Indoor Location Based Services in Retail and Marketing

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ABSTRACT

At the end of 2014 the InLocation Alliance (ILA) performed a survey among its members, asking them for the areas in which they expect that indoor positioning will be able to deliver value to the involved stakeholders, including end customers, venue owners, technology providers and system suppliers. Members indicated Retail and Marketing at the top of their efforts to reap benefits in the short / medium horizon.

This result is in line with the wealth of announcements of products, trials, and deployments that are unceasingly being published.

In this White Paper the ILA describes the motivations supporting these findings, reports some exemplary developments and deployments in retail and marketing, and highlights the importance of the ILA as a catalyst for open innovation.

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Table of Contents

2. Introduction

The main purpose of this white paper is to notify Retail industry thought leaders of some technical solutions being developed by the InLocation Alliance members; these technical solutions utilize the ILA developed technology-agnostic System Architecture which provides interoperability for ILA member developed use cases.

Although many notable examples of deployments in the retail industry are already available, with some being reported here, the ILA believes that the time has come for a more extensive activity that will allow a deeper integration of the indoor location technologies in the business processes of the retail industry, to the benefit of all involved stakeholders.

Industry organizations and alliances as well as innovative companies in the Retail industry are invited to contact and cooperate with the ILA to fulfill this intent.

To obtain more information about engagement possibilities with the ILA please see the contact information at the end of this white paper.

3. Notice to users

3.1 Laws and regulations

The indoor location technologies described herein make use of radio frequency devices for communications and location. All radio frequency devices are subject to regulations in the countries they are used. This paper does not address regulations for radio frequency devices and assumes all radio frequency devices are operated within regulation.

The determination of location creates information that may be owned or regulated. The ILA recognizes that in many jurisdictions there are rights to privacy and authorities who may have certain rights to information access. This white paper does not attempt to define rights to privacy, ownership rights or location data access authority. This white paper considers a generalized notion of these rights and offers suggestions and methods for how they may be

addressed. This white paper is not to be considered an authoritative source on these rights; this white paper may require updating as legislation, regulations or common law are established.

3.2 Copyrights and Disclaimers

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4. Location Based Services go indoors

With the wide availability of inexpensive Global Positioning System (GPS) receivers, people and businesses have come to rely on the GPS capability to allow the accurate positioning of smartphones, vehicles and other equipment. Its performance is sufficient for a multitude of everyday outdoor tasks, from wayfinding and navigation to asset tracking and resource management.

The overwhelming success enjoyed by these “killer applications” has raised the expectation of similar functionality indoors and in urban canyons, where the GPS signal is often weak or non-existent and so cannot be used to reliably fix a position..

In the meantime, numerous other technologies capable of supporting reliable and accurate indoor positioning are maturing and are reaching mass-market scale. Unlike the uniform coverage of GPS in open-sky environments, a range of options are available or are emerging for indoor positioning. Some systems exploit the Radio Frequency (RF) and networking capabilities of the device, such as cellular networks, WLANs and Bluetooth (BT); others are aided by the rich set of sensors available on current smartphones. Many systems can achieve indoor positioning by using almost any combination of accelerometers, gyros, magnetometers, cameras and microphones. Unlike the outdoor environment, there is no global infrastructure available for indoors and businesses will need to deploy solutions that best fit their applications and use cases. In some cases, the available inertial sensors provide good support to positioning and navigation. In other cases, a combination of fingerprinting, beacons and cellular networks may prove more appropriate. In one sense this adds complexity to a proposed system (what technology to use), but also unveils new opportunities: i.e. how the best “fit” for a given set of applications can be achieved.

5. Why Indoor Location Based Services: Retail

During the last decade retail has exploited two main channels: online and offline. With the advent of mobile technology the two branches have been edging ever nearer. A large

number of people admit to “showrooming”: i.e. visiting physical stores to experience “hands on” the product of interest and then buying it online - or doing a price comparison while in store.

Offline sales tend to involve an impulse element and there are no satisfactory tools (other than fidelity cards) that can help optimize the experience. Online customers are comparatively much easier to support and to track in their purchase process.

Marketing spent on Point of Sale is more than $20 billion[1] annually in the US alone, and it is really difficult to calculate the returns from this investment in terms of increased sales.

With the help of Location Based Services (LBS), we are reaching the moment in which the two worlds will meet. LBSs merge the offline and online retail experiences by realizing when a potential customer needs help in his decision process and tailoring the appropriate messages according to his profile and his behavior within the shop. Retailers can now establish an interaction that reaps the advantages of both worlds: brick and mortar and online shops.

