Proximity Social Marketing Facts!

CommSmart Global Group were one of, if not the first to look at the different signals that surround us, information that floats like dust in the sunlight pouring through a window, hence the development of '***Atmospherics***' some seven (7) years ago.

Atmospherics was not just '*the dust*', it was particles of information, snippets of vocal and digital data that are surrounding our space, the very bubble we all dwell in.

It is the overall work ethic of ***CommSmart Global Group, a LexisNexis Risk Solution Partner***, which has driven the digital data capabilities within our deep involvement law enforcement and public data. The manipulation of real-time collection, analysis and link capabilities has afforded us a deeper understanding of what is required in our corporate decision making processes.

CommSmart Global Group's Proximity Social Marketing (PSM) division and their partner, Leantegra, delivers significant innovation and competitive advantage to physical retailers and brands by enabling them to truly engage with their customers by unifying their smartphone on-line experience with their physical shopping activities.

With the main focus on commercial venues, like shopping malls and supermarkets, they build software and hardware products integrated into a single platform called the *Connected Venue Operator* (CVO).

Wireless Analytics is about collecting the wireless signals, like Wi-Fi or Low Energy Bluetooth (BLE), for further processing and analysis. The signals might be supplied by a variety of devices inside your venue: smartphones, tablets, laptops, tags or specific wireless sensors.

Wireless Analytics from **PSM** includes the following four main features:

1. Location Analytics - estimating the location of smartphones or any other wireless devices (e.g. based on Wi-Fi traffic). Using heat maps, charts or tabular presentation of the following statistics:

- *Number of visitors per location*
- *Zone popularity*
- *Dwell time*
- *Popular routes*
- *Recurring visitors and historical information*

2. Device Analytics - gathering statistics for device manufacturer, operating system, connection type etc.

3. Wireless Sensor Analytics - collecting useful data with sensors but not limited to which are powered by IR, BLE, EnOcean or ZigBee technologies:

- PIR motion detectors
- Infrared counters for visitors
- Accelerometer-based motion detectors
- Touch sensors, step sensors

4. Wireless Network Performance Analytics - measuring the quality of experience for your Wi-Fi network: availability, coverage and signal strength distribution, download and upload speed, spikes distribution etc.

For sure, there are many challenges with implementing the features for Wireless Analytics. Let's review the common challenges, which are considered and addressed in the solutions by **PSM**.

Challenges for Location Analytics

The main source of information for Location Analytics comes from the indoor positioning systems (e.g. based on Wi-Fi fingerprinting or trilateration algorithms). There are multiple ways how the accuracy of indoor positioning might be influenced - for example:

1. Specific ways your visitors might carry their smartphones or tags - impact the resulting signal strength:

   - Carried in hands with a good line-of-sight (LoS) connectivity to Wi-Fi AP

   - Carried inside a pocket

   - Carried inside a bag

   - Covered with obstacles like a visitor's own body

2. Specific RF characteristics of smartphones carried by your visitors - like Wi-Fi antenna gain, signal strength, RF sensitivity etc. This means that iPhone 8, Samsung Galaxy Note 8 and LG products might provide different RF information for the same location.

3. Level of dependence upon the manual labor and the "offline training phase" - for example: Wi-Fi fingerprinting algorithms depend upon the amount and the accuracy of collected fingerprints. Too much dependencies and manual work is required.

Challenges for Wireless Network Performance Analytics

There are numerous vendor-specific network monitoring and analytics solutions available today. Every solution is vendor-dependent and targets the specific wireless equipment (e.g. Wi-Fi AP devices) from the same vendor.

There is a more universal solutions, which integrate with WLAN routers or controllers directly. They're still dependent upon the vendor specifics and the limited list of Wi-Fi device models. They can't work with any Wi-Fi network from any vendor.

We see the following main challenges in this field:

1. Vendor lock-in for WLAN performance analytics - you will need to install the same Wi-Fi equipment from the same vendor to enable the network performance analytics.

2. More universal solutions: require large efforts for integration with vendor-specific WLAN routers and controllers.

3. General lack of solutions for wireless performance analytics other than Wi-Fi (e.g. Bluetooth or WSAN) - many vendors are focused on Wi-Fi only.

