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1st May, 2013

A location based web application to plan and record travel experiences

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A project report submitted for the award of
BSc Computer Science

Abstract

Before social network existed, people made travel plan based on the recommendation from generic travel guides and shared travel experiences by posting blogs or writing travelogues. Then, with the invention of social networks which makes it easy to share daily life among friends, people start considering opinions and experiences from friends when they plan for their trips online. Many social networks have emerged for different purposes and other websites and services start integrating social elements. Furthermore, with the development of GPS embedded devices and the internet becoming ubiquitous, people are able to post thoughts online or check-in at places when they are travelling or upload photos with GPS information attached. At the same time, their friends at home can share their travel experiences by replying to their thoughts, commenting on photos and they can see where the photos are taken and where the statuses are sent from. However, not many social networks are designed for travel experiences sharing and not many travel guides are designed with social media integration. People can hardly see where exactly their friends have been to and how their routes look like.

In this project, a location based web application is designed, implemented, tested and evaluated. It is specially designed to share travel experiences on a map which shows travel routes as well as photos, statuses and check-ins. It also allows users to plan their trips based on where their friends have been to. The overall objective is to enhance sharing experiences and travel experiences after people use the application.

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1. Introduction

The way people make travel plan and share travel experiences has changed significantly in the past few decades with the development of the web. Instead of reading travel advertisements on newspapers and consulting with local travel agents, people now plan their trips by booking flights and hotels online, searching for their destinations on Google, and checking photos and reading reviews from other travellers on online travel guides and social networks. Social networks with different purposes and functions have been developed in recent years, enabling people to share photos, videos or locations with friends. For travellers, instead of keeping travel photos in physical albums and writing travelogues, people check-in at places of interests and upload photos to social networks where their friends can comment or "Like" their photos.

As online travel guides implements more social elements, they are becoming more popular among travellers (Xiang & Gretzel, 2010). However, online travel guides recommend travel destinations based on reviews and ratings from every user and planning trips based on the experiences of friends is difficult. Study has shown that people trust more of recommendation from friends than generic recommendation system (Sinha & Swearingen, 2001). Therefore, an application that allows users to plan their trip only based on the experiences of their friends would be useful. Although, many websites and applications have functions that fulfil such requirement, they are not specially designed for it and thus lack of usability. Therefore, the application developed in this project is specially designed for sharing travel experiences among friends and making travel plans based on the experiences of friends. It is aimed at enhancing overall travel experiences for travellers by better way of sharing and planning.

This report presents the literature review of social media, travel guide and visualization in the second section. Then in section three, requirements for the project are extracted from the problems presented in the literature review. Based on the requirements, the design of the application is produced in section four. Cost and risk analysis are presented in section five. Implementation and testing of the application are shown in section six and seven. Then, a comparative evaluation results are presented in section eight. Finally, summery and possible future works are concluded in section nine.

2. Literature Review

As the internet becomes ubiquitous and the connection gets faster, people are able to search for more and more information online and at the same time share more about themselves and their experiences with the expansion of social networks. Social networks have become another way of spreading and obtaining information (Hall & Tiropanis, 2012). They have also been proven to be influential on the behaviours of travellers in a case study of TripAdvisor (Miguéns, Baggio, & Costa, 2008). Many social networks have the function of sharing travel experiences but they are not originally designed for travellers. As for travel guides, they are not usually designed with social integration. Although some of them have social integration, they are not actually providing destination recommendation based on users' friends. An application that specially designed for sharing travel experiences and travel planning based on experiences of friends would be useful. This section reviews the literature on social media, travel guide and map visualization and provides reasons for why such application is needed.

2.1. Social media

As social networks get so popular, research has been conducted and lots of ideas of social networks have been implemented. This part provides an overview of social networks and then moves on to location-based social networks which are related to the project.

Most social networks are developed to visualize existing friendships in real life (Boyd & Ellison, 2007). People are able to shares status updates, photos and locations with their friends and family. Other social networks allow connection with strangers with common interests (Boyd & Ellison, 2007). Keenan and Shiri (2009) analysed how social networks enable users to socialize online. Facebook, with over one billion users (BloombergBusinessweek, 2012), virtualizes existing friendships and makes the sharing of updates, photos and videos easy through simple, intuitive and user-friendly interface (Keenan & Shiri, 2009). Twitter is simple and quick, allowing easy updates even from mobile phones (Keenan & Shiri, 2009). Social networks provide a convenient way for people to connect.

Sharing locations is also getting popular with the popularity of phones with embedded GPS devices. A study of Foursquare (Lindqvist, Cranshaw, Wiese, Hong, & Zimmerman, 2011), one of the most popular location sharing applications, found that people share their location with friends to socialize with them, to meet new people who have been to the same place or to keep a record of the places they have been to (Lindqvist et al., 2011). This study also found that restaurants and bars are the common places to check-in (Lindqvist et al., 2011). This study clearly shows that people are interested in sharing information about where they are and have been to.

Then geo-tagging is invented to enable people to tag their updates, photos and videos with geographical information. Geo-tagging makes it easy for people to view images of a specific location and binding time and location to photos makes them natural for viewers (Luo, Joshi, Yu, & Gallagher, 2010). With geo-tagging, information can be easily displayed on a map.

Previous work that organizes geo-tagged photos and displays them on a map has been done before including Google Panoramio (Panoramio, 2012) and Flickr Map (Flickr, 2012). Users can zoom in and click on photos they want to see. However, Google Panoramio is mainly used for exploring places and does not involve people. Flickr map shows photos of all users and it is difficult to find photos of friends. Also, neither of them links photos and forms routes.

In 2007, researchers developed an application called PhotoMap, which allows users to upload photos and then the system will automatically organize them based on time and geographical information and display the photos and tracks on a map-based interface (Viana, Filho, Gensel, Oliver, & Martin, 2007). In this project, they also argue that map-based interface is more interactive and can easily show the itineraries (Viana et al., 2007). However, their project was focused on automatic annotation of photos.

Table 1 shows the features available on 5 popular social network sites. While most sites allow the sharing of statuses, photos and locations, viewing them on a map is not always available and none of them has the feature of showing travel routes on a map. Therefore, based on the literature review of social media, this application will focus on sharing travel experiences by displaying status updates, photos and check-ins on a map and displaying the route.

