

# RFID Social Networking

## Measuring Consumer Satisfaction Index by Means of NFC

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**Abstract**—Radio frequency identification still is a source of inspiration and innovation. In this context it is legitimate to think about sustainable development repercussion and how RFID may improve human being life. This paper presents pilot solution for consumer called social RFID platform providing services such as sharing information about consumed products or service and the associated satisfaction degree. Also, the platform offers a publicity service for any company through loyalty and marketing models. Finally the platform provides statistics to institution such us consumer defense associations and statistics organism.

**Keywords**—RFID; NFC; Social networkinng

### I. Introduction

Radio frequency identification (RFID) [1] belongs to the Auto-ID family where the purpose is identifying objects using appropriated technology. Among them we list smart card, OCR, Biometric procedures, magnetic card, barcodes and RFID. The use of a technology should be well defined and must respect some criteria with regard to a business case model. Bare codes is a famous identification system but it suffers from some drawbacks like its sensibility to the environment (dirt, moisture, abrasion ..), the need of a line of sight (LOS) between the code and the reader, and the impossibility to update its contain as barcodes are finally a picture. However, with RFID things are different as no line of sight is required; RFID tags come in different types and clustered mainly according to reading range, read/write capabilities, energy autonomy (passive/semi passive/active).

RFID tag is a kind of silicon memory coupled to a resonating antenna. The chip contains at least the unique serial identification number ensuring the identification of the associated object attached on it. Thanks to miniaturization process, it becomes possible to integrate RFID tag in 'any object' with respect to tag selection criteria to ensure communication with the base station. This is why RFID is the most pervasive technology for today, transforming simple object to communicating one offering new services and return on investment (ROI). A large application palette limited by the imagination could be introduced such as: logistics, transport, item asset management, electronic article surveillance (EAS), real time location system (RTLS), Healthcare, maintenance & monitoring, packaging, sensing application, defense, and so on. Looking to this application mosaic it is legitimate to think

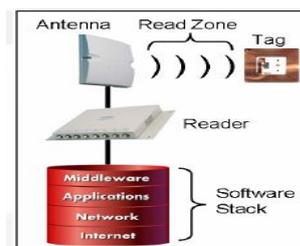
about new one able to be accepted by a huge community in order to create a sustainable market. The first idea that comes into mind is social networking application as an emerged tool ensuring people connection and activities visibility. well adapted by all the humanity to share personal information, transferring documents, opinion and experience, and any kind of information... So the idea why do not enjoy these services without the use of smart phone, PC or any complex communicating system, just we will use a wristband RFID tag that contains specific information that will be explained in the following paragraph. The first trial Integrating social network with RFID technology appears with coca-cola, Nissan Europe [3]. As long as the chain comports a lot of stockholders, as long as the project is defendable and ROI calculation could be clearly calculated. We have defined three types of stockholders: first consumers for sharing inquiry, satisfaction degree. Second producers for publicity and third institution such as statics organism and consumer defense associations, ,

### I. CONSUMER SATISFACTION INDEX

Evaluating consumer satisfaction is a critical mission to ensure any organization growth and business sustainability. The consumer satisfaction index is an economic indicator calculated in general based on survey questionnaire addressed to some peoples according to an appropriated model; like the American, Singapore, UK Customer satisfaction index. In general this mission is conducted by neutral body called often as Institute of Customer service or Consumer Protection organization.

### II. RFID Technology

Fig1. RFID System.



RFID is the acronym of Radio frequency identification. It describes a set of technologies with principal focus is the

identification of objects and persons wirelessly. The first designed system belongs to the era of the second world war. At that time it was vital to identify and differentiate between friend or foe (IFF) plane. The British developed the first active RFID system; the idea consisted to put a transmitter on each plane and send an identification sequence while receiving the radar signal from base station. At that period, the German developed the same system by controlling the radio signal reflected back when receiving the radar signal from the ground station. This system belongs to the category of passive RFID family.

Now days, thanks to advance in communication system and miniaturization, RFID becomes the most ubiquitous form of pervasive computing system. This fact is due to added value creation, with regard to specific vertical activities, through the integration of RFID in some business process. The added value creation deeply depends on the return on investment, application requirements and the RFID ecosystem constraints. This is why we could not use any RFID system on a plug & play basis. RFID has dropped its classical meaning related to contactless identification; it is possible now to design miniature tag providing advanced functionalities and information such as speed and the object physical state (sensors). It is obviously clear that RFID applications are limited by imagination

A basic RFID system consists of three parts. The first element is called tag or transponders. In general it is a chip coupled to an antenna. The chip contains at least the unique serial number, but may include some memory and advanced functionality as sensing environment.