Coupons are considered an important tool in the hands of marketers, in both online and offline retail, but their effectiveness has to be improved. For example, of the over 329 billion coupons for Consumer Packaged Goods issued in the US in 2013, only 2.9 billion or 0.88% were actually redeemed[2]

[1] “Mapping the indoor marketing opportunity”, Opus Research, January 2014
http://opusresearch.net/wordpress/pdfreports/OpusIndoorReport_24_Jan2014.pdf

[2] “inmar 2014 Coupon Trends”, March 2014

The ability to follow customers interests within the store coupled with the possibility to access their purchase history, allows retailers to effectively assess the customer's needs and deliver immediate value to them.

Different levels of customer engagement will require respecting the customer's privacy rights. More active approaches will require an "opt-in" by the customers when their willingness to share personal data is proportional to the perceived benefit.

6. The landscape

A clear result of the internal survey cited in the abstract, is that 75% of the respondents (mainly indoor location infrastructure and solution providers) indicated retail businesses among their top priorities and/or customers.

Digging into the detailed answers, we can report that ILA members are giving primary interest to content management (e.g., product and promotional information), people tracking, and the ability to provide directions and guidance, as the most important features.

We further observe that positioning and geo-fencing are key features, but proximity, where adjacency to individual displays and aisles is used, is emerging and is expected to become a leading feature. Basic positioning, however, remains paramount.

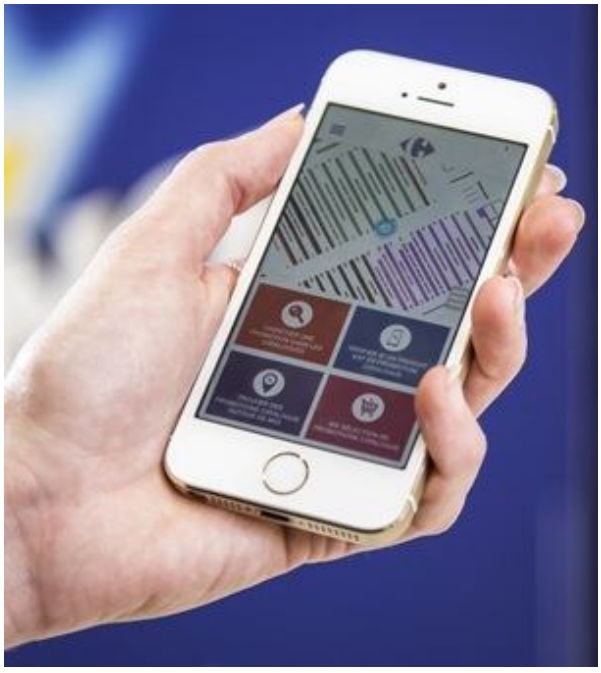
Other requirements listed as important in this use case working group survey are:

1. Adequate accuracy
2. Consistent user experience throughout different venues. It is not expected that people will accept or tolerate different usage models among different venues from different retailers.
3. User experience has to be enjoyable. This will motivate people to engage into indoor LBS and opt-in to the related services.
4. Privacy is a strong concern. Clear and simple privacy policies need to be provided and strictly adhered to.

7. Illustrative examples

Retail and marketing are currently attracting many developments with the perception that these technologies will be a game changer. In the following we report some of the examples provided by the membership.

7.1 Where are the discounts?



The newly refurbished **Carrefour** hypermarket in Lille, France has replaced its previous fluorescent lighting with energy efficient **Philips** LED lighting using patented VLC (Visible Light Communication) technology to transmit a unique code through light. It is undetectable by the human eye but can be simply detected with a smartphone camera, without the need for any additional accessories.

The system consists of LED fixtures, a cloud based location database and a software development kit upon which retailers can build their mobile interaction platform. The LED-based indoor positioning technology is easy to scale, accurate to sub-meter level and does not require any additional hardware investment besides the light fixtures themselves. The Philips connected lighting system has the potential to transform shopping into a more interactive and personalized, 'fun' experience. At the same time it will enable retailers to differentiate themselves, enhance customer loyalty and provide new services to shoppers. It already enables Carrefour to provide new services to its customers, such as helping shoppers to navigate and find promotions across the 7,800 square meter shop floor.

7.2 Location based multipurpose application for customer interaction

To support large retailers in establishing a solid and fruitful relation with their customers and a more interactive user experience, **Qrok** has developed a multipurpose application that integrates indoor navigation with iBeacon technology, contactless payments, intelligent loyalty and couponing.

The system collects extensive information about customers and their individual and collective behavior when moving inside the venues. Further data can be drawn by direct connection to social networks to allow more effective inferences.

Currently the system has been deployed in multiple shopping malls (see role model use case at one of the most prestigious shopping malls in Odessa Ukraine - **City Center**[3]) and QROK is implementing a similar approach also in other industries such as logistics, leisure & tourism (event centers, stadiums) and transportation.