	Facebook	Twitter	Google+	Foursquare	Flickr	This Application
Post statuses	✓	✓	✓	✓	✓	✗
Post photos	✓	✓	✓	✓	✓	✗
Post locations	✓	✓	✓	✓	✗	✗
View statuses on a map	✗	✗	✗	✓	✓	✓
View photos on a map	✓	✗	✗	✓	✓	✓
View check-ins on a map	✓	✗	✗	✓	✗	✓
View travel routes on a map	✗	✗	✗	✗	✗	✓

Table 1. Feature matrix

2.2. Travel planning on the web

In the area of traveling, with the development of technology and globalisation, more people travel around the world for variety of reasons such as business cooperation or experiencing different cultures.

Before traveling, people tend to search for their destination and plan their journey online. In a study about the search for travel information, Walden, Carlsson and Papageorgiou (2011) found that almost 28% of search resuilts on Google.com are from social media. Social media includes sites such as TripAdvisor providing consumer review, virtual community, blogs, etc. However, results from mainstream social media like Facebook are not a lot. Possible reasons are that travel marketers do not use them, the sites are successful without them or users simply do not use them (Walden et al., 2011). However, the authors argue that information from social media sites is up-to-date and diverse and thus social media cannot be ignored among all travel information (Walden et al., 2011).

A case study of TripAdvisor showed that the way people share information is being shifted form business-to-customer to peer-to-peer, which means that people rely more on the content generated by others who have travelled to the same destinations (Miguéns et al., 2008).

In 2011, a paper about personalized location-based system written by four researchers in Korea proposed a geographical context service, which is based on locality, social relations, user created content and knowledge to make recommendations based on both user profile and social relationships (Lee, Kim, & Lee, 2011). These studies show that user generated contents from social networks are becoming important when people choose where to travel.

While studying the impact of social media on travel experience, Tussyadiah and Fesenmaier (2009) found that multimedia features such as text, images, videos or blogs enhances the experience of travellers (Tussyadiah & Fesenmaier, 2009).

These studies show that user generated contents play a key role in the travelling of other people. However, what kinds of user generated contents are suitable for travel guide? After the analysis of travelogues with tagged photos, researchers from Microsoft Research Asia and Tianjin University in China (2009) state that purely textual information is not efficient to express what the use means (Lu, Pang, Hao, & Zhang, 2009).

Moreover, an earlier study which compares recommendations from friends and recommender systems suggested that people prefer the former (Sinha & Swearingen, 2001). However, such system that recommends places to visit based on the places their friends have been to rarely exist.

Therefore, because recommendation from friends is preferred to recommender systems, this application will recommend places to users based on the places their friends have been to.

2.3. Map visualization

The researchers for the PhotoMap project mentioned earlier states that map is more interactive and shows the itinerary (Viana et al., 2007). The application visualizes the itinerary on a map by showing the icons of photos on a map and the track the user takes (Viana et al., 2007). However, because geospatial visualization was not their main objective, tracks on their map simply used the default Google Map purple lines.

Data can be visualized in many different ways on the map, such as dotmap, pinpoint, heatmap, choropleth and cartogram. The simplest way is to use markers to represent the locations of geotagged data. A geospatial visualization of conference attendees was presented by Zhang and Shi (2007), who used different colours of Google Map markers to represent the amount of people from different country or city attending the conference. This approach can certainly be used in this project where the number of photos, updates and check-ins can be represented by different colours to indicate popularity of places.

To represent popularity of places, heat map can also be used. Previous work on visualizing popularity on a map has been done by Microsoft Research (Fisher, 2007). They collected data from maps.live.com from which areas each user had viewed were recorded. The popularity of areas was shown on a map with colour ranging from white to red (Fisher, 2007). Google Map also provides ways to represent popularity. Tools such as heatmap are used to represent secondary information, in this case, popularity of places (GoogleMapAPI, 2012).

Other visualization methods have also been used for variety of purposes. The Canadian Department of Foreign Affairs and International Trade uses choropleth map to indicate the level of travel safety of other countries (CBC, 2013). Recent gunshot incidents have triggered researchers to produce a pinpoint map of all gunshot incidents since December 2012 (The Huffington Post, 2013). Dotmap has been used to generate a map of every person in the US in 2010 (bmander.com, 2011).

The use of colours has also been studied. Research by Brewer, MacEachren, Pickle and Herrmann (1997) evaluated the accuracy of map-reading and user preferences of four diverging colour schemes, the spectral scheme and three sequential schemes for choropleth maps. They confirmed that people preferred colourful map over monochrome maps (Brewer et al., 1997) and found that spectral colour scheme (red – orange – yellow – blue - purple) and the diverging scheme of purple and green combination were the favourite colour schemes. This study provides the guidance of the colours used for the application developed in this project

2.4. Conclusion

Many social network sites emphasized on different functions have been created in recent years but an application specially designed for sharing travel experience rarely exists. On most existing social networks, people can browse travel photos in albums or on a map but can hardly see the whole journey or the itinerary.

Before travelling, people usually search for the places they plan to go. Currently, most results are from travel guides that provide general information and reviews from everyone. Route planning based on where friends have been to is difficult. However, study has shown that recommendation from friends is more reliable than generic recommendation system (Sinha & Swearingen, 2001).

Therefore, this project is aimed at developing a location based web application specially designed for travel experiences sharing and travel planning.

3. Requirements

Based on the problems presented in the literature review, requirements are developed. They are specially designed for application that helps people share travel experience and make travel plan, and are divided into functional and non-functional requirements.

In each category, MoSCoW method is used to prioritize the requirements (Coley Consulting, nd), which is important because of the time constraint of the project. Functions that solve the problem need to be developed first and solving the problems successfully will lead to the success of the project.

3.1. Functional Requirements

Priority	Requirement	Description
Must have	Existing social networks integration	Users are able to link their social network accounts to the application. Research by Yeung et al. (2006) suggested that users are not usually willing to change applications and migrate data to other social network because they are tired of registering and adding friends to the new application. Therefore, using the data from existing social network instead of users signing up to a completely new application is plausible. Facebook, the most popular general purpose social network allowing people to share status updates, photos, videos and location check-ins with friends, has more than one billion registered users (BloombergBusinessweek, 2012). Thus, this project will allow users to login using their Facebook accounts and use the data from Facebook. Twitter is also integrated for quick updates.
	Display updates, photos, check-ins and routes on a map	Users are able to view routes with updates, photos and check-ins on a map. Study by Viana et al. (2007) has shown that map-based interface is more interactive and can easily show the itineraries. Therefore with all items located on the routes, it is clearer for their friends to know where they have been to and what they have done.
	Suggest places	Users are able to plan their routes based on where their friends have been to and which places are popular. Study suggests that people prefers recommendation from friends to recommender system (Sinha & Swearingen, 2001). However, most current travel guides provide recommendations by showing the number of people who have been there and reviews from strangers. Thus, this project will mainly show the routes of friends and allow users to plan their journey based on the experience of their friends.
Should have	Integrate more social networks	If possible, the application should integrate more social networks because people may use different applications to share updates, photos or check-ins.

