An iPhone Application for Providing Beacon based Services to Car Showroom

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Abstract- *A decade ago, Smartphone's and tablets were not available but now days everyone use smart phones. In addition, ten years ago, the term "app" had not entered. Today, there are over 800000 Apps available in app store. Mobile devices are revolutionizing how consumers interact, communicate, and carry out everyday activities. In a typical day a student may use a mobile device to read the latest news, email, notification, post status updates etc. At the same time, mobile technology presents exclusive privacy experiments. As compared to other technology, mobile devices are typically familiar to an individual, almost always alive in the network. Beacon is Bluetooth Low Energy (BLE) wireless technology used to create a different way of providing location-based on information and services to iPhone and other iOS devices. The beacons themselves are small, cheap Bluetooth transmitters. Apps installed on your iPhone listen out for the signal transmitted by these beacons and respond accordingly when the phone comes into range.*

Keywords: Beacon, Bluetooth low energy device, GPS

I. INTRODUCTION

Services in the showrooms are becoming automated. Many showrooms viz., automated malls, grocery are selling their product with e-commerce website or application. With the emergence of website and its applications, the market is also excelling for growing their business to increase their sale e.g. Honda/Toyota websites encompasses the market publicity with the help of e-media, as we know picture speaks more than 1000 words. With images, videos and animation all automobile showroom also have integrated this graphics inside their websites try help of which they are quite progressing for selling and increasing customer for their brands. When a visitor wishes for a car or needs information on that wish car, sales marketing executive person delivers all information of the car. If visitors got any queries then the sales executive resolves queries. And after that day the marketing person takes the follow up till the visitor become the customer by purchasing his wished /interested car. Taking this motivation we are proposing an architecture that will reduce the efforts that salesperson takes for giving information, solving queries and convinces visitor. In India, most of the visitors buying cars have got the smart phones. So we can deploy an application on iPhone which could assist that visitor for gaining all information, online query resolving, through online support available for 24*7 hours and 3D views of the car could minimize the cost and effort of executives so less staffing of marketing executives will be necessary.

For example, if you pass a beacon in a shop, the retailers' app (assuming you have it installed) could display a special offers alert for you. As such iBeacon could be a much better option for in-door mapping which GPS struggles with. So our prime focus is to implement the technology which gives us information about automobiles and mobiles on our smart phone through low energy devices that broadcast their identifier to nearby portable electronic devices.

II. LITERATURE SURVEY

In earlier days, for locating one particular location, some technologies were used like GPS, Wi-Fi, Cellular, Bluetooth, Infrared and Radio Frequency Identification (RFID). GPS [1] is a technology which uses latitude and longitude concept and depends on range of the internet, which is both time and battery power consuming of mobile. Beacon is a Bluetooth Low Energy and intentionally conspicuous device designed to attract attention to the specific location. iBeacon [2] is a extended location service in iOS [4].

With the help of iBeacon a Smartphone's software can approximately find the relative location to a iBeacon in a store. 'Brick and Mortar' [3] retail stores use the beacons for 'mobile commerce' [8], offering customers special deals through mobile marketing. While the smart phone's capability is changing, there is also progress being made in application. This paper describes the use of iBeacon for developing iPhone application. This application is particularly developed for the car showroom.

III. SYSTEM ARCHITECTURE

Our proposed system is related to 2-tier client server architecture where iPhone acts as client and server contain its API's, databases and logic for acquiring result. iBeacon is continuously broadcasting its 'beacon id' within its particular range.

When beacon comes into range of iBeacon, it will receive this 'beacon id'. Also iPhone is having its own UUID. iPhone send this 'beacon id' along with its own UUID as a HTTP request towards server for matching ID's.

