Ping Based Online Digital Marketing Service

Project Plan (v1) [01 October, 2017]

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01 – Abstract

This is a synchronized web and mobile application project that will enable multiple marketers to digitally market their products or services using Global Positioning System (GPS) and Mobile Wallet technology. Marketers will be able to promote their service or product by creating a 2-dimensional location ping on a global map. Data of such 2-dimensional location pings will be periodically retrieved by a mobile app to allow end-users to access advertised promotion. In short, this project will aim to transfer physical advertisements, such as billboards and leaflets, to mobile notification. By definition, this application will be classified as an Online-To-Offline (O2O) application as it will divert online user traffic to physical traffic, for example in-store traffic.

02 – Introduction

Over the last five years or so, smartphone users have roughly doubled; from approximately 1.8 billion users to approximately 4.5 billion users (refer to Fig. 1). Henceforth, with the drastic insurgence of smartphones and mobile applications, such as Facebook and WhatsApp, it will be safe to assume that a large portion of the population are glued to their mobile phone screens on the streets. A possible justification for such assumption is the announcement MTR corporations added to their public announcement system at their stations. The above mentioned announcement is, “Don’t keep your eyes only on your mobile phone”. Another possible justification for such assumption is the cellphones only walking lane in China that was introduced in 2014 to avoid pedestrians unknowing bumping into each other [1] (refer to Fig. 2). Consequently, such human behavior justifiably decreases the effectiveness of physical advertisements, such as billboards and leaflets, as people are losing attention of their physical surroundings with their dependence on their mobile phones. Hence, to exploit such dependence on mobile phones and possibly improve the effectiveness of advertising, this project proposes to build a synchronized web and mobile application to achieve the above mentioned goals.

Fig. 1: Illustration on increasing number of smartphone users. [SOURCE]

Fig. 2: Illustration on cellphones and no cellphones public walking lanes. [SOURCE]
03 – Objective, Scope and Limitation

The objective of this project is to take advantage of people’s dependence on their mobile phones by allowing marketers to digitally market their product on an Offline-To-Online (O2O) service using Global Positioning System (GPS) and Mobile Wallet Technology. This will be achieved by developing and releasing two public interfaces, a web interface and a mobile interface. Note that the project will be developed for worldwide use.

The web interface will enable marketers to create virtual pings that hold their advertisement data. The pings will be a circular area with a certain radius that will be centered at the user defined pair of longitude and latitude values (refer to Fig. 3). The web interface will allow marketers to create multiple forms of pings to suit their desired purposes; such as Text Ping, Coupon Ping, Membership Card Ping and Ticket Ping. A Text Ping will hold text based promotions. A Coupon Ping will hold one-time-use offer promotions. A Membership Card Ping will aid loyalty programme registration of new nearby customers. A Ticket Ping will aid in distributing certain transit or event tickets. For Coupon Ping, Membership Card Ping and Ticket Ping, the marketer will need to design a mobile wallet pass/card so that mobile interface users can store their coupons, membership cards and tickets on their mobile wallet. The web interface will be providing such service for Apple Wallet passes (refer to Fig. 4) and Android Pay cards (refer to Fig. 5).

The mobile interface will periodically retrieve and notify end-users about nearby digital advertising pings based on their GPS location. Moreover, the mobile interface will also allow manual retrieving of nearby digital advertising pings. For Coupon Ping, Membership Card Ping and Ticket Ping, the mobile interface will aid end-user in registering for a corresponding Apple Wallet pass or Android Pay card. Also, a service for in-app purchase of certain pass/card will be provided through Apple Wallet or Android Pay payment.

Moreover, it is important to understand that the GPS technology is only limited to locating a mobile phone on a 2-dimensional plane, i.e. longitude and latitude. Hence, the digital advertising pings will be limited to 2-dimensional plane.
04 – Background Study

04.1 – Similar Applications
Note that only functionality based downsides are mentioned in the analysis of these applications to different these applications from the proposed application.

