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USER INTERACTION SYSTEM TO PROVIDE LOCATION BASED SERVICES USING IBEACON TECHNOLOGY

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Abstract — *In 2013 Apple developed a new idea, called iBeacon. This one is on the basis of the project and in this project, we are going to elaborate what it is and how it operate, means how it uses these indeterminism. This new idea may also be used by Android system. An IOS classification or any other hardware is able to receive advertise notification from adjacent iBeacon classification through this technology.* The main pupose of this paper is to foresee a *iBeacon is technology which can be used for scanning the Bluetooth equipment for sending advertise notifications to the hand-held devices which are in adjucent Bluetooth range. It can be used in Android based sophisticated devices which can interact using the android application installed in it. Raspberry Pi can be used for sending notifications to all directions i.e., it can work as intermediator in between the server and the Bluetooth. The system can do number of operations similarly adjucent field-positioning, route guiding, rating, howlback & conversation with surrounding physical environment.*

Keywords- *iBeacon technology; advertising notification; Encryption of data; User Data Security*

I. INTRODUCTION

In recent years apple developed the new idea which is called ibeacon technology which is basically worked on Bluetooth Low Energy(BLE) or bluetooth 4.0. iOS used the ibeacon technology for advertising push notifications to embedded devices for the iOS devices only that is iPhone .This new system we developing for the Mall. recently ibeacon has been worked on Bluetooth Low Energy(BLE) which is not better secured and it is multiple targeting system. the ibeacon technology we use in our project is used with Wi-Fi. With the help of the ibeacon technology we can advertise push notifications to the embedded devices which are portable in surrounding location. this system can work on android device which can interact with android application installed in it. raspberry pi has been used as intermediator between the server and Wi-Fi for sending the messages to all directions. This all needs to provide the security to user data so for that we are using the Advance Encryption Standard(AES) algorithm for encrypting the user's personal data. The system can do many of the functions likewise advertise notification, adjacent field-positioning, route guiding, rating, feedback & interaction with surrounding physical environment.

II. RELATED WORK

In [1] author used iBeacon is an interior of building positioning system works on Bluetooth Low Energy(BLE) technology system advertises notifications automatically to the user when smart devices with iBeacon application come to certain position. It gives the related information about customers position through the push notifications. This technology is used in museum worked on Bluetooth Low Energy(BLE). For studying musical history on museum hall used this technology. Through the iBeacon in museum hall visitors can interact and their spirit history learners. iBeacon is used to analyses the users interest or spirit interest according to visitors behaviors .And to get the better way to learn more history.

III. LITERATURE SURVEY

Present a literature survey and system tutorial for Beacon is an interior of building positioning system provided by Apple based on BLE (Bluetooth Low Energy) technology. Smart devices, such as iPhone or Android phone can founds the advertising signals sent by the low energy consumption very small device. Notifications will be sends automatically to the user when smart device with iBeacon Application come to particular areas. It provides desirable and portfolio usage scenarios for business, such as sale stores, to push related information about customer's interested products with the awareness of customers' position. This technology also can also be used in museum studio. In this research , we described the technology of iBeacon, and addressed a design of interaction system between users and collections helped by iBeacon technology.
This paper depict a concept of an extended iBeacon system for interior of building navigation and guidance . iBeacon is a point of attachment wireless notification service proposed by Apple, Inc. This service uses beacon modules emitting

radio waves based on Bluetooth Low Energy technology and provides automatic initiation of a single notification from a beacon module to multiple smart phones at proximity. In usual iBeacon systems, there is one-to-one relation between notification and beacon module.

IV. PROPOSED SYSTEM

When user enter into the mall , the user needs to turn on the Bluetooth for receiving the notifications from server. Client sends a request of http long connection, and then waits for response from the server. This request is asynchronous. After the server receives the request, it does not immediately send the data, but hold this connection. This process is none blocking, so the server can continue to process other requests. Only when the server has new data, the server takes the initiative to push out these new data, through good connections established before, to the client. The client receives data returned which can be processed and then gives a new request of long connection again. When a user enters an area covered by the iBeacon signal, client of the device which this user carries will receive iBeacon's ID, under the condition that the device's wireless network, 3G or 4G is opened. Client gives ID received to the server, and the server will compare the received ID with data put into database by technical personnel. If it exists, this user's location will be gotten. When a user approach target area, the client will determine the distance between iBeacon module and user terminal. When this distance is less than a specific value, the client will take the initiative to request the server to push dynamic message of the area including the promotions and discounts. Furthermore, the client also can push detailed introduction of the range of the location.

IV. THE OPERATION OF THE SYSTEM

5.1. Project task set

5.1.1. Upload the Offer's

Uploading the offer's to server :

For broadcasting the offer's to the android user first admin need to have that offer or present that offer at server. If the offer is not present at the server but admin need to broadcast that offer first admin needs to upload it to the server. Into the mall there are number of shop's available and daily the any shop wants to give the best offer to the user for sailing there products. Offer means giving the discount for product to user.