Could have	Invite friends to the application	Users can invite their friends from existing social networks to use this application. Because this application recommends places based on routes of friends, more friends using the application will make the experience better.
	Comment on routes	Friends can comment on routes or the whole travel experience.
Won't have	Live logging	Recording where people are in real time will not be implemented because the privacy concerns of live logging. It can be implemented in the future but requires huge amount of research and effort.

Table 2. Functional requirements

3.2. Non-functional requirements

Priority	Requirement	Description
Must have	Scalability	As this is a web application, it must support the increase or decrease of the number of users. Therefore, this application is hosted on Google App Engine, which uses Google's high performance infrastructure and scales applications automatically (Google App Engine, 2012).
	Privacy settings	This application must allow users to controls what other people can see. The study of Foursquare shows that privacy concerns prevent people from checking in (Lindqvist et al., 2011). As this application reveals the location of users, privacy setting is crucial.
	Intuitive interface	This application must provide intuitive interface. An intuitive interface for privacy settings can also solve privacy concerns (Akcora & Ferrari, n.d.).
	Use on mobile phone	Users can access their planned routes on their phones.
Should have	Cache users' data from social network	Because data are retrieved from existing social networks, the application will not store updates, photos and check-ins in the Google App Engine. Therefore, caching may be required if users view a route frequently. This will improve the performance of the application.
Won't have	Choose username	Users can pick a username, so strangers may see their routes but will not know who they are. As this application will associate with more than one existing social networks, users can either use the existing one or choose a new one.
	Print or export travel route	Users can print out the travel plan or export as PDF format so when they do not have internet access, they can still see their routes.

Table 3. Non-functional requirements

4. Design

Unified Modelling Language (UML) is used to model application structure, behaviour and architecture and to help the developer to understand the system. UML provides many types of diagrams, for example, use case diagram which reflects functional requirements, sequence diagram which shows actions in temporal order, class diagram which shows the static elements of the system.

4.1. Use Case Diagram

Figure 1 shows the use case diagram for the system. It is derived from functional requirements and shows the interactions between users and the application.

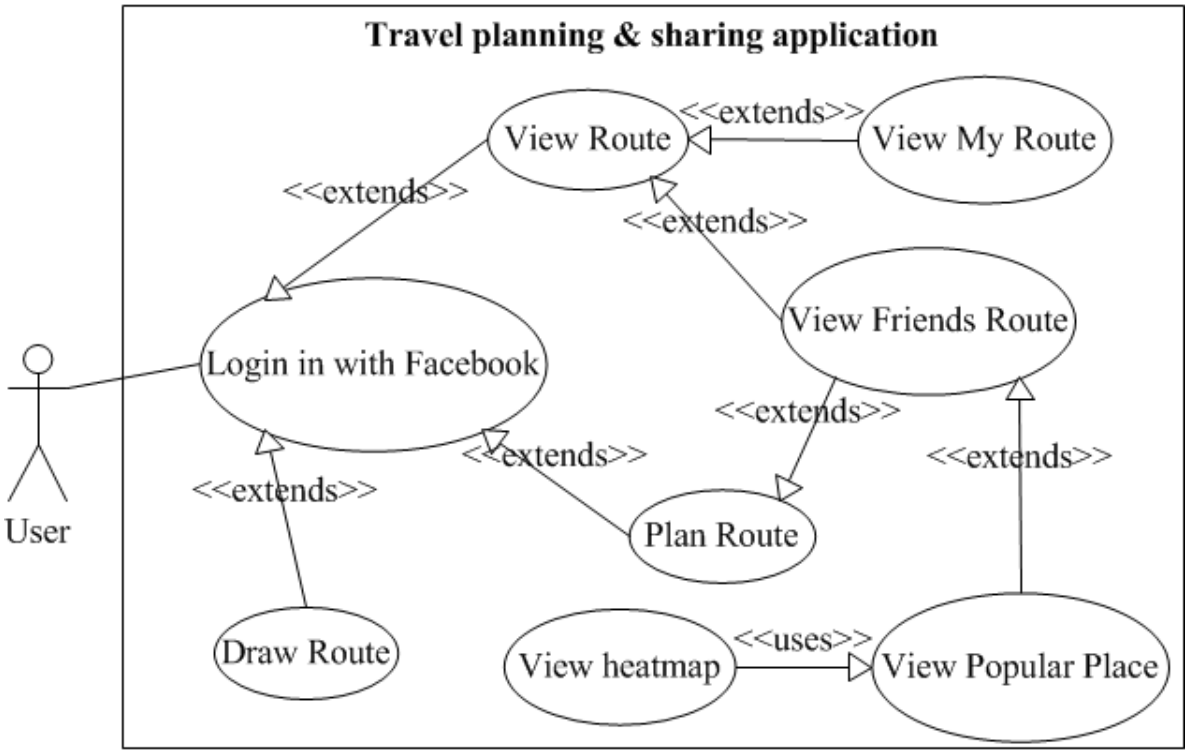


Figure 1. Use case diagram for the whole system

4.2. Deployment Diagram

Because the web application needs to be scalable, it will be hosted on Google App Engine. The database will store users' information including users IDs, names, linked social networks with photo, update and check-in IDs, and routes information. The database also stores all the geographical points on the map, which are used to calculate popular places.