Challenges for Wireless Sensor Analytics

The main challenges in this area relate to the data volumes and the network interfaces:

1. Amount of data for collection and analytics - your sensor network might be generating terabytes of data per week. This data needs to be correctly stored and optimized for the best user experiences.

2. Complexity of protocols and interfaces - there are multiple standard wireless protocols like IR, BLE, ZigBee or EnOcean. Integration on the level of protocols is hard, providing a single unified UI for analytics is even harder.

Challenges for Device Analytics

MAC address discovery is the main technique for Device Analytics. Mapping MAC addresses to the vendor names can be easily implemented using a database with MAC address ranges.

But there are two main challenges, which make this implementation less straightforward:

1. MAC address obfuscation - starting from iOS 8 there is an option to randomize Wi-Fi MAC address in the probe requests. This makes tracking of iOS devices very hard to implement.

2. Indirect relation between Wi-Fi / Bluetooth MAC address and the smartphone vendor MAC ranges - some smartphone models do not supply the smartphone vendor MAC information in Wi-Fi / Bluetooth traffic.
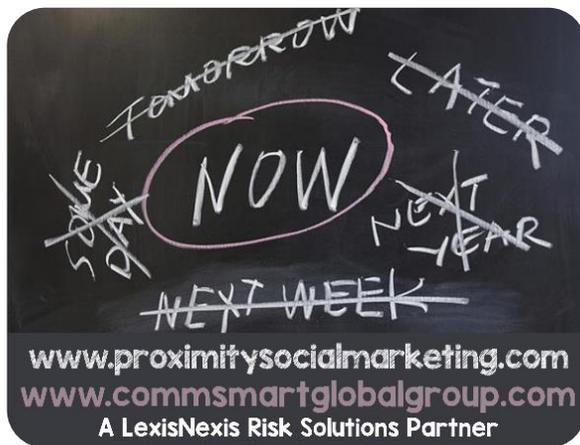
Things have really changed, you've probably heard many things about iBeacons already. This technology is leading the space of proximity marketing nowadays with multiple deployment cases around the world, which we are proud to be the instigator.

The future of iBeacon technology looks bright, considering its adoption for both iOS and Android platforms, good selection of relatively cheap iBeacon device models, overall simplicity of installation and usage etc.

But let's review and clarify several important things, which you can't do with iBeacon devices. I've selected five specific things, which I keep hearing in the form of popular questions about iBeacons:

1. No Content Distribution

2. No Visitor Analytics

3. No Location Services

4. No Work without Mobile Applications

5. No Troubleshooting and Maintenance Mechanisms

So let's analyze these statements and the relevant solutions by **PSM** in some more details:

1. No Content Distribution with iBeacons

iBeacons can't send any content to your smartphone. They broadcast a very small message and a secure clickable URL with iBeacon ID and proximity information only, nothing else. No file exchange or textual message delivery.

The useful content is provided by the mobile application on your smartphone using 3G/4G or Wi-Fi connection to the content server. Sometimes this content is embedded into the mobile application itself (local files), but this approach is much less flexible and dynamic.

Now imagine that you're on vacations in another country and walked into a shopping mall (e.g. Dubai Mall in UAE). Some nearby iBeacons in a retail shop trigger the proximity events in your iPhone application. Content download should be started …

Question: how to download this content based on the proximity events? Let's keep in mind that iBeacons can't send any content to your smartphone, it is only a notification. Possible options for this case:

- Using your 3G/4G mobile data roaming connection? - Extremely expensive, sometimes not affordable at all.

- Using the available Wi-Fi connection in a shopping mall? - Pretty rare case. Not all shopping malls have Wi-Fi connectivity, especially a free Wi-Fi with a good coverage in all places.

- Even if there is a free Wi-Fi installed near this specific retail shop - you need to discover its availability before the proximity events will be triggered. - Complicated and not intuitive.

Our Solution

With **PSM** you can use **PowerBeacon** devices themselves to distribute content via Low Energy Bluetooth (BLE) or Wi-Fi connections. No dependencies on 3G/4G connection or even the local Wi-Fi installations. For the case of available free Wi-Fi network inside your venue we function as a local CDN (Content Delivery Network) with advanced synchronization and caching of content.

