A

Seminar Report

On

BEACON TECHNOLOGY

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in
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by

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<u>CERTIFICATE</u>

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ABSTRACT

In the current smart mobile devices are increasingly popular trend and Bluetooth technology more widely. Beacon is based on Bluetooth technology and precision positioning technology. Beacon in use, mostly focused on the retail consumer push applications can bring promotional opportunities. 2013 Apple WWDC conference released iBeacon, is a wireless transmission scheme, exposed the micro-positioning in the future. However, any use Bluetooth low energy (BLE or Bluetooth 4.0) micro-positioning signal transmitters can be called Beacon, Beacon and iBeacon difference is only the difference between the broadcast signal frequency. Beacon technology addition to applications in the commercial, the paper will explore Beacon on a variety of information services applications, such as traditional library service combined iBeacon tour combining culture and technology to promote digital reading, use of site characterization recommended book list, different field will recommend different books, makes eBook thrust and iBeacon pull interact with each other, develop more users.

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INTRODUCTION

Beacons are a small device that broadcast a low-energy Bluetooth (BLE) signal nearby. You can use this signal strength to tell the approximate distance between the beacon and another Bluetooth enabled device. This could be sending an alert or performing an action once the app detects the beacon is a certain distance away, or it could be used as a method to track locations of people or products in an indoor environment. Due to satellite location systems being unable to work indoors, beacons are fast emerging as one of the primary indoor location technologies. There are two major beacon protocols in use today, one developed by Apple known as iBeacon. The other made by Google is known as Eddystone. Beacons send along some basic information periodically: A unique identifier (UUID) along with major and minor numbers are used to identify the beacon itself.

The signal strength and the interval between sending those signals are set by the manufacturer but can be changed to suit your needs. An Eddystone beacon can also send a URL address. While a beacon is broadcasting its signal, it will require something else to receive and utilize that signal in some way, commonly via a smartphone and accompanying app. With the most current research in 2018 suggesting that 40 to 50 percent of consumers leave Bluetooth turned on making their devices easily receptive to beacon messages, there's a real opportunity to reach users through this channel. According to Grand-view research, the Bluetooth Beacon Market will be worth $58.7 Billion by 2025 with Bluetooth beacons estimated to have a large-scale adoption and a compound annual growth rate of 95.3% by 2025.

PREVIOUS SOLUTIONS/PREVIOUS IMPLEMENTATIONS

When beacon technology was first developed and how it has been adopted around the globe.

10th June 2013: Apple introduces iBeacon as part of iOS 7 at World Wide Developer Conference (WWDC 2013).

1st September – 10th November 2013: Titan installs 500 beacons in Manhattan phone booths for "maintenance purposes."

6th December 2013: Apple installs beacons in all 254 of their US shops to provide customers with in-store notifications about items, product reviews, and deals.

Bluetooth Beacon-Based Proximity Marketing

Established in 2013, Bluetooth beacon technology was initially seen as a marvelous innovation for all things related to proximity marketing but as time passed, and more and more businesses turned to it, its limitations became visible. A Bluetooth beacon connection requires the use of two devices, a beacon and a mobile phone with enabled Bluetooth technology, thus sending information such as promotional messages, sales codes, and more. This technology was embraced by companies and marketers with the expectation that due to its popularity, beacons prices would drop significantly, yet that didn't happen exactly according to hope. But is cost the only problem with Bluetooth beacon-based proximity marketing.

12th August 2014: 3 UK stores trial beacon technology in their mannequins with the aim of providing prices and links to buying online to customers when they enter the beacon's 50-meter range. Significantly, customers had to have an app downloaded to receive the beacon's information. Customers were also tracked on how long they spent looking at an item and their method of purchase in order for the retailers to form a more accurate and personalized marketing strategy.

29th September 2014: The single largest application of beacon technology in retail to date occurs when Macy's installs over 4,000 devices across their shops.

21st November 2014: Aruba Networks successfully implements "blue dot" indoor navigation using beacons. This offers a cheaper and lower maintenance alternative to Wi-Fi for indoor navigation.

Early 2015: Some of the largest and most downloaded apps, including Facebook and Shazam, begin integrating beacons into their functionality.

14th July 2015: Google launches Eddystone, a platform-agnostic competitor to Apple's iBeacon. Eddystone is designed to provide location-based content to your smartphone. Being compatible across platforms, it aims to encourage developers to work with beacon technology.

14th April 2016: Google announces Eddystone-EID, which turns your phone, if connected to a beacon, into an encrypted target – safeguarding users when connected.

Late 2016: With users needing to download apps to receive proximity marketing from beacons the popularity in retail begins to stall. However, Google works on making it possible for people to use the feature without downloading any apps, resulting in a resurgence in popularity.

Aug 2017: Bluetooth states that beacon technology will become the foundation of the Internet of Things.

Late 2017 – Present: Google pilots Project Beacon.

Now, you are probably asking, what does this technology actually mean to me a marketer or local business owner? This next section will cover the benefits of beacon technology and just how these could improve your business.