At server side, request is first handled by web-app API's which act as interface between server and client. Web-app API sends this request towards web-app Logic where actual matching of ID's takes place. If ID's are matched then the information of product stored for that 'beacon id' is fetched from database by using database API. Database API act as interface to access database for fetching product information. Appropriate product information is then transferred towards iPhone in reverse way in the form of HTTP response.
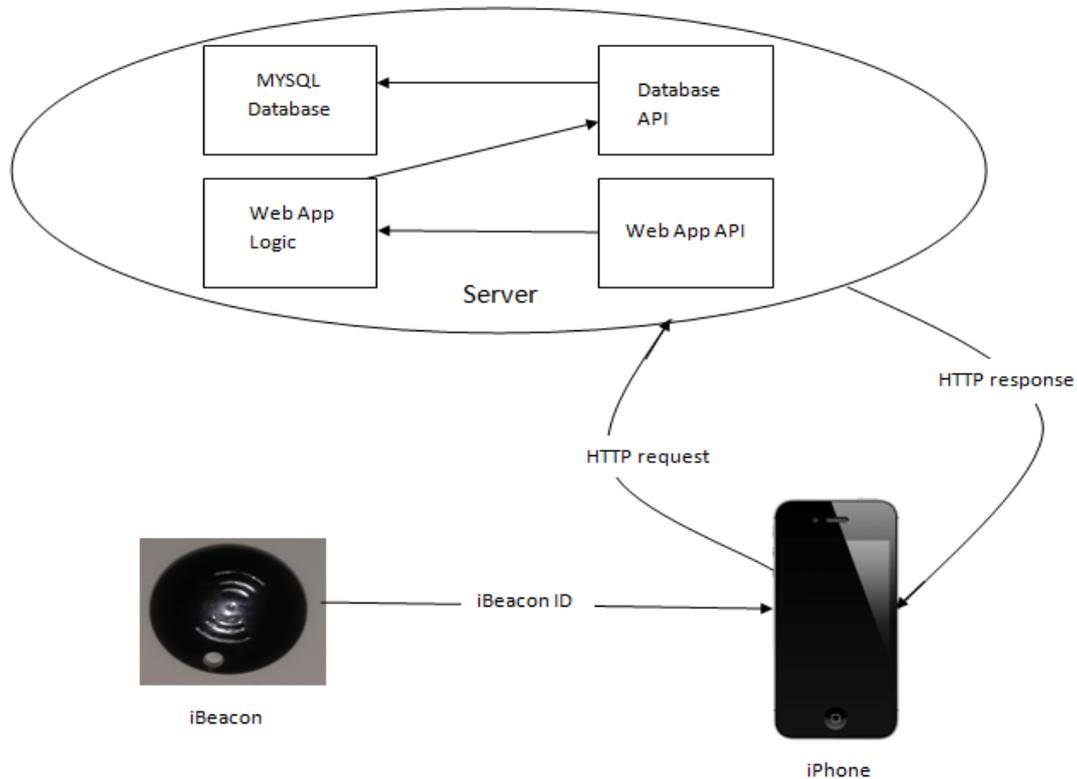
figure 1. System Architecture

IV. MODEL DESCRIPTION

A. Software Development Life Cycle

We have clubbed features of Iterative and Incremental model for our application development. During the software development, more than one iteration of the software development cycle may be in progress at the same time. In our project, we can redesign and reanalyze the system as per the customers or users requirement changes.

B. MVC Model

MVC stands for Model View Controller. In which our database acts as a Model and client acts as View as well as Controller. View and Controller are connected to model through the web service and acts as intermediate.

To develop our front end, we used Objective-C language. It is a superset of the C programming language and provides object-oriented capabilities and a dynamic runtime. Objective–C inherits the syntax, primitive's types, flow control statements of C and adds syntax for defining classes and method. For development of our project with Objective C language, we use Xcode 7.1[6] as development tool. Xcode is an *Integrated Development Environment* (IDE) used for Mac.

We use MySQL as a back end and PHP [5] as a scripting language. The PHP (Hypertext Preprocessor) is a programming language that allows web developers to create dynamic content that interacts with database. PHP is server side scripting language that is embedded in HTML [7]. It is used to interface the web server, database and application.

When we create new file in Xcode, it automatically creates 3 types of new file i.e. .h, .m, and .xib..h contains the declaration interface, confirming the delegates, declaration of property, etc., .m contains the actually implementation of property, interface etc. .xib contains the design of our screen's. Actual process running in this 3 file is- When we perform any action, then we have to give the implementation of that action in .m file. Then .m calls the web services then web services

made indirect call for PHP. If any response from the database is available then that response is stored into the dictionary and using JSON Parser, it sends to controller and that response is displayed on view. All database action are handled or managed by Admin. Admin also communicate with the database through the web service.

V. MODULES IN SYSTEM

Initially we have divided work into the following modules for its use on iPhone users only:

Module I. Registration and Login

New iPhone user should first register to use the application. For the registration of user we are providing one *Registration Form*. In this form user should enter their personal information such as full name, address, email ID, password, mobile no, gender etc. After the registration is successful, iPhone user can login with their email ID and password anytime. Also can see all the information related to automobiles. Existing registered iPhone user can use the application after login. This login form can take only valid credentials i.e. email id and password entered by user are checked with database and if it is valid only then user can able to make login.

Input: - Personal information of user

Procedure:-

Start

    1. Fill the registration form with personal information of user

    2. Click on Register Button

    If (user already exists)

        Appropriate error message will be display

End

Output: - User can either see the Registration Successful message or appropriate error will be display.