1) Van Leuween Mobile App [2] – Van Leuween is a New York, USA based ice cream vendor that started a campaign in 2014 that notified nearby app users about $5 ice cream campaign to attract them to visit their shop. Their app incorporated PayPal’s mobile payment service for digital payments. Such initiative was well accepted in public as the vendor was able to make 5% of its sales digitally. However, the downside to this application is that the app only allowed marketing of a specific product.

2) Nearbuy.com Mobile App [3] – Nearbuy.com is a New Delhi, India based digital marketing firm that allows its users to manually search for nearby offers based on region rather than dynamic location. However, the downside to this application is that its users have to manually search for nearby offers rather than automatically getting notification on them as it is not using any GPS technology. Also, the app is limited to within India use only.

3) Thinknear Marketing Solutions [4] – Thinknear is a California, USA based company that designs and develops personalized mobile apps for various companies that enable these firms to advertise to nearby people based on their locations. However, the downside to this is that, one application will only work for one firm.

4) HoKoBuy Mobile App [5] – HoKoBuy is a Hong Kong based company that allows marketers to advertise their products on its web and mobile interface. However, similar to Nearbuy.com, HoKoBuy does not use GPS technology to advertise its content to its mobile application users.

5) Eatigo Mobile App [6] – Eatigo is a Hong Kong based mobile application that advertises discounts at various restaurants based on reservation timings. However, similar to Nearbuy.com and HoKoBuy, this mobile application also does not advertise based on real-time location of its user.

04.2 – Differentiating from Similar Applications
Based on a couple of weeks of research on location based marketing applications, it was found that there were not any popular location based marketing application in the current market that used both GPS and Mobile Wallet technologies and allow multiple marketers to advertise their product on one interface. Henceforth, this project will address all the downsides mentioned in section 04.1, to differentiate from these applications as well as succeed over them.
05 – Methodology

05.1 – Brief overview
The development of this project is divided into six major phases; the six major phases are research and project specification, database implementation, backend server implementation, client website application implementation, client mobile application implementation, testing and deployment.

05.2 – System Architecture
Moreover, as this is a full stack project, a modified MEAN stack will be used to implement this project. MEAN stack consists of MongoDB, ExpressJS, AngularJS and NodeJS. However, CouchDB will be used instead of MongoDB to isolate the database from the application. The modified MEAN stack will continue to follow the conventional Model-View-Controller framework. Referring to Fig. 6, all client application will have to use HTTP and JSON for request-response query cycle on the server REST API on the Amazon Web Service EC2 Virtual Machine IP address. Moreover, for data security purposed, the database REST API will only be allowed access from the IP address of the designated Amazon Web Service EC2 Virtual Machine. In contrary, the server REST API will be allowed access from any IP address given valid user authentication details, i.e. API access key and secret. Note that, API access key and secret will be provided to only the client web-app users. Also, note that to enable easy scalability, the webserver will be hosted on Amazon Web Services’ EC2 virtual machine.

![Fig. 6: Illustration on the system architecture of the project](image)
05.3 – Phases of Development

1) Research and project specification – This phase includes in-depth research of the project and finalizing project specification.

2) Database implementation – This phase includes designing and implementing CouchDB database.

3) Backend server implementation – This phase includes development of backend core logic functionality using NodeJS and ExpressJS. Adding on, it also includes CouchDB database integration, Apple Wallet integration for Apple Wallet Passes, Android Pay integration for Android Pay Cards, Slack integration for error reporting, and other trivial tasks. Slack is a chatting webapp that has an open-end endpoint for sending message to a particular internal chatroom.

4) Client website application implementation – This phase includes development of a frontend website application using AngularJS, HTML5 and CSS. Apart from the functionality stated in section 03 for the web interface, the web application will include visual error reporting and other trivial add-ons.

5) Client mobile application implementation – This phase includes development of two mobile applications for Apple and Android devices. Both the mobile application will have the same functionality as stated in section 03 for the mobile interface. The Apple and Android applications will be developed using XCode and Android Studio respectively.