DISADVANTAGES OF PREVIOUS IMPLEMENTATIONS

The Disadvantages of Using Beacons for Proximity Marketing

1. Beacons Do Not Work on Their Own

Although beacon notifications usually come installed in the operating system of most smartphone, customers will still require to have an application on their phones for catching the signal emitted by the beacon. This requires a much more complicated interaction from a customer than simply consenting to messages when logging in a **Wi-Fi hotspot**, for example. Not being self-reliant, beacons will always be a hassle to manage, regardless of the industry in which you are implementing them.

2. Tracking Movement is Not Simple

A beacon can only track the movement of customers when they have their mobile device with them and switched on, have the application installed and with permissions already enabled, and also have their Bluetooth and Wi-Fi options enabled. Therefore, beacon-based proximity marketing is not as intuitive as it was expected to be, and it is difficult to gather information on customer movement, and send messages based on it.

3. Beacons are Not Cost-Efficient

Because we are talking about a technology that is still not as affordable as it was foreseen, it is difficult to speak of beacons in terms of covering all the needs and goals of a business. Oftentimes companies have to limit their implementation and use of beacons due to budgetary restrictions, thus making it harder for the beacon-based proximity marketing solution to function as needed. As beacons do not provide a highly accurate location coverage, you might need to install more for the results to be closer to what you expected, yet that costs more money.

4. The Matter of Trust and Security Limitations

Proximity marketing needs to be safe, secure, and trustworthy. By having a beacon zone, you are automatically logging in and accessing your customers' preferences and information, and not all of them are comfortable with that. Also, given the fact that beacon signals are easy to duplicate, that makes the customer vulnerable to spoofing.

5. Bluetooth is Not Battery-Friendly

Having a mobile phone with an enabled Bluetooth connection is not at all battery-friendly, and very few customers agree to keep their Bluetooth activated in order to connect with beacons from their favorite brands. Since there isn't a precise way of knowing where a beacon is located, you can't turn your Bluetooth on and off depending on whether you are near a beacon or not, thus making it rather difficult for people to engage with this technology on-the-go and not run out of battery before the end of the day.

6. Beacons Don't Offer a Lot of Analyzable Data

When you conduct a marketing campaign, you need to gather and analyze all the data related to it, in order to improve it as you go, or draft better campaigns in the future. Without a clear way of offering analyzable data, beacon-based proximity marketing is not at all helpful when it comes to providing marketers with data and information upon which to improve themselves.

PROPOSED SOLUTION

Beacon technology in Retail:

Even before the pandemic, many consumers shifted their preference from in-store shopping to the ease of online. Brands thus began transitioning to feature a digital presence long before we transitioned into social distancing. In 2020, a record 12,000 stores permanently closed their doors. However, as we embark further into 2021, store openings are outpacing closures.

Small to mid-size businesses serve as the backbone of the American economy. As American consumers once more adjust to a new normal of cautious reopening , retailers must adapt to thrive. For instance, 87% of shoppers prefer shopping in stores with touchless self-checkout options. By adapting to more change, smart beacons in retail can ease the transition of a successful reopening and carry on the future of retail in 2021.

Overview: Proximity Marketing and Beacon Technology

Leading retailers use proximity marketing to distribute advertising wirelessly to those located in a particular place. Although it may sound similar to digital advertising, it falls into a much more sophisticated marketing category. This type of technology focuses on absolute specificity: marketing to specific consumers, at a particular time, and one exact location. Moreover, successful proximity marketing depends on the use of beacon technology.

Smart beacons in retail are a piece of in-store Bluetooth technology that detects nearby smartphone users. First introduced in 2013 by Apple, beacon technology gathers data on users entering a location. After the users opt-in to receive notifications, it then sends personalized alerts to smartphones with the end goal of convincing them to purchase something in-store. Additionally, the user has an enhanced customer experience through digital personalization.

ADVANTAGES OF PROPOSED SOLUTION

Increase customer data granularity

As a link between mobile devices, applications, and back-office systems, the diminutive beacon can play a pivotal role in [retail business intelligence](#).
Beacons let you gather the following types of data:

- Areas of your stores that receive the most and least foot traffic

- Employees' movements on the sales floor and in the stock rooms

- Levels of shopper engagement with various categories/items of merchandise

- Details about first-time and repeat customers

- Resource utilization in-store and throughout the supply chain

Improve in-store usability

Large supermarkets and department stores are often overwhelming for shoppers. They can't find what they came for, wander aimlessly among the aisles, and end up buying something they don't really need, potentially increasing product return rates. Beacons can solve this logistical issue by guiding customers around the shopping premises. For this, customers could just open the store app and immediately see where they are located, search for a particular item's location, and ask for a direction.

Some store apps, like Target's, feature a GPS-connected digital shopping cart. Shoppers can create shopping lists in the app, and once they are in-store, they are able to see where those items are located and how close they are to those products. The app guides customers in real time, and can also cross-sell items that go well with the products in a digital shopping cart.

Leverage proximity marketing

One of the major beacon use cases is sending promotional notifications to passing-by customers to prompt them to visit the store and make a purchase.

