Wi-Fi Analytical Platform Software and Hardware Development

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ABSTRACT

Nowadays, smartphones are integral parts of humankind and these devices connect to internet for all day long. People are online for searching, sharing and following other people at any moment. These actions of people provide companies a lot of information about their consumer behavior. Companies can reach consumers to advertise their products in a more efficient way by using the data collected from them. Some companies even prefer to individualize the advertisements and campaigns according to customers' profiles.

INTRODUCTION

People living in digital age have been interacting with technology more than ever. The increase in interacting with technology further demands efficient solutions to overcome problems faced in daily life and this has changed the way that technology companies communicate with people.

This project is about data analysis, mobile app and API development in cooperation with BonBon Technology A.S which aims to understand consumer behavior to help companies advertise in a much more efficient and personalized way. We work on data collected through the BonBon's Wi-Fi tracker devices located in some shopping stores.

BonBon Technology is a technology company by design and a next generation IOT company at heart with the aim of simplifying commerce and using data in the most efficient way that will give rise to increase in profit for SME's.

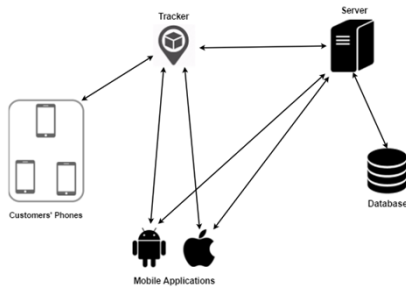Figure 1: BonBon Technology Wi-Fi Tracker

Figure 2: Overall System Architecture

OBJECTIVES

The objective of this project is to implement new solutions and to improve the solutions which are already implemented by BonBon Technology A.S regarding the analysis of data collected through the Wi-Fi devices. The intended deliverables of the project listed as;

1) Mobile application development for the Android and iOS platforms which will enable customers to connect to BonBon's Wi-Fi devices so that the customers' location information could be get as accurate as possible on a mobile application.

2) Analyzing and modifying web service to test the mobile applications and API development

3) Data analyzing by IBM tools and get meaningful relations between some parameters.

ACHIEVED GOALS AND RESULTS

1. MOBILE APPLICATION DEVELOPMENT

Mobile applications are developed in two different platforms, Android and IOS. The application development part includes three main components which are analyzing user interface design, backend and frontend development.

The mobile applications are developed with two main functionalities. One of the functions provides that user get authenticated and take codes of router devices form server. Firstly, user signs in and connects to the API to take token. After that, user enters device id to reach related file which includes device codes. The token allows the user to reach the file and download the codes in a secure way. Other function we developed measures dbm level of router devices. To achieve this, Android or IOS device where application is installed to should be connected to router devices to be measured. User can start or stop the measurement at any time. The results are used to determine the border of data collection area.

Mobile application provides user interface to users who are provided service to reach tracker and make some updates. Users can make installation of trackers. Thus, users can buy trackers on the internet and when users get their trackers, they only need to make installation by following the instructions on how to install the tracker. After installation, the trackers should connect to wireless network, therefore network name and password login are required. If there is any change in the network, for example password or network name changes, users can update this information through mobile application.
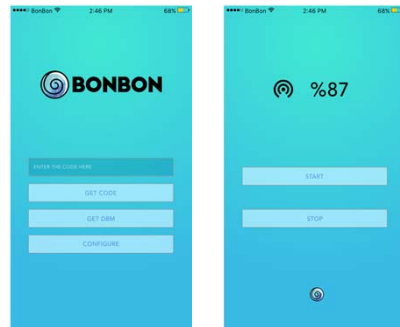

Figure 3: Sample UI for Mobile Application

ACHIEVED GOALS AND RESULTS

Customers' phones ping to trackers. Pings are used to determine costumers' instant locations and measure how many minutes they spend in a particular area. To identify costumers, Service Set Identifier (ssid) is used to take customer's mac address from IP table. Trackers which are closest to costumer transfer pings to server side of the system. The location information is necessary to calculate the amount of customer which entered or passed by the stores, also measure the time they spend in there. These data are organized and recorded in every 30 seconds.
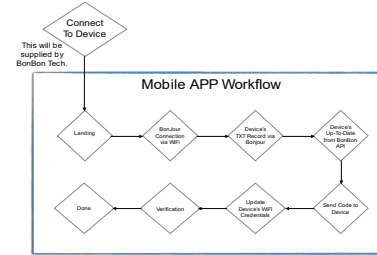

Figure 3: Framework of Mobile Application

2. API DEVELOPMENT

Analyzing and modifying web service is the second aim of our project. We have made a new API and identified a new endpoint for the mobile applications' functionalities.
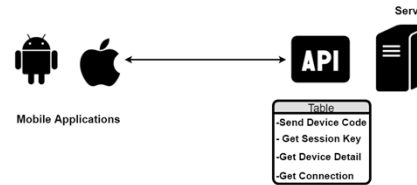

Figure 4: API Architecture

3. DATA ANALYTICS

The goal of this part is to analyze the data supplied by customers by using IBM tools such as SPSS and Bluemix, and further to get some meaningful relation and trend by evaluating this information.

The data shared by BonBon Tech includes almost 500.000 people with size of 1.5 GB. Since, it has big size, we need to divide them into parts to analyze detailed.

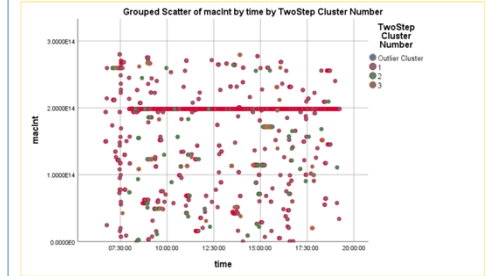## ACHIEVED GOALS AND RESULTS

Figure 5: Location Based Cluster

In the above figure, data is clustered based on locations and shown in macInt-time chart.
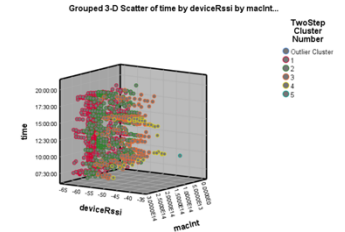

Figure 6: DBM Level Based Cluster

In the above figure, data is examined according to dbm level and then determined which people are in the store on the 1st of March 2017. Points state the density of customers in the store.

IBM TOOLS

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