7.3 In-store navigation and content delivery

indoo.rs GmbH based in Austria works with a number of retailers worldwide, including shopping malls, to offer navigation and proximity marketing solutions.

Not only does this help people get to their favorite shop quicker, but to get the up to the minute best offers sent directly to their phones.

Additionally, this gives the connection between the online and offline retail world giving another layer to the shopping experience.

Mobile campaigns require half the impressions as desktops, producing a 15% better Return-On-Ad-Spend, with desktop averaging 216% in ROAS vs. 257% from mobile[4].

[3] http://citycenter.od.ua

[4] "Do your mobile metrics measure up?", 4info/Catalina whitepaper, May 2015

With this in mind, adwhere by **sensewhere**™ uses precise location information of a user within a shopping mall through their smart device by picking up Radio Frequency signals such as Wi-Fi and Bluetooth and cross-referencing them with sensewhere universal location database to help determine intent to buy and create highly relevant content. This automatic fine-grain positioning means consumers can be targeted when they are most likely to make a purchase: in the proximity of the brand's store with a tailored offer in hand; activated on their smartphone.

8. Where do we go from here

Indoor Location Based Services are expanding and will not be confined to retail, POS and proximity marketing. On the contrary, we expect Indoor Location Based Services will span most businesses to fuel a new generation of context based functionalities that will improve how people interact with the retail establishment they are visiting, allow new users to interact for the first time, support the visually impaired or other special needs customers and improve how the retail owner manages store setup and floor plans to improve business.

Prnnewswire.com[5] reports the results of two research reports from different analysts showing forecasts of 36.9% Compound Annual Growth Rate (CAGR) worldwide for 2014-2019, and a second forecast showing a CAGR of 49.42% for 2014-2018. Although the studied periods and underlying assumptions do not completely overlap, both studies agree that the Indoor Location Based Services technology is now ready for an important market impact.

The main drivers are the spread of enabled phones which is expected to reach the billions a few years from now, and; the decreasing upfront investments needed to set up an infrastructure within the venues of interest.

[5] "Indoor Location Market Growing at 36,5% CAGR to 2019". November 2014, http://www.prnewswire.com/news-releases/indoor-location-market-growing-at-365-cagr-to-2019-282132411.html

For instance, next generations of fixed indoor Radio Frequency hardware (such as Wi-Fi and Bluetooth standards) are expected to be capable of broadcasting the location of Latitude, Longitude, and Altitude or Floor number. This is important for indoor positioning because these open standard RF units immediately become geo-spatial way-point markers that can be interpreted by any application that can address a geo-referenced model.

The availability of the technological enablers coupled with the improved awareness of the benefits will provide strong motivations to accelerate deployment rates.

9. The Open Innovation approach and ILA

As said, implementations can be based on fully or partially proprietary technologies.

ILA members believe that standard products and a consolidated approach will consistently reduce the upfront investments necessary for the development of indoor positioning solutions. Also Total Costs of Ownership are expected to decrease, thus consistently improving the cost / quality ratio and ultimately the ROI to the venue owners and service providers.

Further, the current proprietary solutions can be viewed as “closed” ecosystems that do not provide opportunities for the third party applications that have driven much of the mobile application innovation. Standardization will drive the definition of open interfaces that can be used by third parties to develop new solutions for customers and businesses alike.

The InLocation Alliance is the open industry forum where market players can reach a common technical understanding of the key components, interfaces and standards needed for end-to-end solutions. Standard based solutions shall also stimulate innovation, enhance service delivery, and allow companies playing different roles in the ecosystem to share use cases, experiences, and results from pilots and trials.

The ILA was founded in 2012 with these objectives and has now over 60 members. In ILA, member companies find a good setting for identifying and evaluating business cases and customer needs, with the associated technical and business requirements. The ILA actively

collaborates with relevant SDOs by contributing technical requirements rather than to create new standards itself.

The ILA has recently published a System Architecture white paper which defines a technology neutral architecture for indoor positioning solutions.

ILA is also active in showcasing concepts and technologies by organizing public panel discussions and demonstrations of solutions and concepts in key industry events.

Member activities are organized in the following working groups.

- System Architecture is developing an open, technology-agnostic architecture for accurate mobile location for different types of venues.
- Promotion is responsible for the external ILA relations and offers member opportunities to expand marketing reach.
- Use Case is identifying indoor positioning use cases and using these to drive requirements to the system architecture and to analyze their business impacts.

Further information can be obtained at our web site http://inlocationalliance.org/

To become a member, inquire about collaboration or for further information please contact: admin@inlocationalliance.org.

Photos courtesy of Philips Koninklijke