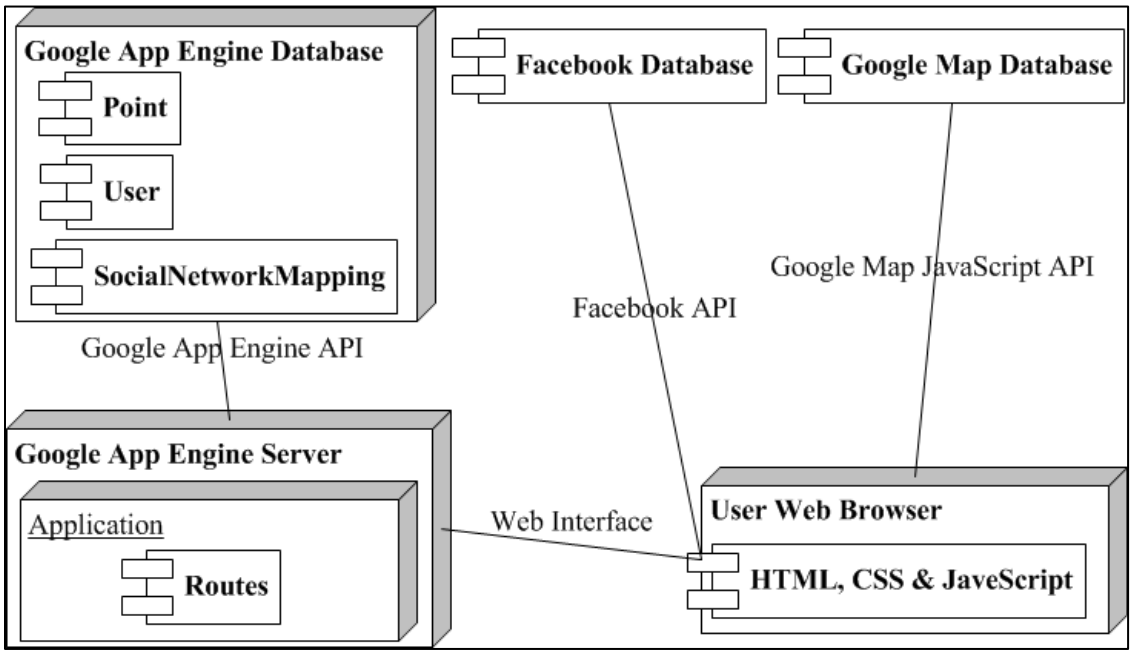


Figure 2. Deployment diagram

4.3. Sequence Diagram

The three sequence diagrams (figure 3, 4, 5) show the actions for drawing routes, view routes and planning routes.