Module II. Notifications:

When iPhone user comes into radius of beacon then device can receive notification of beacon. User accepts the notification and gets connected to server. After connecting to server user can able to access following utilities:-

1. *Product Information:*

iPhone user can view product information like car name, engine, car type, full economy, fuel, tyres, colour, type, insurance, etc. related to respective car on which beacon is attached.

2. *Discount Offers:*

User can get all the discounts offers on iPhone when device comes into range of beacon. These discount offers are only for regular customer i.e. the customers which are regularly visited to our system and are more likely to buy cars.

3. *New Offers:*

If user wants to know about any new offers then he can check here. These new offers are for regular as well as new customers. And these offers are given to customers only on occasion.

Input:- iPhone user comes into range of beacon

Procedure:-

Start

    If (app is install on iPhone)

        1. Then user gets notification on iPhone

        2. User click on that notification

    Else

        1. First install app on iPhone

  End

Output:- Home screen of app

- **Home screen**

Input: Three options on Home screen

Procedure:-

Start

    If (user clicks on product information button)

        1. User can view the specifications of car

        2. User can view 3D-Views of car

        3. Also user can view the video of the car

    Else if (user click on discount offer and new offer button)

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If (User is regular)
    If (Any occasion)
        1. View Discount offer
        2. View New offer
    Else
        Discount offer
Else
    View New offer
End
```

Module III. Admin

There are mainly two admins associated with our system:

1. Rights Admin:

Only rights admin can have access privileges so different set of employees working inside the showroom. They can provide suitable *discount offers* or any *new offers* for any festival/ occasion for existing / newly registered users.

2. Database Admin

Database administrator is another admin person who can give authorization for device configuration, database analysis or data management activities just like printing the weekly reports, addition / deletion of product, modifying earlier database entry etc.

a) Register Customer Information:
Admin can retrieve or see the customer's details who had registered.
b) Register Devices:
Database admin can have right to register beacon and can register device by entering its beacon id, its major-minor range etc.
c) Add Product Information:
Database admin can store all the details about mobiles. All car specification then its images, videos, 3-D views etc. can be added by this admin.

Module IV. Buy/Purchase

After accessing all information of the car, if user wishes to buy the car then user can add that car into the wish list. At the last, customer can view all the cars from the wish list and can compare those cars for fuel efficiency, price, model, engine, etc. For buying any car from wish list user should simply click on the "Buy" button. For purchasing and payment related queries of the car user should contact the account section. In account section user can get idea related to price and EMI options.

VI. EXPERIMENTAL SET-UP AND SIMULATED RESULTS

A. Hardware Interfaces

- **Beacon:**
    It extends location services in iOS. Instead of using longitude and latitude concept for acquiring location, iOS uses beacon, named as iBeacon. iBeacon is Apple's version of Bluetooth based beacon concept, which permits Bluetooth devices to broadcast or receive tiny and static piece of data within small distance. Apps installed on your iPhone listen for the signal transmitted by these beacons and respond accordingly when the phone comes into range. Beacons are small battery powered devices that can communicate by Bluetooth (Bluetooth Low Energy, to be exact) with smart phones and other mobile devices. They can also find out the location of a person, carrying a Bluetooth enabled mobile device, indoors.
- **iPhone:**
    iPhone is capable of supporting bundled of applications from apple, as well as from third- party developers. Software applications cannot be copied directly from Mac OS X but must be written and compiled specifically on iOS.

B. Software Interfaces:

We use **Xcode 5.1** as development tool. Xcode is an *Integrated Development Environment* (IDE for short). It has,

o An editor	—	For writing application code
o A GUI editor	—	UI of application's screens
o A compiler	—	For building applications from code

o   A debugger   —   To probe running applications

VII.   ACKNOWLEDGEMENT

VIII.   REFERENCES

- **Papers**

[1]   Sahil Puri, "Indoor Positioning System using Bluetooth", Issue No.5, Volume No.4, pp : 244-247, May 2015.

- **White Paper**

[2]   E Bouchet, "iBeacon & Location-based marketing", May 2014

[3] "What is bricks and mortar? Definition and meaning". Inve Storwards.com. Retrieved 2012-11-03

- **Books**

[4] Lou Franco, Eitan Mendelowitz, "Hello! IOS development" July 2013

[5] Mr. Richard, "PHP / MySQL concepts", 2nd ed,, Aug 2014

[6] Books Jayant Varma, "Xcode 6", Jan 2015.

[7] Remy Shark & Bruce Lawson, "Introducing HTML5", May 2010.

- **Website**

[8] http://cryptome.org/ljyalglomob.htm