5.1.2. Privacy preserving in user data processing

AES Algorithm:

The more popular and widely adopted symmetric encryption algorithm likely to be encountered nowadays is the Advanced Encryption Standard (AES). It is found at least six time faster than triple DES.

A replacement for DES was needed as its key size was too small. With increasing computing power, it was considered vulnerable against exhaustive key search attack. Triple DES was designed to overcome this drawback but it was found slow.

The features of AES are as follows −

- Symmetric key symmetric block cipher
- 128-bit data, 128/192/256-bit keys
- Stronger and faster than Triple-DES
- Provide full specification and design details
- Software implementable in C and Java

Naïve Bayes Algorithm:

Bayes Classifier example: Users Feedback Analysis

As an example, let us try and find the probability that a Feedback (the document) can be classified as positive (the class). At first glance the theorem can be confusing, so let's simplify it a bit by breaking down the various components:

$$P(A|B)$$

This can be read as the probability of A, the class, given B, the Feedback. This is the end result we're looking for.

P(B|A)

This can be read as the probability of B, the Feedback, given A, the class. This is determined by previously gathered information.

P(A)

This is the probability of A – the class. It's independent of all other probabilities.

P(B)

This is the probability of B – the Feedback. It's independent of all other probabilities.

P(Positive|Feedback) = (P(Feedback|Positive) . P(Positive)) / P(Feedback)

Since the probability of the Feedback, P(Feedback), is constant, it can be disregarded in our calculations. We're only interested in the probability of the Feedback given the class,

P(Feedback|positive), and the probability of the class, P(positive):

P(positive|Feedback) = (P(Feedback|positive) * P(positive))

P(positive)

For the sake of this example, let's say there's three possible classes: positive, negative and neutral. That gives any Feedback a one in three (or 33%) chance of falling into any of those classes. That gives us P(positive) = 0.33333.

P(Feedback|positive)

To calculate P(Feedback|positive), we need a training set of Feedbacks that were already classified into the three categories. This gives us a basis from which to compute the probability that a Feedback will fall into a specific class. Since the chances are relatively low that we'll find a specific Feedback in the training set, we'll tokenize the Feedback and calculate the probability for each word in the training set. This gives us the following formula:

P(Feedback|positive) = P(T1|positive) * P(T2|positive) * .. * P(Tn|positive)

Where T1 to Tn is all the words in the Feedback.

P(Ti|positive)

To determine the probability of a specific word falling into the category we're testing, we'll need the following from the training set:

- The number of times Ti occurs in Feedbacks that were marked as positive in the training set.
- The total number of words of Feedbacks that were marked as positive in the training set.

There's various ways in which you can get these numbers, so we won't go into specifics here. as an example, let's look at the word "mobile", with the following numbers:

- Number of times mobile occurs in positive Feedbacks: 455

Number of words in positive Feedbacks: 1211

So to calculate the relative probability of mobile occurring in the the positive category, we divide 455 by 1211, giving us 0.376. Since mobile can have positive, negative and neutral interpretations, it's not surprising that its relative probability is 37%. This process now needs to be repeated for each word in the Feedback.

Since we now have the ability to calculate the probabilities that each word in the Feedback can be classified as positive, let's calculate the probability that the whole Feedback can be classified as positive – P(positive|Feedback) = P(Feedback|positive) * P(positive). For this example, let's say the Feedback was "I love good food", and the probabilities we calculated were 25%, 62.5%, 74% and 42.5% respectively.

P(positive|Feedback) = P(Feedback|positive) * P(positive)
= P(T1|positive) * .. * P(Tn|positive) * P(positive)
= 0.25 * 0.625 * 0.74 * 0.425 * 0.33
= 0.016216406
This same procedure can now be used to calculate the relative probability for each of the classes.
From the training set, we calculate P(negative|Feedback) as 0.000003125 and
P(neutral|Feedback) as 0.0082809375. Once we have the probability for each class, we can
compare the classes, and use the highest ranked class as the class for the document. Intuitively, it makes sense to classify Samsung Galaxy S3 is best mobile as positive, but now we have mathematical proof, based on gathered data, that it can be classified as positive.

5.1.3 Navigation :
When user select the product system will provide exact route guidance for that product to the user. The navigation in the form of image or audio clip for better understanding to user.

5.1.4. User Feedback :
When user buying the product he must have to give the opinion about the product, according to feedback admin can knows user how much like that product. Depend on users feedback admin can give the same offer or with more discount on product.

5.1.5. Output:
(a) Analysis of the user rating for product is very important but not compulsory for next day offers.
(b) With the route guidance ,this will provide the exact location for the user.