6) Testing and deployment – This phase will include user acceptance test (UAT) to verify whether the application is market ready or not. If needed, changes will be made to implementation of previous phases based on user feedback. After the completion of the testing process, the project will be deployed to a live environment for the public to start using. Note that, a domain name for the web application will be purchased after the whole application is completed.

Note that, all following phases require the previous phase to be fully implemented.
06 – Risks, Challenges and Mitigation

With such a massive project, risks and challenges are inevitable. Major risks include not being able to gain access to certain services, i.e. Apple Wallet Developer account or Android Pay Developer account, as well as limited experience in mobile application development. Moreover, the major challenge for this project is user interface (UI) and user experience (UX). Success of both web and mobile interfaces heavily depend on these two elements. Henceforth, with the limited time given, it will be extremely challenging to achieve satisfiable level of quality. Furthermore, to mitigate such risks and challenges, it will be important to consult project supervisor and qualified personal for assistance. Also, it will be important to spend significant time researching for best used practices to mitigate common risks.

07 – Deliverables

07.1 – Public Release
Public Release Set 1 – Frontend Website for marketers
Public Release Set 2 – Frontend Mobile Applications (both Apple and Android) for end-users

07.2 – Non-Public Release
Non-Public Release Set 1 – Database Implementation
Non-Public Release Set 2 – Frontend and Backend Server Implementation

07.3 – Project Management Deliverables
Project Management Deliverables Set 1 – Project proposal and Project website
Project Management Deliverables Set 2 – First project presentation
Project Management Deliverables Set 3 – Project interim report and preliminary implementation
Project Management Deliverables Set 4 – Project final report and finished implementation
Project Management Deliverables Set 5 – Final project presentation
Project Management Deliverables Set 6 – Project exhibition deliverables
Project Management Deliverables Set 7 – Project competition deliverables
08 – Schedule

08.1 Project Development Schedule

<table>
<thead>
<tr>
<th>Dates</th>
<th>Milestones</th>
</tr>
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<tbody>
<tr>
<td>01 Sep 2017 – 01 Oct 2017</td>
<td>Phase 1 – Research and Project specification</td>
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<tr>
<td>02 Oct 2017 – 10 Oct 2017</td>
<td>Phase 2 – Database implementation</td>
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<tr>
<td>21 Nov 2017 – 10 Feb 2018</td>
<td>Phase 4 – Client website application implementation</td>
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<tr>
<td>11 Feb 2018 – 30 Mar 2018</td>
<td>Phase 5 – Client mobile application implementation</td>
</tr>
<tr>
<td>01 Apr 2018 – 10 Apr 2018</td>
<td>Phase 6 – Testing and deployment</td>
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08.2 Project Management Deliverables Schedule

<table>
<thead>
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<th>Dates</th>
<th>Milestones</th>
</tr>
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<tr>
<td>15 Sept 2017 – 01 Oct 2017</td>
<td>Project Management Deliverables Set 1 – Project proposal and Project website</td>
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<tr>
<td>25 Dec 2017 – 07 Jan 2018</td>
<td>Project Management Deliverables Set 2 – First project presentation</td>
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<tr>
<td>08 Jan 2018 – 21 Jan 2018</td>
<td>Project Management Deliverables Set 3 – Project interim report and preliminary implementation</td>
</tr>
<tr>
<td>05 Apr 2018 – 15 Apr 2018</td>
<td>Project Management Deliverables Set 4 – Project final report and finished implementation</td>
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<td>10 Apr 2018 – 15 Apr 2018</td>
<td>Project Management Deliverables Set 5 – Final project presentation</td>
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<tr>
<td>15 Apr 2018 – 01 May 2018</td>
<td>Project Management Deliverables Set 6 – Project exhibition deliverables</td>
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<td>TBC</td>
<td>Project Management Deliverables Set 7 – Project competition deliverables</td>
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09 – Project Budget

<table>
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<td>TOTAL</td>
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10 – References