2. No Visitor Analytics with iBeacons/Eddystone

Visitor analytics is an important feature for marketing, retail operations, building administration and other areas.

You can collect information about visitor locations, "hot" and "cold" zones inside your building, visitor device statistics, retail product popularity, conversion rates, consumer behavior patterns etc.

iBeacons don't provide this functionality. Visitor analytics can't be done using your existing iBeacon installation. iBeacon/Eddystone devices support broadcasting only - no two-way communication scenarios and no monitoring of the nearby smartphone devices.

Our Solution

PSM's CVO Platform provides advanced features for visitor analytics. Both real-time and historical analytics with location information, visitor device statistics, flows and trends etc. Statistics can be presented using heat maps, 2D/3D charts or tabular data formats.

3. No Location Services with iBeacons/Eddystone

You can't build the real-time location services (RTLS) using iBeacons/Eddystone. Indoor mapping and navigation applications simply can't be developed using iBeacons/Eddystone as well. The same for visitor location analytics or any other location-based services.

iBeacons/Eddystone provide the proximity range information only. No information about the distance in meters, just one of the proximity ranges:

1. Immediate

2. Near

3. Far

So you can't calculate (X, Y) coordinates of your visitor's smartphone based on the proximity to iBeacon devices.

Our Solution

Our platform has advanced implementations for RTLS based on Wi-Fi, Bluetooth and UWB. Our location services will work with or without installed mobile applications - like visitor location analytics or even indoor navigation for consumers.

4. No Work without Mobile Applications

Indeed iBeacons require an installed mobile application on your smartphone. Eddystone does not! iBeacons are useless for your visitors (and your business), if there is no mobile application configured specifically to work with the installed iBeacon devices in your venue.

You might say "not a big deal, it is easy to develop a mobile app nowadays". And basically you're right with this statement, but please consider the following comments:

- Bigger part of your visitors will not have your mobile application installed.

- Many of them will not agree to install your mobile app.

- Many of them won't be able to install / use your mobile app for iBeacons - different smartphone models and different OS versions without support for iBeacons. For example: older Android and iOS versions, Windows Phone devices, Nokia feature phones.

Speaking about the average numbers - get ready for 2%-5% of your visitors having both the right smartphone model and the installed mobile application for iBeacons (statistics is based on the local data only).

Our Solution

Many features of PSM CVO Platform work without the need to install any mobile applications. Visitor analytics, indoor navigation, proximity marketing, asset tracking and content distribution might work without mobile apps.

5. No Troubleshooting and Maintenance Mechanisms

There is one large gap in the original architecture of iBeacons - nothing is defined or implemented for troubleshooting and maintenance processes.

iBeacons are just standalone devices, which are not connected anywhere. You can't monitor or control them remotely like your Cisco switch (e.g. using SNMP or SSH or Web UI). Yes, there are some mobile applications for iBeacon configuration and control, but they work over Bluetooth LE connection. So you need to be in proximity to your iBeacons for configuring them - not very efficient and scalable, far away from the full-featured remote management.

There are many questions, which you will face upon planning your iBeacon installations:

- How to do the remote monitoring of iBeacons for failure alerts?

- How to do the remote firmware upgrades? Especially some urgent firmware patches for resolving the critical bugs?

- How to do the remote control, like turning on / off some iBeacons upon necessity?

- How to do the operational analytics for all installed iBeacon devices? Collecting statistics about performance, system events, failures etc.

- How to track the location of iBeacon devices on an indoor map of your building? How to track any possible location changes of iBeacon devices?

- General question - how to enable a good approach for planning, implementing, deploying and operating iBeacon networks with the best balance of cost, schedule and features?

And this is just a small part of the operational questions, which need to be answered in the process of planning your proximity marketing project.

Our Solution

PSM CVO Platform has been originally designed with advanced local and remote management features in mind. Remote monitoring and control, full-featured troubleshooting processes, SLA and performance management, remote firmware upgrades, advanced operational analytics etc.

For a heart to heart conversation of how we can produce more efficient profitable marketing with real-time data, contact us.

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