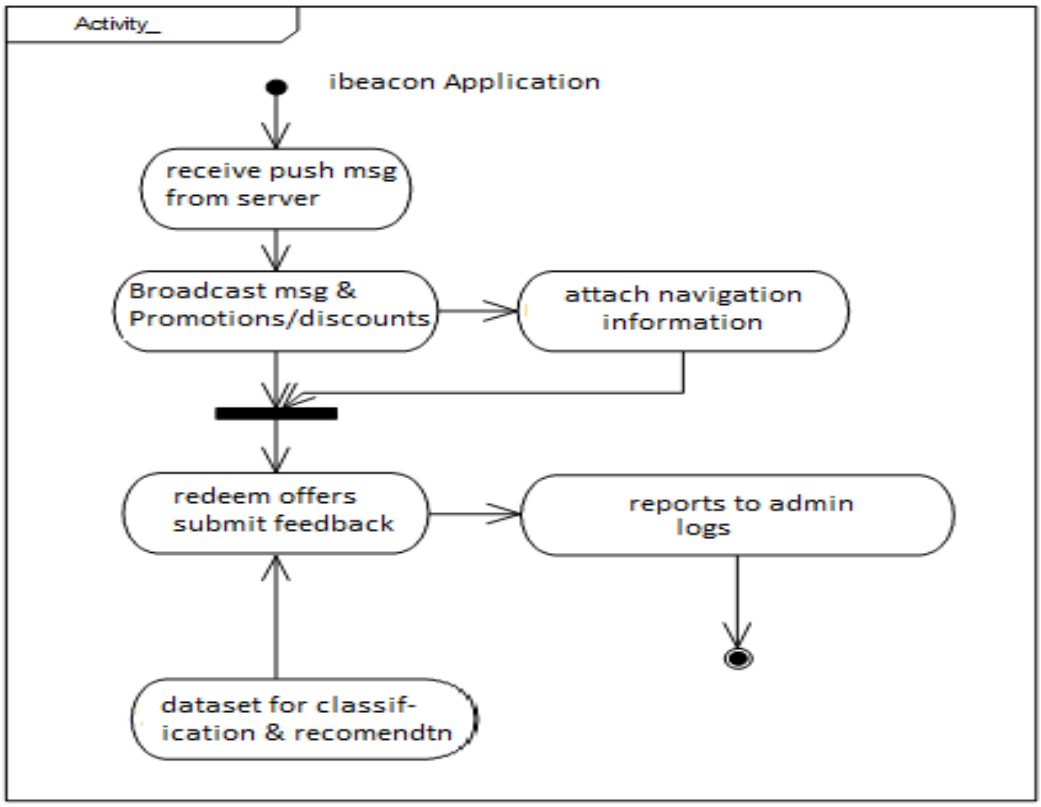


Fig.1: Activity Diagram

V. ARCHITECTURE DESIGN

In this paper, when user entering into the mall then with the help of Wi-Fi provided by Raspberry-pi processor user receive the notifications in the form of offer on his android system. After that user select the offer which one he want to buy. Now depending upon the selected offer apart from all offer which user want to buy server will provide the route guidance of that offer's shop is where exactly in the mall. The route guidance is the main and important factor for provide exact location to user. The location provided to user in the form of route guidance is with the help of Bluetooth Low Energy (BLE) . For pushing notifications to the user first the shop owners need to upload/ update the

offers daily on the server with the administration permission. After user buying the offer he needs to give feedback to that product and depending upon the user's feedback the shop owner of that product can analyses to continue the offer for next day. In the previous iBeacon technology they use the iBeacon device for performing operations. In our new system we develop that system and with this it reduces the cost of iBeacon device