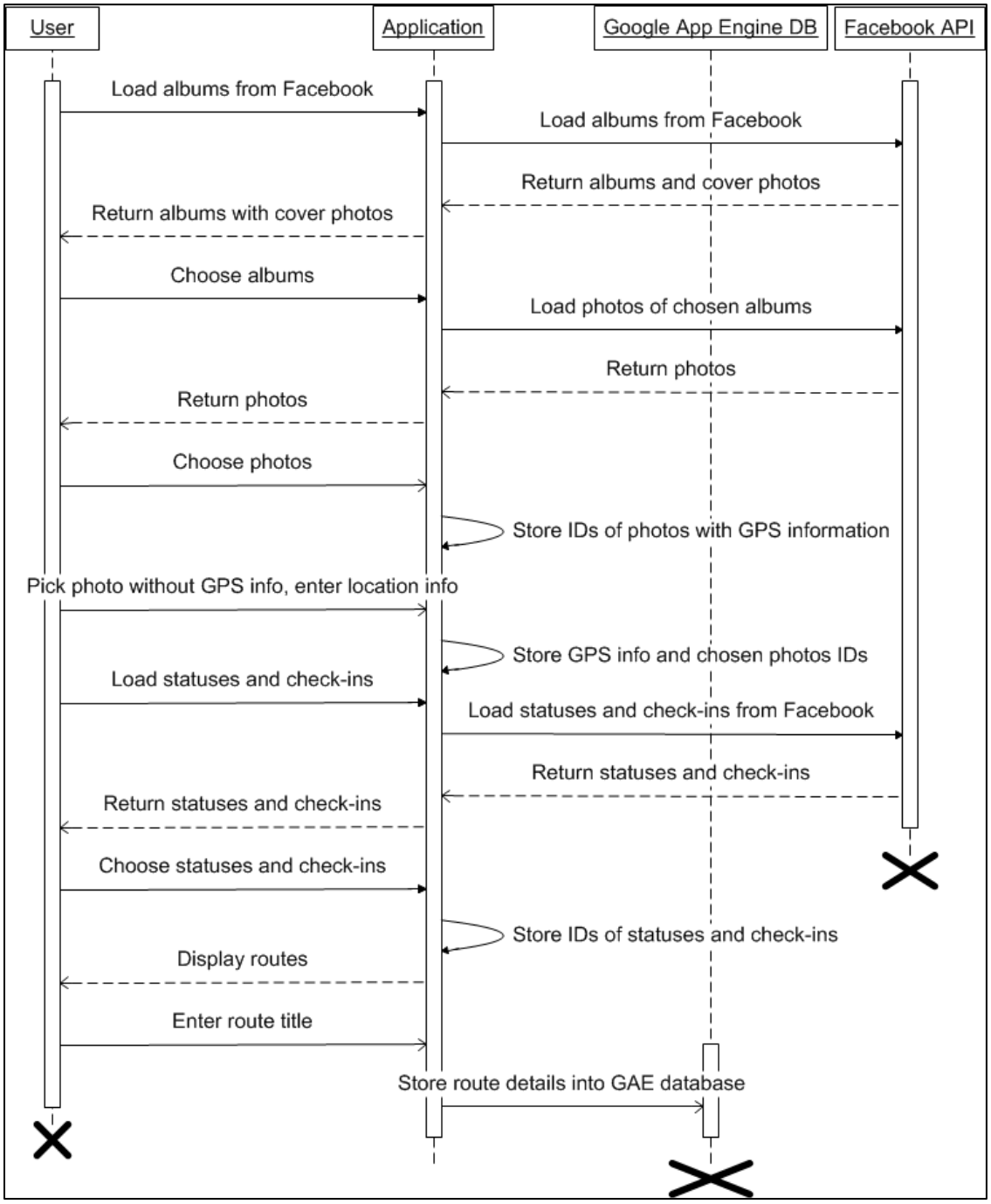


Figure 3. Sequence diagram for drawing a route

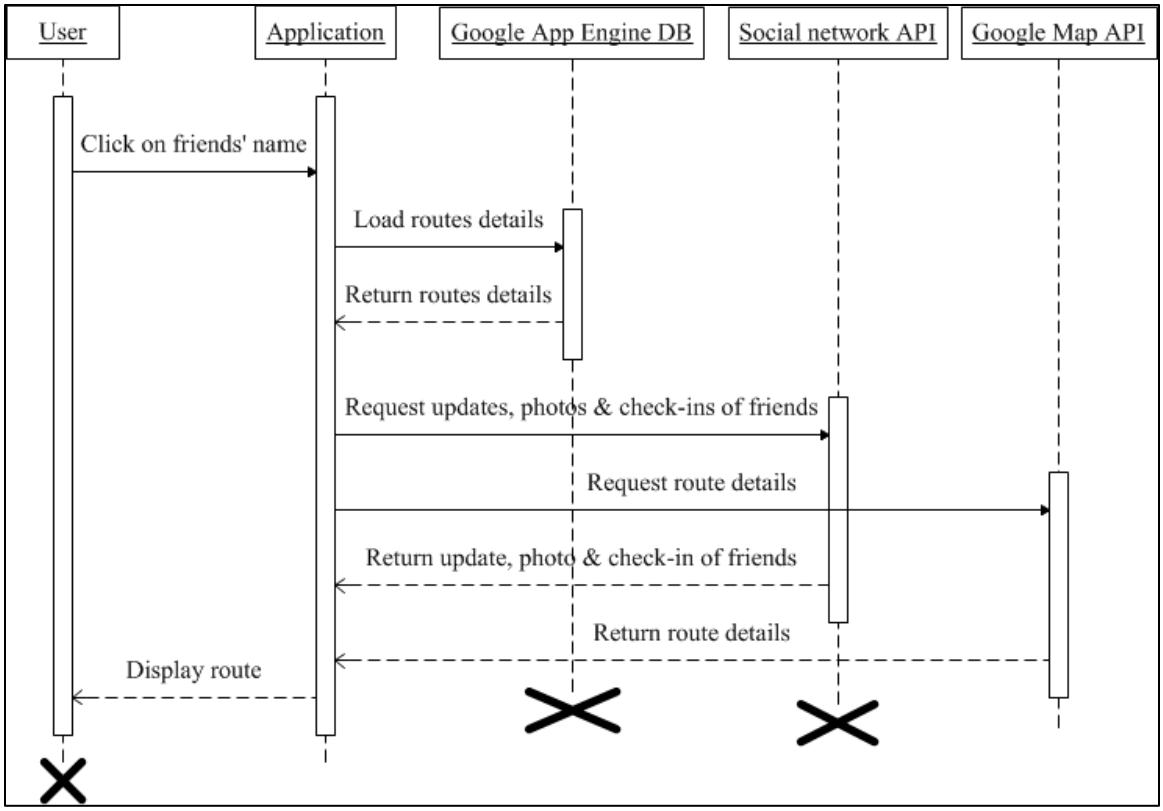


Figure 4. Sequence diagram for browsing a route

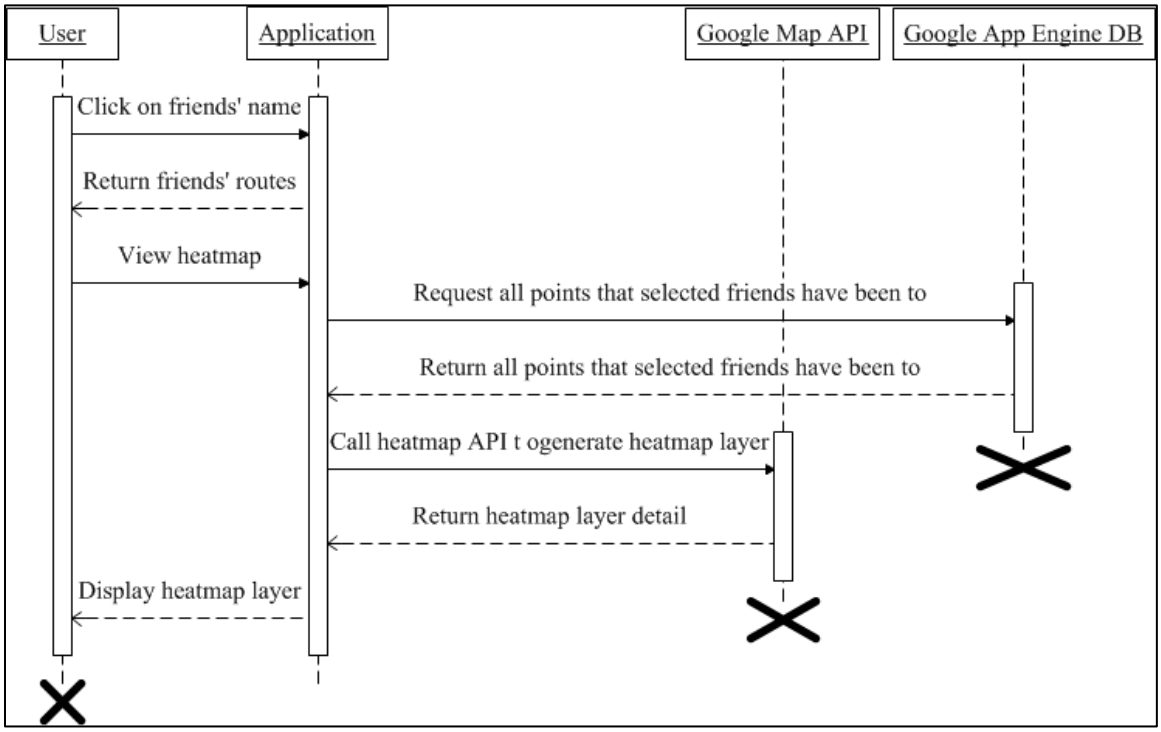


Figure 5. Sequence diagram for planning a route

4.4. Class Diagram

The server class diagram is shown in figure 6. User, SocialNetworkMap and Point are Google App Engine datastore classes. User stores user ID and user routes. SocialNetworkMap stores which user has logged in with which social network. Point is the class for storing locations that people have been to. Each entry stores the location for either for an update, a photo or a check-ins, the user who has generated the item and geographical information. This information will be displayed as popular places when users are planning their routes.

Store, Bound, Route and Delete classes response to data retrieving and storing. LoginPage and HomePage handle the rendering of the login page and the home page.

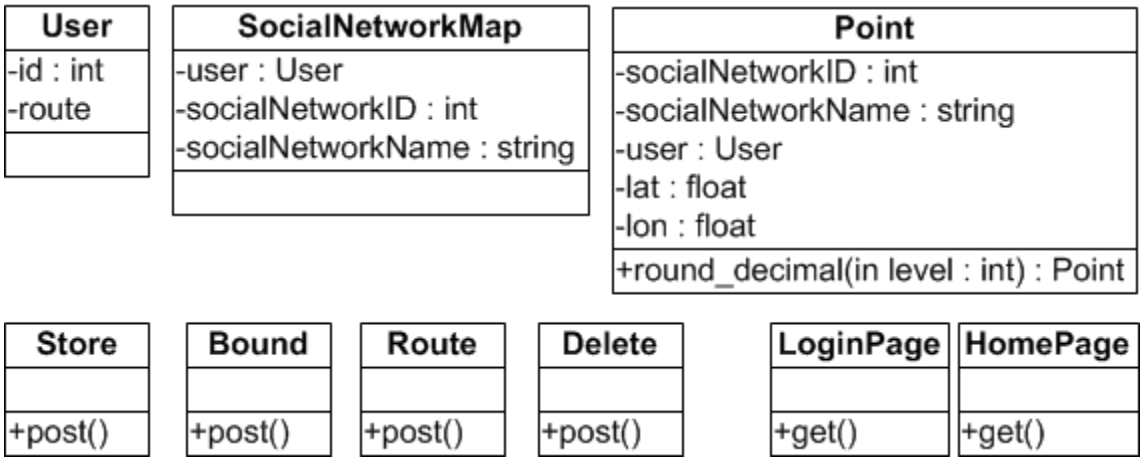


Figure 6. Class diagram for server side

4.5. Wireframes

The original design of the interface is shown in figure 7. It makes the view of the map as large as possible so users can have the best view of their routes. The panel on the right shows a list of friends and routes of the current user.

