification cards or electronic tickets.

The difference with other wireless technologies is that the range is too short, you need the two devices to interact almost in contact for a while. despite this inconvenient feature that prove to be a limitation, is the opposite of this is the success of this technology, unlike what happens with RFID or Bluetooth services, based on the discovery of the presence of the device in proximity.

Bringing NFC device to the detector itself is a clear statement of our willingness autentificarnos

This technology was developed by Philips and Sony in 2002.

NFC systems is divided in two elements:

The Initiator, as the name implies, starts and controls the exchange of information (the RFID reader system) target, which is the device that responds to the requirement that the initiator (tag).

In an NFC system there are two modes: active and passive (fig. 2). In the active, both devices generate their own field of radio frequency to transmit data (peer to peer). On the liabilities side, only one of these devices generates the RF field, while the other is used to load modulation for data transfers.

Figure 5. (a) NFC device emits an RF signal to activate a target (b) Two NFC devices establish an active communication between them [18].

It is important to show that, although the NFC protocol can be installed in any electronic device, our focus is on mobile phones with NFC.

Difference Between RFID and NFC

NFC is an evolution of RFID, hence both technologies have a common basis in its apparent functionality. But that similarity only goes up there. NFC is an extension of the ISO 14443 standard, and its means of communication is by inducing a magnetic field between an initiating device (the reader or initiator) and a target device (or target).

The difference between NFC and RFID are three aspects
• The maximum distance (This does not mean you cannot run longer distances, but is the second point, the data security, marking the imitation)
• security in data exchange (NFC is intended for the exchange of sensitive data and the need to limit the elements interact when establishing this exchange)
• the ability of interaction between its elements as passive / active and active / active.

NFC was designed to operate at less than 10 cm between the initiator and the target, NFC is designed for the exchange of sensitive data and the need to limit the elements interact when establishing this exchange.

We are quite aware of the problems that have RFID security, why this technology was not seen with good eyes for use in electronic commerce, NFC has been initially designed for more sensitive applications, such as banking and e-business.

the RFID technology we perceive users within a service area; and with the NFC one, we locate them at a service point. This can be observed in Table 2.

The combination of both technologies does not limit the use of NFC in an intelligent environment. We can establish service points outside an RFID-defined area.

Table 2. Perceive vs. locate

	Techno-logy	User's action	Description
Perceive users in a sensitive	RFID	Implicit	It perceives the user that carries the

area or service			label within the reader's reach
Locate users at a service point	NFC	Explicit	The users have to bring the NFC devices close to each other.

The combination of both technologies does not limit the use of NFC to only an intelligent environment. We can establish a point of service outside the RFID-defined area.

A. Services

Although there is a great diversity of services in an intelligent environment, our interest focuses on those produced by identification from RFID and NFC technologies. Each one generates a particular type of services: RFID generates "Services in the area" and NFC brings "services at a point".

1) Area services

The user will be able to receive a series of services when inside the area of the RFID reader's reach (service area) depending on his or her characteristics and preferences, as well as on the availability of devices. We can now mention some of these services (Table 3): Visualization, Attendance, Location, and Note to comment.

2) Services in a point

When a user brings his NFC device near to another, it will be for the purpose of obtaining services. This service point can be fixed (if is part of the infrastructure of AmI) or mobile (if is carried by other user). The different services at a point are (table 3): Explicit sure identification, Presentation Card, Scheduling appointment/meeting, Carry files.

Table 3, EXPLICIT SERVICE BY NFC.

Services in point services	Data necessary
Business/Presentation card Bringing cell phones near each other in order to exchange a presentation card.	- Id User - Name - Address - e-mail - Tel & cell,
Scheduling date	- Id User
The user selects the option which will look for a meeting with another. By just putting the cell phones of both users close to each other, the system searches for and selects a suitable meeting arrangement.	- Cell phone agenda
Explicit sure identification The secure user identification at a "point of service". Example: When opening a door.	- Id User
Carry files Take files into the tag or cell phone memory so as to exchange data	- Id User -File destination - File

NFC technology requires an explicit action, "touch", to confirm the compliance process by pressing a button on the launcher.

In this interaction can contain one or two steps called "touching interaction", defined as "the deliberate approach between two devices, in order to obtain services."

"Touch" is the explicit task generates an "emotional interaction" - that removes the implicit ideal interaction or invisible. This generates so while saving effort in comparison with the traditional way to interact with electronic devices.

For now, the mobile phone with NFC is starting to distribute their applications and focus on two categories: Pay and Smart posters. As a device is widely used, however, there is the challenge to provide more embedded in the same device.

4. Case Study Touching interaction in conference Ambient intelligence interaction scenario

We have developed a prototype which is to describe the scenario described above. We decided to implement a test to visualize and understand the reactions of the users during the "2nd International Workshop on Ubiquitous Computing and Ambient Intelligence" (wUCAmI '06).

days before beginning the workshop, we asked the participating exhibitors and digital documents from

their presentation and identification assigned to such participation. Given that such information was stored on your accreditation badge exhibit or event participant which contained an NFC tag, considering that all the coordinators of this event had a mobile phone with NFC

During the development of the workshops at the beginning and at the end there is a display of ads that are of interest pair participants and exhibitors. At the start of each event coordinator until his credential situation indicated that it has complied with the reading of the device, continuing with the cell phone in this way the cell will receive the corresponding information. This will serve as the exponent approaches the presentation board automatically after your device is read, began the presentation by the speaker (Figure 5)

Figure 6. Reading the NFC target with the NFC-enabled cell phone.

While the workshop ended surveyed attendees, for comment and degree of knowledge of the NFC. Results that courage was: more than 90% of the participants considered it excellent applications were carried out in the workshop. They all thought that the application is very simple to use and over 80% felt that the application represents a reduction of effort of interaction.

5. Conclusions and further work

NFC features may circumvent the limitations of RFID. NFC contributes to the memory location and the tip which is what is lacking RFID.

It presents implicit services through a device that is used daily, which implies a saving of interactive effort. These features we ensure immediate acceptance by users.

It is suggested that the concept of "emotional interaction", giving this name to the process of bringing two NFC-enabled devices close to each other, in order to get services in an ambient intelligence environment. We have proposed a scenario and the corresponding evaluation of it on a real case.

This scenario gives us a combination of RFID and NFC is a better option than using either separately. For the moment, we are developing the next stages of our application and provide other environments could generate a combination of RFID NFC applied.

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