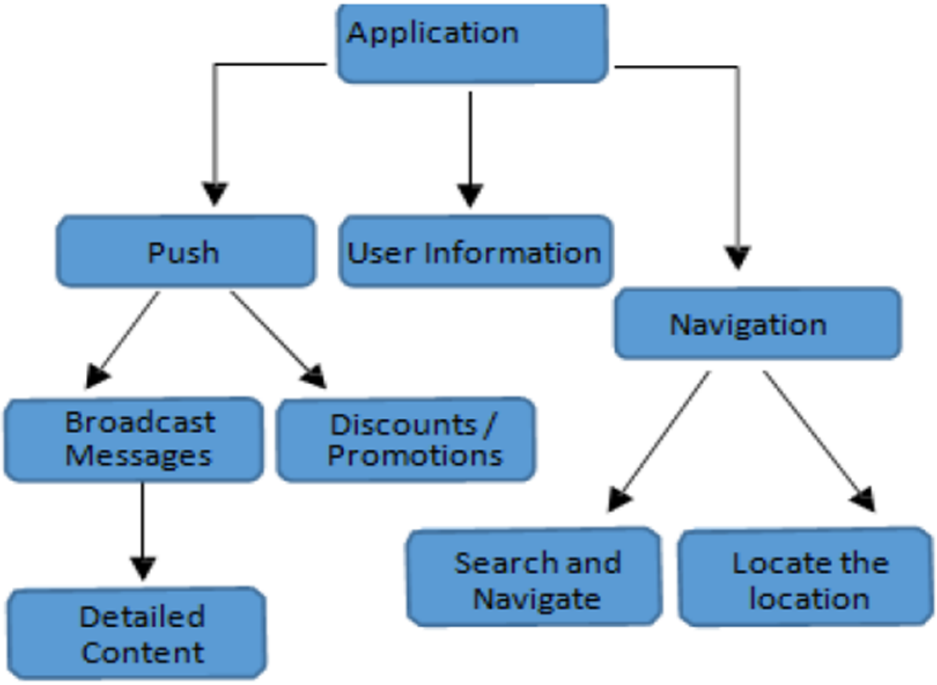


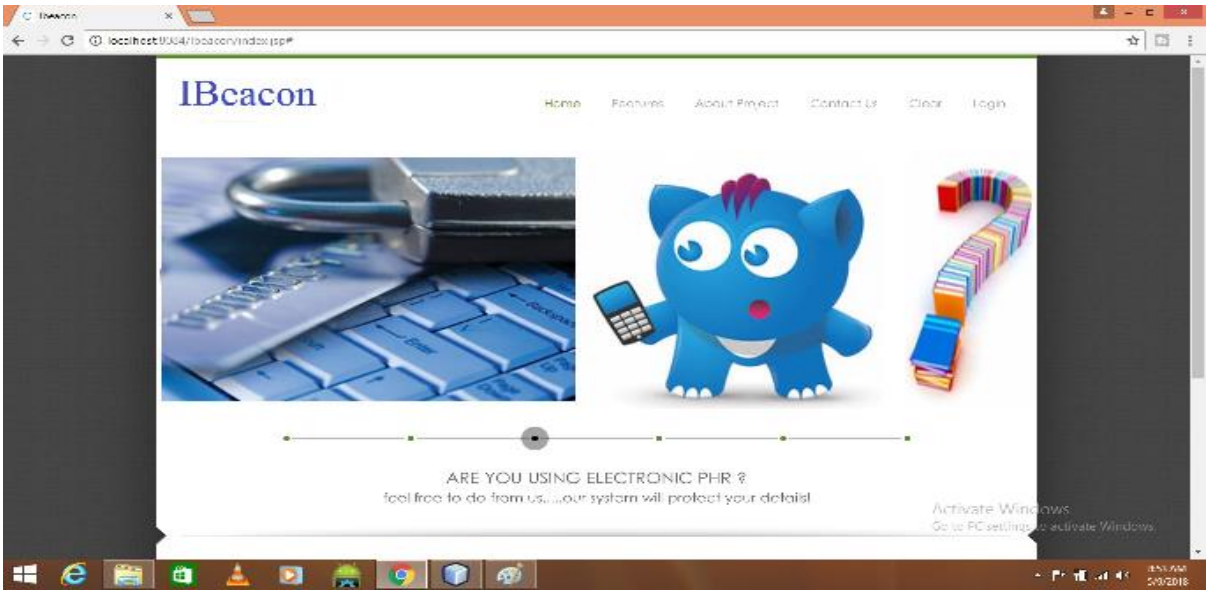
Fig.2: Architecture Diagram

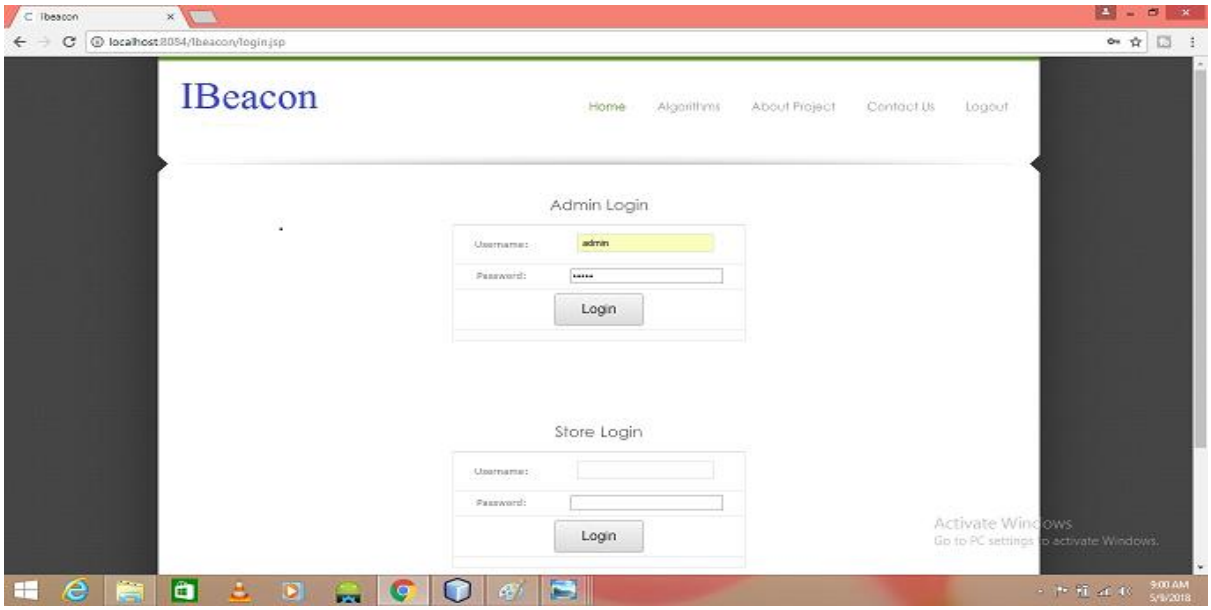
VI. CONCLUSION

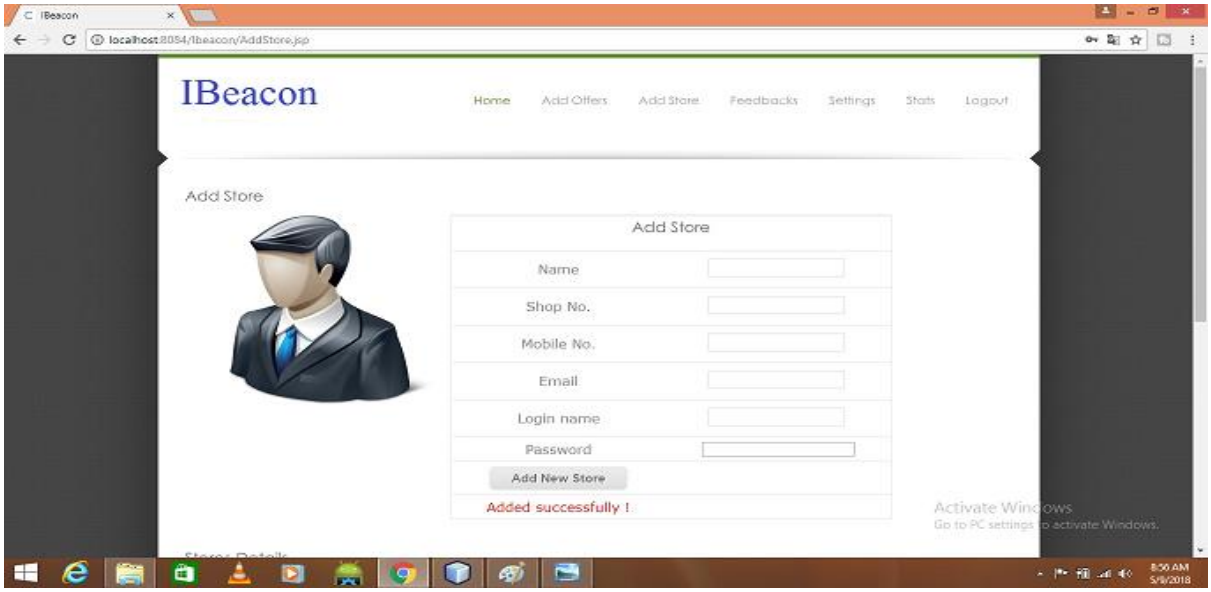
Hence we conclude that user interaction system to provide location based services using ibeacon technology for the android user. It is the framework which is introduced in this paper is for time efficient , low cost , exact route guidence, user feedback related to that product and rating with user friendly system. In this paper when user registering into the mall it can sens its personal information to server and its our resonsibility to provide security to his information , so for that we are used over here the Advance Encryption Algorithm (AES) for encrypting the users personal data.