Figure 7. Wireframe of home page.

The detail of content on the map is shown in figure 8. The arrows on the routes show the direction of the journey. At the locations where users have taken photos, sent tweets or any other activity, information windows are used to indicate these contents.

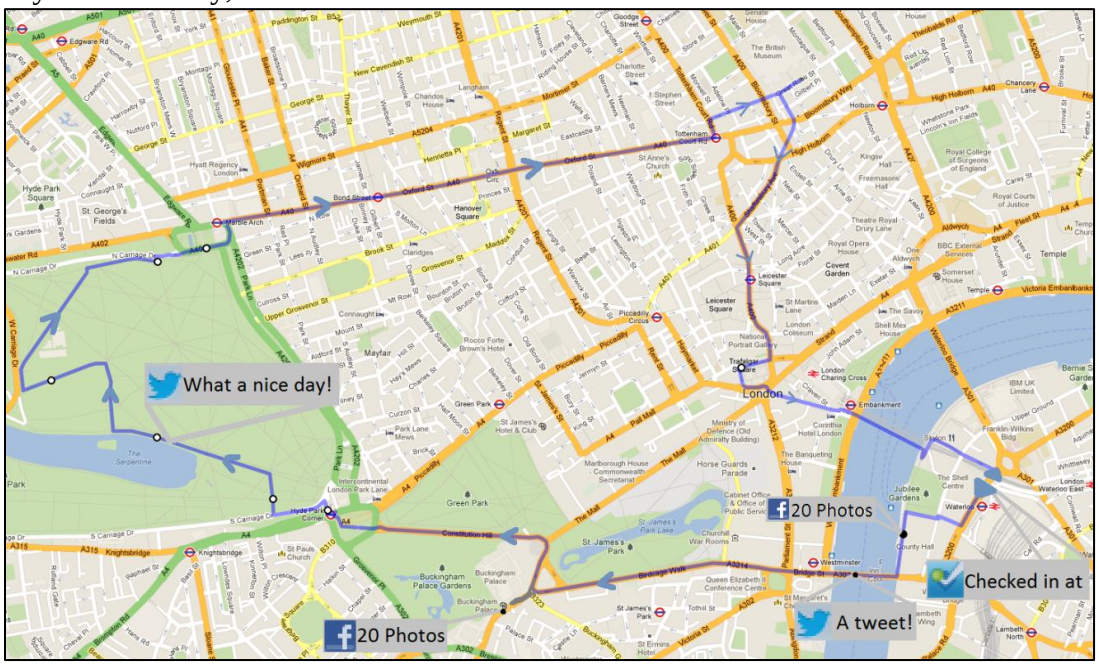


Figure 8. Map showing a route.

5. Analysis

This section provides the cost and benefit analysis and risk assessment of the application as it is likely to be developed further in the future.

5.1. Cost and Benefit Analysis

The cost consists of developer salary, hosting on Google App engine and possible advertisement of the application. The benefit can be gained from displaying advertisements on the map or selling restaurants or hotels offers. The details are explained below.

5.1.1. Cost

Main personnel cost will be the salary for developers, assuming that the number of developers grows one per year and the salary is £20,000 per person per year.

The application is hosted on Google App Engine, which is one of the main expenditure. It offers 28 free instance hours per day and 1GB free data storage. Then, it charges $0.13 per GB per month for storage and each instance hour costs $0.08 per hour (Google App Engine, 2013). The estimated cost based on the number of active users is shown in table 1, assuming that active user uses the application for 10 minutes per day and each user has 10KBytes data.

No. of active user per day	Instance cost per day	Storage cost per month
1,000	$11.10	$1.17
10,000	$131.10	$12.87
100,000	$1331.10	$129.87
1,000,000	$13331.10	$1299.87

Table 4. Cost of instance and storage of Google App Engine.

The application will be advertised on Google and Facebook.

The cost for the first 4 years is shown in table 2. The currency rate used is 1 Dollar to 0.66 Pound (Currency, 2013).

	Year 1	Year 2	Year 3	Year 4
No. of employees	1	2	3	4
Salary	£20,000	£40,000	£60,000	£80,000
No. of active user per day	1,000	10,000	100,000	1,000,000
Instance	$4051.50	$47,851.50	$485,851.50	$4,865,851.50
Storage	$14.04	$154.44	$1,558.44	$15,598.44
Advertising	£500	£1,000	£1,500	£2,000
Total	**£23,165.93**	**£72,683.59**	**£383,190.56**	**£3,303,756.96**

Table 5. Cost of instance and storage for the first 4 years.

5.1.2. Benefit

The benefit will be mainly from displaying advertisements on the map or displaying advertisements in the control panel. The amount of advertisements displayed on the application will be just enough to cover the cost shown above so users will have the best experience when using the application.

5.2. Risk Assessment of the application

Risk assessment consists of risk identification, risk analysis and risk prioritization (Boehm, 1991). In the same paper, top 10 software risk items were listed and the most relevant ones for this application are listed in table 3.

	Probability (0 – 1)	Strategy
Management		
Short of personnel (e.g. illness)	0.5	Temporarily hire another developer or ask help from friends.
Unrealistic schedules and budgets	0.4	Develop detailed schedule and financial forecast.
Development		
Developing wrong functions and properties	0.5	Make sure that functions developed are useful and exciting for users.
Developing wrong interface	0.5	Make sure that functions are elegant to users.
Requirements changes	0.3	Use iterative and incremental development method so the changes can be made in later iteration.
Gold-plating	0.7	Analyse the cost and benefit of designing functions.
Problem with externally performed tasks e.g. Facebook API, Google Map API	0.7	Provide relevant error or delay information to users.

Table 6. List of possible risks with predicted probability and strategy to reduce the impact.

6. Implementation

The application was developed following the feature-driven development methodology. A list of feature developed is shown in Table 7.

The application is built on client server architecture. The server stores user data on Google App Engine, responses to user requests and deliver data. The client displays the application and communicating directly with Facebook API and Google Map API.

