Bridging Physical Space and Digital Landscape to Drive Retail Innovation

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ABSTRACT

This paper describes a contemporary concept store, offering a technology-rich blend of entertainment and interactivity targeted to help customers in their shopping experiences while shortening the time they waste queuing.

CCS Concepts

•**Human-centered computing** → **Empirical studies in ubiquitous and mobile computing;** *Interaction devices;* Graphical user interfaces;

Keywords

multi-device interaction; mobile interaction; personalization; touch screens; smart retail; smart spaces

1. INTRODUCTION

Today's retail environment is more competitive than ever [6]. Internet has transformed the retail industry and this is confirmed taking a glance on many consumers, for whom Internet is the first port of call before making a purchase. However, given that the lack of experiential information and physical interaction with the product is one of the main barriers to buying online [2], retailers are trying to provide added-value experiences in their physical spaces [3]. Several solutions have been implemented under this principle and having the specific goal to save customers' time [1]. Current researches look to facilitate an immediate onsite purchase with mobile advertising [7] and mobile recommendation agents [4] and keeping an huge interest towards the multi-channel phenomenon [5]. However, there is still a gap in the literature concerning consumers' response towards these emerging retail approaches. This paper focuses on the creation of innovative services for small shops or showrooms, which are suffering the competition and growth of e-commerce and big players (malls, supermarket, large

brands, etc.). It describes a prototype development and its first round of users' evaluation in a real shop.

2. APPROACH AND ARCHITECTURE

The system is built for retailers that want to exploit available technologies to transform traditional shops into *Smart Retail Spaces* where they can offer a digital multi-channel experience to their customers. Its two-phases approach includes: an *idle* phase where the customer is not directly involved and an *active* phase where (s)he takes exclusive control of a large display to interactively obtain information. In the idle phase a *contextual digital signage* is played on large screens in the shop where promotional information tailored on the real time occupancy of the shop is displayed, by assuming that if most in-store users have smartphones by a specific vendor, playing promotional material related to that vendor can be more effective. In the active phase the user can take control of a multi touch screen to retrieve general information or to transfer on it previous interactions done using the shop app on his smartphone. The mobile app presents a splash view composed of a set of features: among others, it is possible to browse the shop digital catalogue pinning some interesting products for future checks or to connect a large screen available nearby. Using the app the user can scan a one-time QR code displayed on the screen (Figure 1) and automatically the actions previously done on his device (e.g. pinned interesting products) are transferred on the display. From now on, the interaction experiences are kept synchronized since the smartphone can be used as a special remote; in this way, content related to a product selected on the device can be thrown to the screen to be seen in higher quality or the details about a product on the screen can be transferred on the smartphone to be deeply evaluated later on.

The service includes also a discovery functionality where the user, instead of actively looking for a product in a digital catalogue, can explore the space using his smartphone camera. In this way, the user can move around in the store pointing his camera to exposed products and as soon as an item is detected via image recognition (e.g. a service poster or a specific price tag on a physical shelf) a related offer is displayed on the phone which can be literally "launched" and expanded on the large screen through a swipe up gesture. As described in Figure 2, the solution is composed of a box hosting the software that needs to run local to the shop and a set of components in the cloud to enable specific features that combined together can offer in-shop Wi-Fi connectivity,
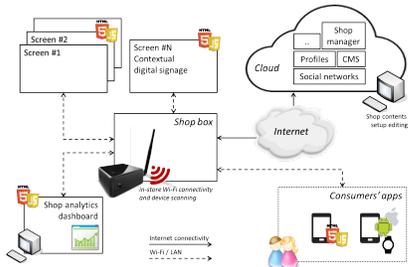
Figure 1: Multi-touch Smart Shelf.

Figure 2: System Architecture.

customer in-store presence detection, delivery of personalized proximity advertising and advanced device interaction with digital signage to create an innovative digital experience while in the shop. The local box provides connectivity to customers in the shop and runs also a scanning software able to opportunistically retrieve information about nearby devices (e.g. counting devices' wireless interfaces switched on and their recurrence, detecting devices' vendors, etc.). The components in cloud manage the links with the store backend system (if any), the users' profiles and preferences, their connection with external social networks, etc. and can be easily plugged in the solution according to specific retailer needs. Applications (both native and web-based) for customers' devices can be developed on top of the APIs exposed by the system. On top of this architecture, a service has been prototyped able both to support customers in searching information while waiting in queue and to provide innovative interactions with the exposed products and the space itself. The work focuses on a mobile-mediated interaction between users and a physical business, implementing an innovative read-to-share feature via QR code connection, which enables the takeover of the public screen and the content sharing.

3. FIELD TRIAL FINDINGS

The trial has been hosted in a mobile phone shop for one working week in early October 2015. Its main objective was to gather users' feedbacks to discover attitude toward the proposed technology, in terms of potential user's assessment of the desirability of using it. Secondly, the target was to examine the impact of this technology and its effectiveness in increasing brand reputation. Each user underwent a description of the solution carried out by the demo assistants, where all the innovative features offered by the service where detailed. After that, each user was asked to autonomously perform the tasks and to anonymously fill a quantitative questionnaire. A survey instrument was administered to a sample of 51 real customers, who indicated their agreement on a four-point scale. Beyond generic profile questions (gender, age, technology attitude, etc.), the main investiga-

tion areas were: technology features usefulness, perceived learnability, perceived potential impact of the adopted technologies on brand reputation and previous experiences of such technologies. Once the data elements were collected, the ANOVA (ANalysis Of VAriance) on the reputational effectiveness of each system feature and affect variables were performed. The results revealed that, among the four functionalities provided by the system: (1) expanding physical objects information from personal devices to large screens, (2) creating a list of pinned products on the mobile, (3) sharing this list on large screens, (4) modifying the list on the screen synching it back to the phone, the least valued functionality has been the fourth even though all of them were supported by at least 50% of users. With respect to the sources of strength (addressing users' needs, entertainment, engagement, attractiveness, innovation), entertainment during queue waiting time has been perceived as major added value, while leading more people scores the least average score.

4. CONCLUSIONS

This multi-connected technology resulted as an added value and benefit for both the end user, who invested his queuing time discovering the physical space, reinforcing his decision making process, and the retailer, who saw in it a concrete support in everyday assistants' work and an opportunity to enforce the building of the brand image. As a next step, we will continue to make our system user-friendly and feature-full, with focus on integrating tool results of different retailers (members of the same consortium), accounting all the users' behavioral concerns.

5. ACKNOWLEDGMENTS

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