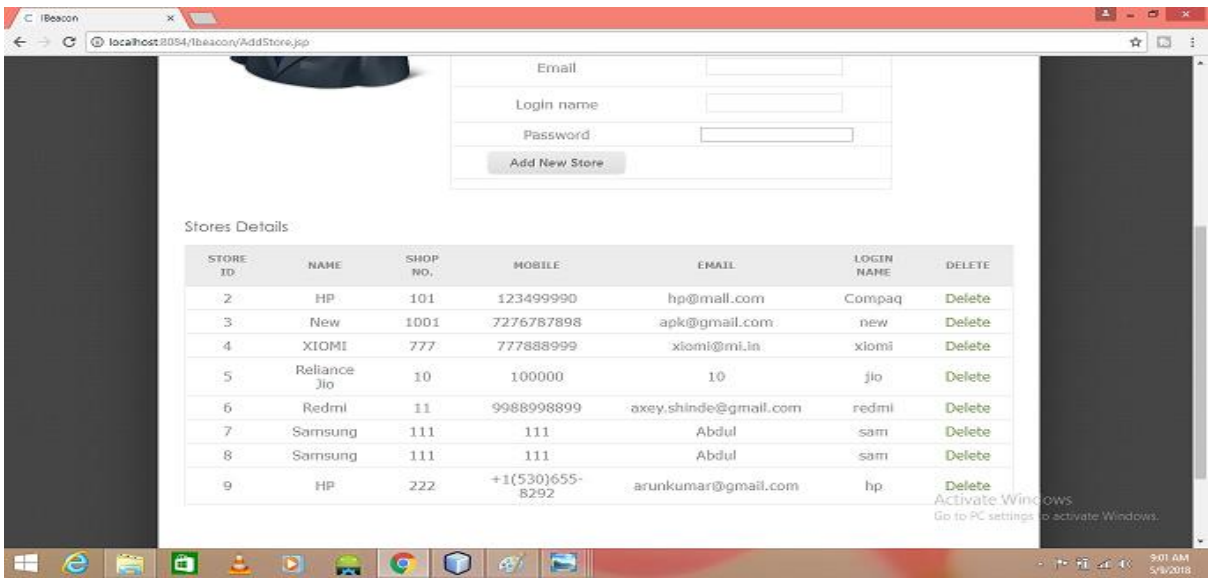
Result

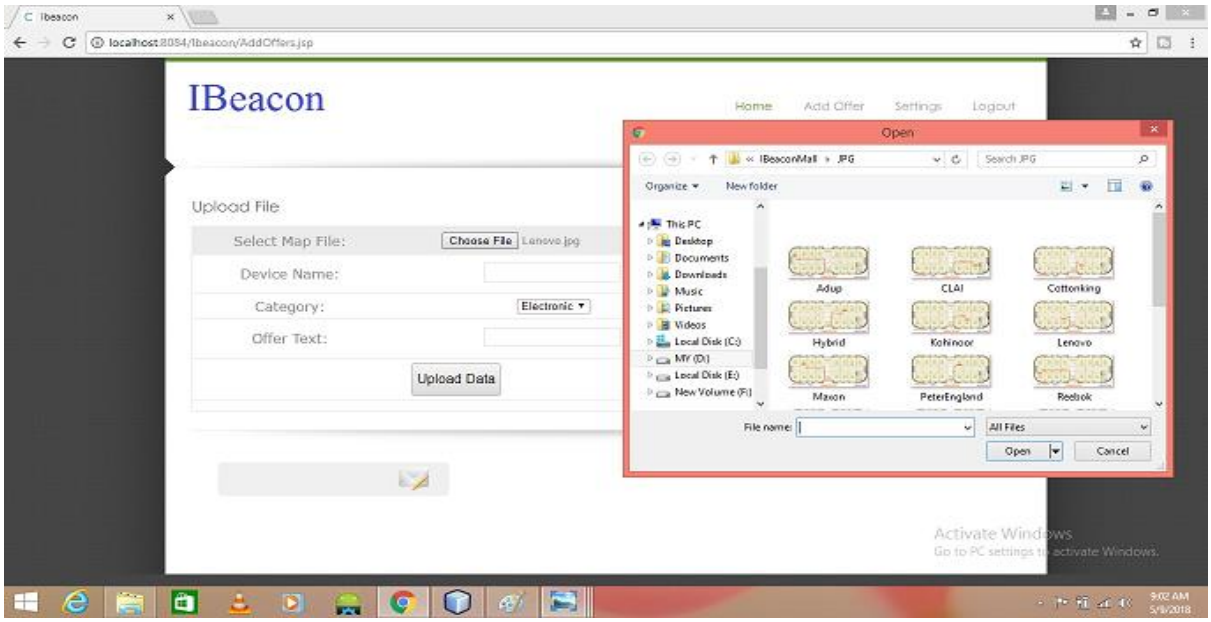
Following are the snapshots of complete flow of execution.