Feature	Start date	End date	Number of days
Display routes with photos	7th Jan, 2013	1st Feb, 2013	25*
Statuses and check-ins can be selected	1st Feb, 2013	5th Feb, 2013	5
Display list of friends who are using the application	5th Feb, 2013	6th Feb, 2013	1
Store routes in database	6th Feb, 2013	10th Feb, 2013	5
Implement heatmap layer	10th Feb, 2013	11th Feb, 2013	1
Pop up information window when users click on markers to view photos, check-ins or statuses	11th Feb, 2013	13th Feb, 2013	3
Add tabs for friends list and routes of current user	15th Feb, 2013	16th Feb, 2013	2
Show/hide routes of friends	16th Feb, 2013	19th Feb, 2013	4
Manually enter location information of photos without GPS information	23rd Feb, 2013	26th Feb, 2013	4
FancyBox implemented to display photos, check-ins and statuses	26th Feb, 2013	27th Feb, 2013	1
Add sequential colour scheme for routes (red – yellow - green)	27th Feb, 2013	5th Mar, 2013	7
Add statuses and check-ins onto routes	6th Mar, 2013	12th Mar, 2013	7
Finish Login HTML page and beautify home HTML page	14th Mar, 2013	19th Mar, 2013	6
More than 1 albums can be selected	19th Mar, 2013	22nd Mar, 2013	4
Photos are displayed in square by cropping and resizing	22nd Mar, 2013	26th Mar, 2013	5
Bug fix	26th Mar, 2013	28th Apr, 2013	3

Table 7. Table of features implemented following feature-driven development methodology.

* 25 days were spent on implementing the first feature was because that 14th January to 22nd January was the exam period of semester one. Therefore, not much implementation was done during that time.

6.1. Server side

The server is implemented in Python, using webapp2 web application framework and Jinja2 templating system. All of them are supported by Google App Engine.

Webapp2 handles the requests and responses. When webapp2 receives request for login page or home page, it will run the Get method in the LoginPage class or HomePage class as shown in figure 9. When webapp2 receives request for data storing or deleting, it will run the Post method in class Store or Delete. Route is used for retrieving routes information and Bound is for retrieving geographical points from Point class given a bound.

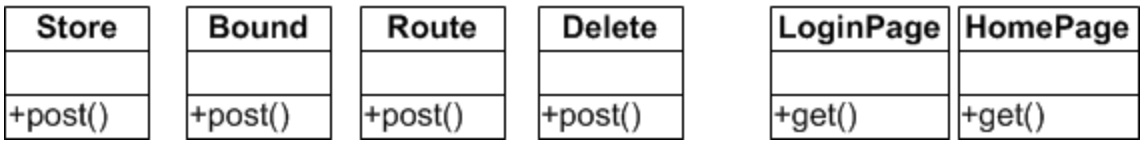


Figure 9. Server classes

Jinja2 templating system provides HTML templates. Without using a template, HTML code is embedded in Python code, which is difficult to read and maintain. By using Jinja2, HTML code is kept in separate files with special syntax to access variables in Python code. The login and home pages are mainly written in separate HTML files, with data dynamically generated from LoginPage and HomePage classes.

Google App Engine also provides a NoSQL database, which is scalable for web application. The application has three tables i.e. User, SocialNetworkMap and Point as shown in figure 10. User stores user IDs and routes. SocialNetworkMap stores the mapping of the application users and their social network IDs. Point stores every location point that photos, check-ins and statuses are located on.

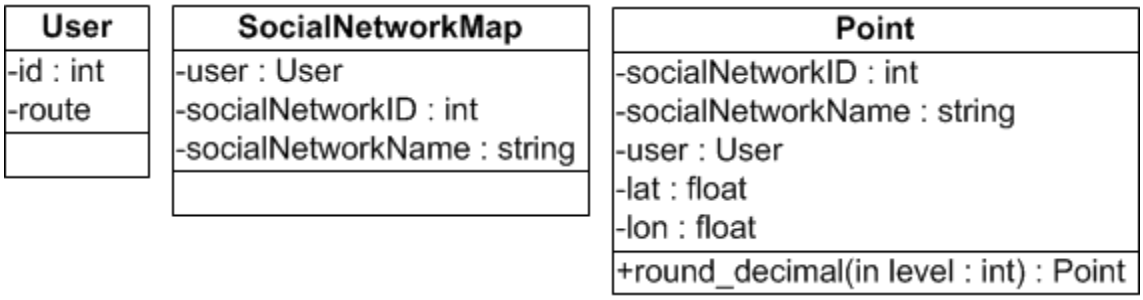


Figure 10. Database classes

6.2. Client side

The client is the user browser, which displays the HTML page to users and handles users' interactions using JavaScript. The client interacts directly with Facebook API and Google Map API. Facebook provides simple JavaScript API for user authentication and data retrieval. Google also provides JavaScript API for rendering map, displaying markers and drawing routes.

6.2.1. Login Page

The login page displays basic information of the application and a "Login with Facebook button" as shown in figure 11. When user clicks on the button for the first time, they will be redirected to Facebook authorization page so they can authorise this application to use their data. The background of the login page is a full screen Google map centred at the current location of the user.