Such notifications can be general and serve as an ad, or be highly personalized, relying on the customer's previous shopping history and matching it to the current visit. For example, if a customer has some items in their online shopping cart, the beacon can send a notification about a personal discount for one of the items.

Build trust with a loyalty program

Most people use their smartphones in-store to find out additional information about products. You can leverage this behavior and use beacons to push promotions as a part of your loyalty program.

When customers feel they belong to a community, they develop trust toward the brand and get more inclined to select it over the competitors. Plus, loyalty programs are a great incentive for customers to download the store's app and use it in-store to get a discount, learn about matching products, or participate in a contest.

Some retailers, like ASOS or Urban Outfitters, go as far as creating mobile-first loyalty programs, that is, providing their users with access to the loyalty rewards only via the brand's mobile apps.

Improve customer attribution

This works well if you connect your beacon data to your brand's Google Ads account. It will make your marketers' wish come true—to understand how your online advertising efforts influence offline activities and customer attribution. In other words, you can find out who clicked your online ad and who then came to the store. By supercharging this data with Google Analytics metrics, it's possible to test and tweak your paid advertising strategy.

When you activate Google's beacons, besides the benefits we've already covered, you get access to a number of preprogrammed features that:

- Help your business show up on Google Maps or in saved places.

- Collect photos and reviews from people who visited your location.

IMPLEMENTATION OF PROPOSED SOLUTION

Researchers predict a major comeback for many retailers hit especially hard by COVID. However, malls and restaurants continue making big plans. The best way to roll out their post-pandemic openings is to use proximity marketing and beacon technology. Here are five ways stores can adapt to the next new normal and sustain the future of retail.

Enhancing a personalized experience in a socially distanced world

Before the pandemic, successful retailers personalized the shopping experience. They did this by offering enhanced customer support. As you enter the store, staff immediately informs you of discounts, new items, and answers to any questions you may have.

Although this strategy still exists, it can be a lot more challenging to achieve in a world that still embraces social distancing. However, with smart beacons in retail, many of these personalized experiences can be taken care of, such as indoor navigation, tailored menus, and traffic updates.

Once customers enter stores, they can receive notifications showing them the locations of new products. Furthermore, if stores have larger layouts, alerts can guide users more efficiently than a GPS. This strategy is ideal for stadiums, malls, department stores, events, and museums.

Better user data for reporting

Every business must know its customers and their corresponding buyer behavior. Therefore, the more data, the better. With smart beacons in retail, stores can obtain insights on shopping behavior and demographics. You can answer more specific questions that include some of the following:

- How long do shoppers stay in particular parts of my store?
- What discounts work better on specific days of the week?

- Does it make a difference in purchasing behavior if consumers shop alone or with others?

Beacon technology can capture this data to give you better insights into your store. That way, you can make any changes needed to drive sales.

Additional advertising method

Shoppers can receive a method of advertising almost immediately. Traditional digital advertising methods have limited control over when and where users receive their ads. For example, advertisers can control the hour and mile radius. However, smart beacons in retail can control a radius in mere feet, and the second they enter that radius for a better perspective.

One strategy not used by many retailers consists of using beacon technology competitively. Businesses, for instance, may launch locations adjacent to competing stores. This is known as a competitive strategy. By establishing a new location next to a competitor, they can compete for the same local audience.
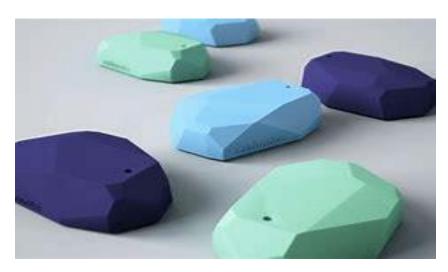
For example, it's not a coincidence that you see a Burger King near a MacDonald's. If located close enough, beacon technology sends out alerts to those near or in a competing store. These alerts can notify shoppers of discounts or cheaper pricing to convert once-loyal customers and thus refine competitive advantage.

Contactless payments

Along with traffic notifications that inform shoppers of capacity, smart beacons in retail can also send payment notifications. Customers who want to limit surface exposure can receive payment alerts once they finished a meal. This way, they can skip crowded lines or pay immediately as opposed to waiting for their server.

CONCLUSION:

- More to the point, our experience with beacons makes it clear that they allow for much safer transactions and business operations than not.
- Beacon technology is a powerful tool to engage the audience and deliver them relevant information on short notice.
- Thus, if anyone is looking for a solution to increase engagement with their office audience or make their event management app even more convenient, this solution is right for them.
- In 2018, Google also started sending free beacons to small businesses in the U.S. to make their locations more visible to customers that are nearby.

Different Types of Beacons

- Plus, when the amount of content and visual information seems endless, beacons' promise of the spot-on non-intrusive mode of engagement may make all the difference to consumers.
- Taking all this into account, it is safe to assume that more and more business locations will have beacons installed in them in the coming years.
- Although long-term projections might not reflect reality in the end, there are no visible hurdles on the way of large-scale beacon technology adoption. .
- After all, beacons demand little to invest, are easy to set up and manage regardless of business scale, and bring clear, straightforward benefits to business across industries.

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