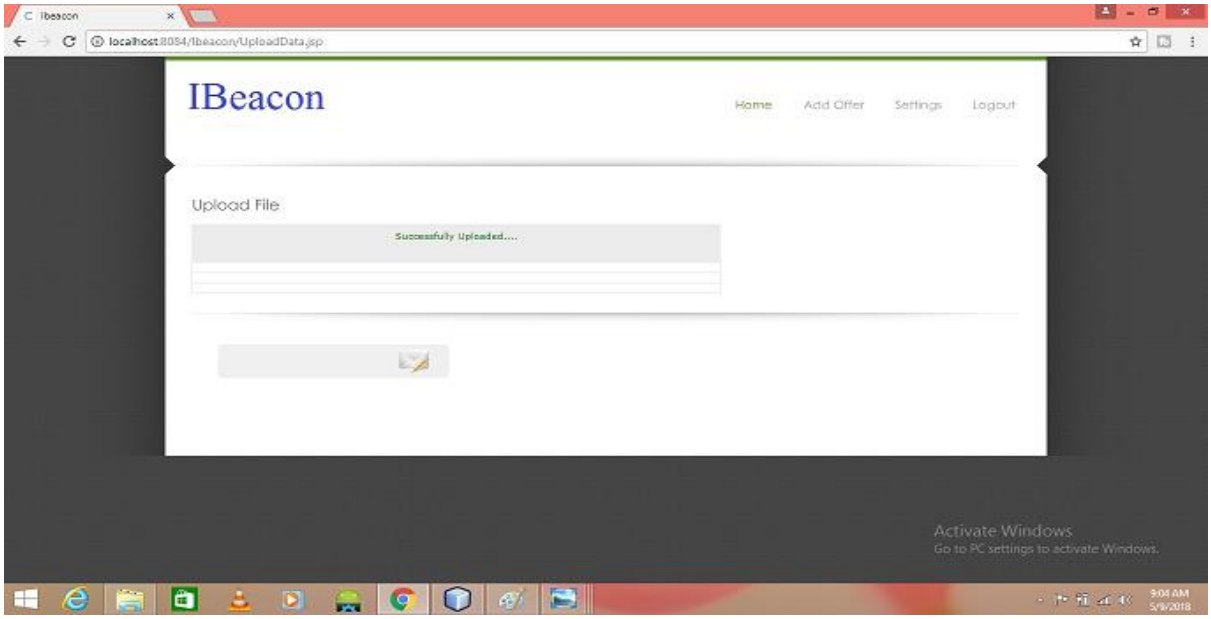


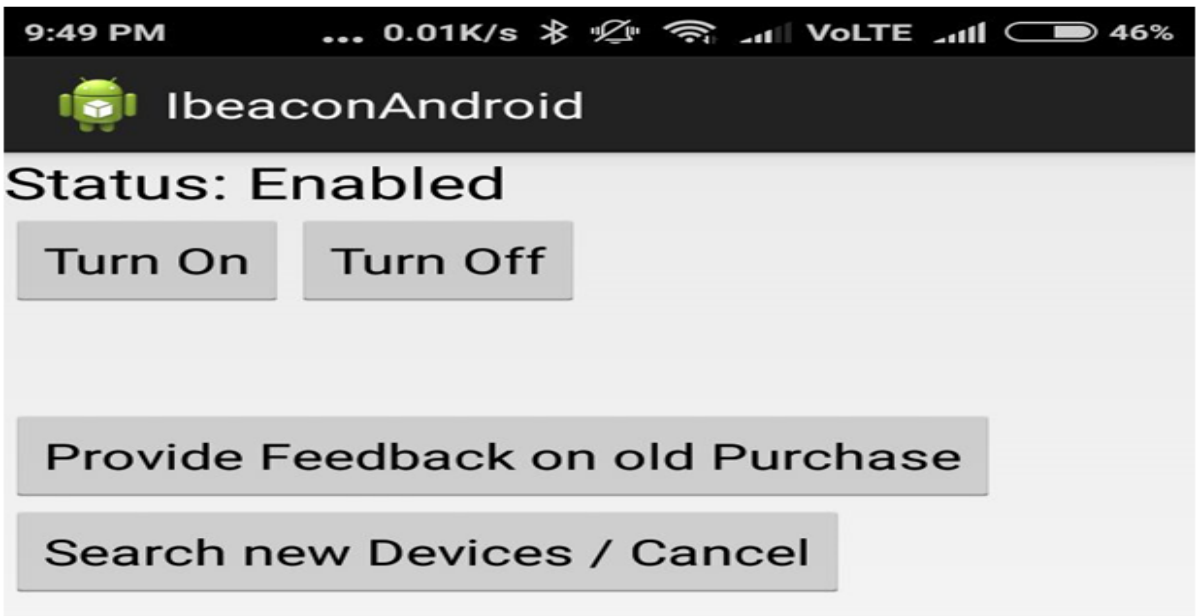


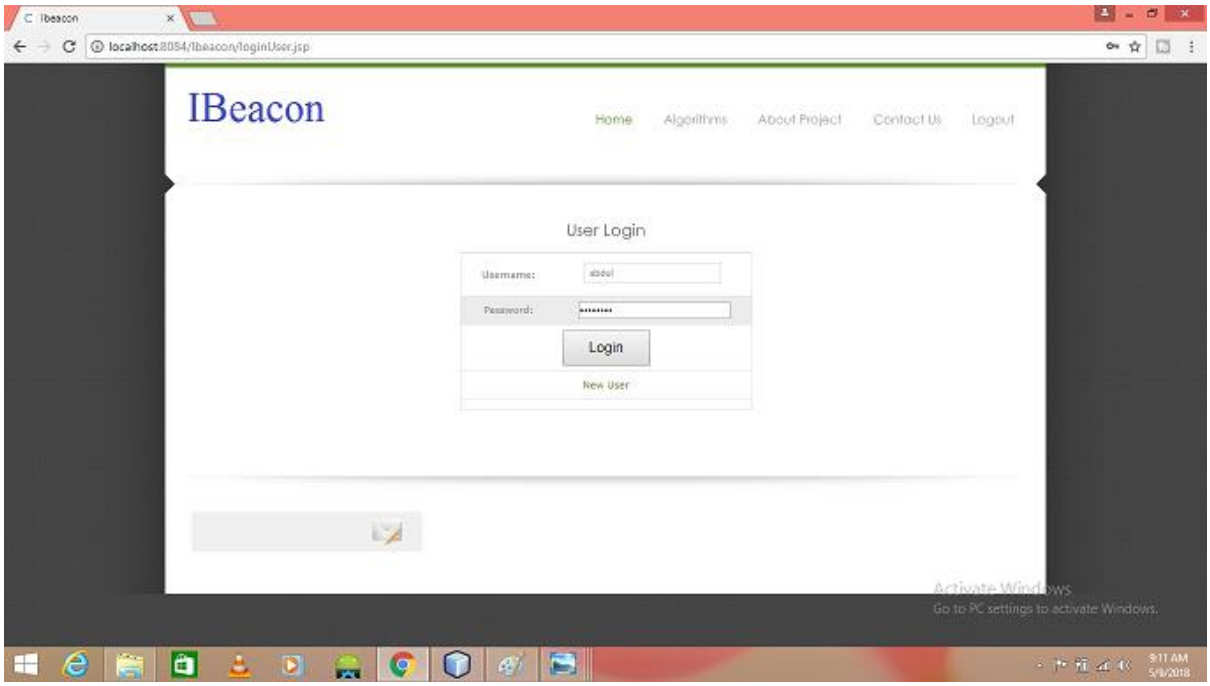