The second part is called reader or base station. This is powerful device.

The third part is the middleware filtering data ...

RFID systems may be classified among the following criteria:

**Energy:** according to this metric three categories of systems are defined. First passive tag; the later do not hold an embedded battery but it harvests the energy wirelessly from the electromagnetic field issued by the base station. The second type is called semi-passive tag; the required energy for the communication process between base station and tag is provided by the reader, but this type of tag contain an onboard battery reserved only to supply additional blocs like embedded sensors. The last type is associated to active RFID tag. This category contains an energy source, as tag part of this family is a kind of transmitter.

**Reading range:** Regarding this criterion, tag are classified according the communication distance short, proximity, vicinity, long distance

**Read/write capabilities:** This criterion describes the access methodology to the tag memory. Basically we distinguish between Read only, write once read many, read /write

#### A. Passive RFID basics

Passive RFID tag harvest energy from the electromagnetic field generated by the reader. According to the wave length, and distance between radar's antenna and tag's antenna, wave

propagation theory distinguishes two zones called respectively near field and far field. In the first area, communication between tags and base station is achieved using inductive coupling. According to this situation, both tag and reader antennas behave respectively as primary and secondary coils of a transformer. However, for far field region, communication is ensured thanks to backscatter coupling on a radar basis.

The base station emits an electromagnetic wave that decreases with distance and covers a region called interrogation area. When the tag enters into this field it starts to harvest energy and modulates the carrier amplitude by the mean of load modulation mechanism. When receiving the modulated signal, the base station decodes the bit stream and gets the unique tag ID

### III. Proposed System Architecture

The designed system is described by Figure. 2. We choose Raspberri-pi as the main intelligent part to manage communication between the following components:

RFID module, Web cam, 3G modem and WiFi connectivity

Figure2. Realized system



The scenario is the following:

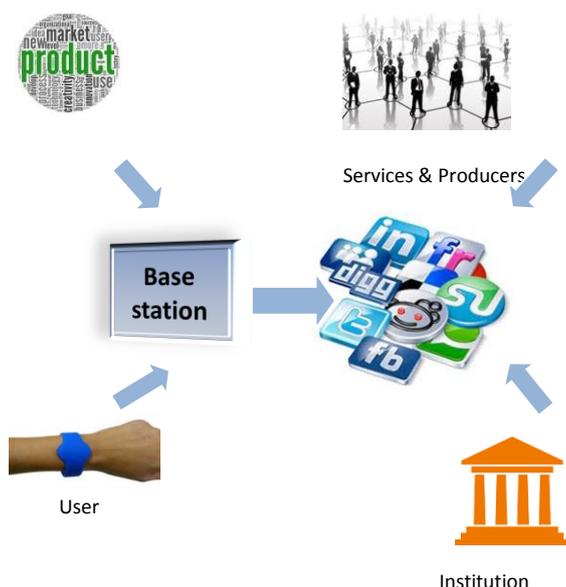
The platform, Figure 3, allows different people not only to share their experiences regarding a specific service or product, but to interact with product producers, governmental institutions or organizations, like those defending consumer right.

The scenario could be as follow: a customer gets an RFID wristband that holds his unique identification number, login and password of the appropriated social network. When he wants to mention his satisfaction or dissatisfaction regarding product, service, event or any experience; he just need to bring the RFID wristband near the base station. At this level, the customer is identified and logged into the social web application and an automatic action is ensured according to user experience. This action could be the automatic generation of satisfaction message (same as well as facebook like button)

or dissatisfaction one with the possibility to share picture by the use of webcam.

This platform, serves as inspection source and dashboard to analyze consumer behavior and reclamation. This fact is of great help for producers as they can consider this information to enhance the quality of their products or services, also the platform could be considered as a 'direct customer link channel', so that any producer can rely on loyalty model to make this link more strong. For instance; producer may propose promotional offer for client that reach a certain level of satisfaction. This platform could be considered as publicity tool in case of satisfaction, so that this opinion may affect other connected user as this is the effect of the social interaction.

Figure 3: Social RFID platform



Our work is still in progress as a lot of issue needs to be resolved related to the solution architecture for its global form.

These issues are mainly related to the interaction with other identification devices such as smart phone with NFC capabilities, also the consideration of big data concern as huge amount of data are generated according to each interaction between the user and the platform. Another issue is related to security.

## IV. Conclusion

In this paper we introduced a social platform that ensures the interaction, mainly, between costumers and producers. We believe that this platform can serve a powerful tool providing the operation of sharing information regarding any product or services. Also, producer may develop marketing action and keep close their customer relation channel (publicity, loyalty programs).

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