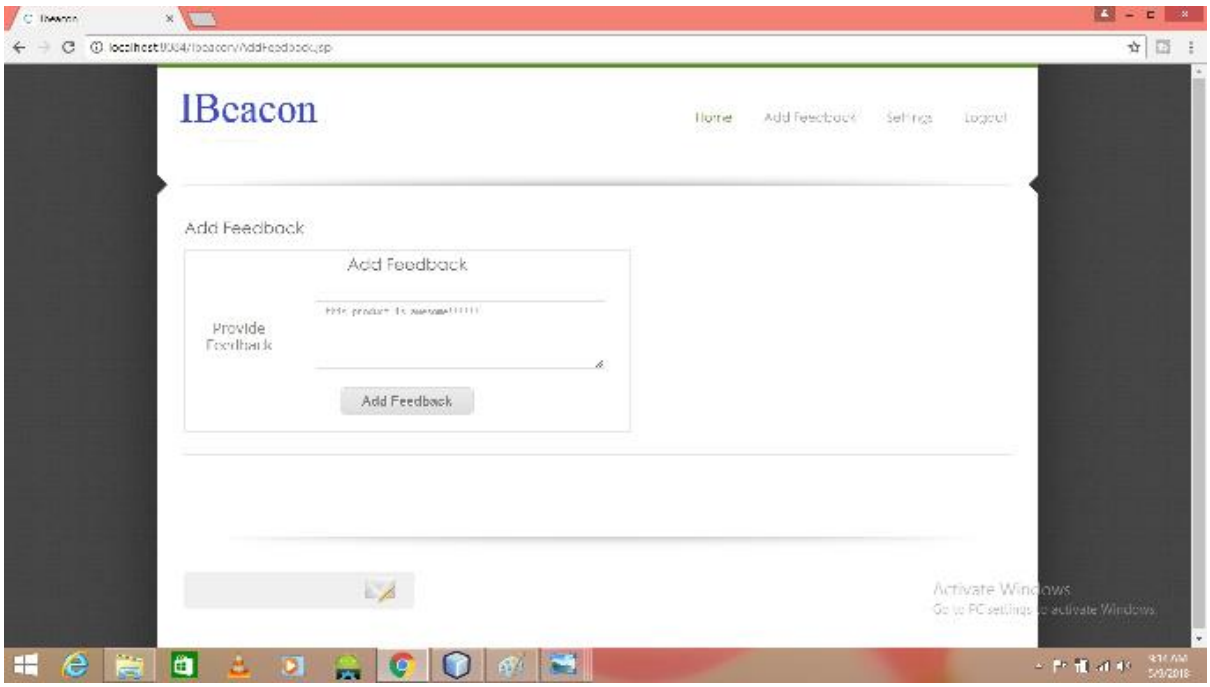












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