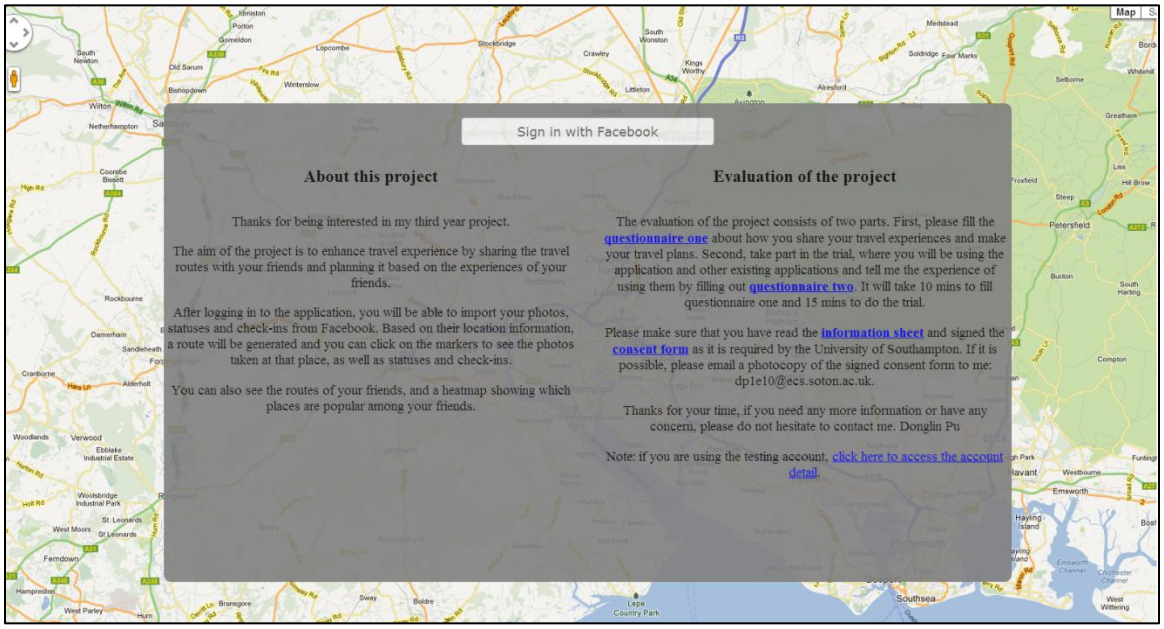


Figure 11. Login page

6.2.2. Home page

The home page is a full screen map with a control panel float on the right side of the screen. In the control panel as shown in figure 12, there are two tabs – Friends and My Routes. By clicking on the names in the Friends tab, routes of friends will be shown on the map. My Routes Tab shows the routes created by the user and options to create a new route or display all routes.

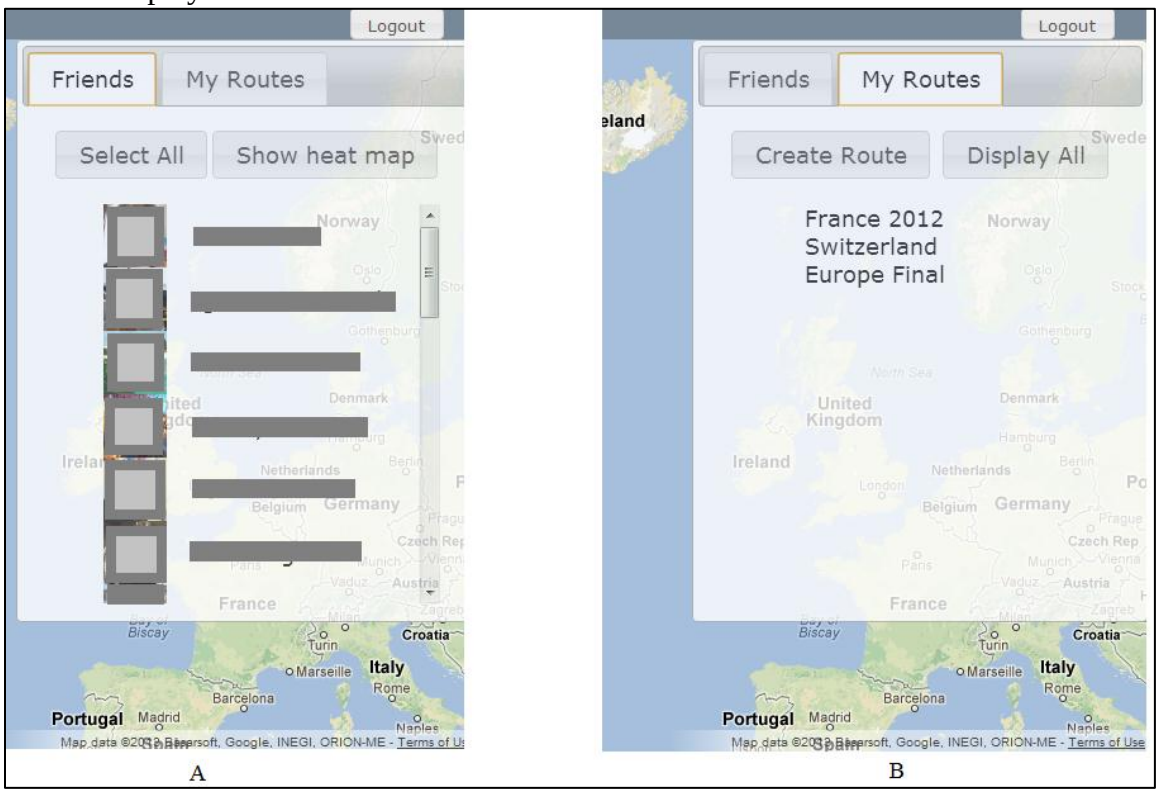


Figure 12. Control panel. A. Friend list. B. Routes of the current user

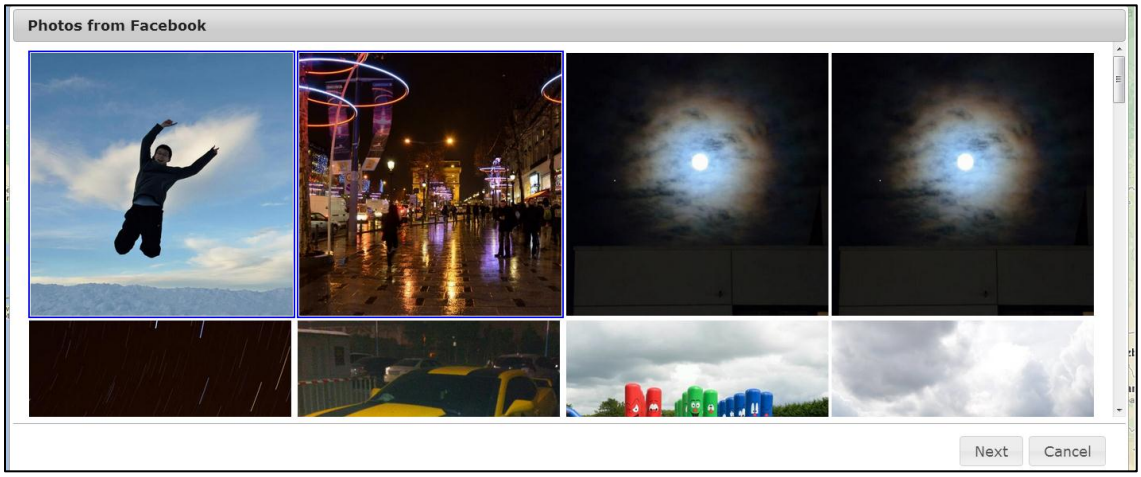


Figure 13. Choose albums from Facebook.

Routes are created by selecting albums from Facebook first as shown in figure 13. Selected albums are shown in blue border. After the user clicks Next, they will be directed to the dialog to choose photos from the chosen albums. The photo selection dialog is shown in figure 14 and selected photos are shown in blue borders.

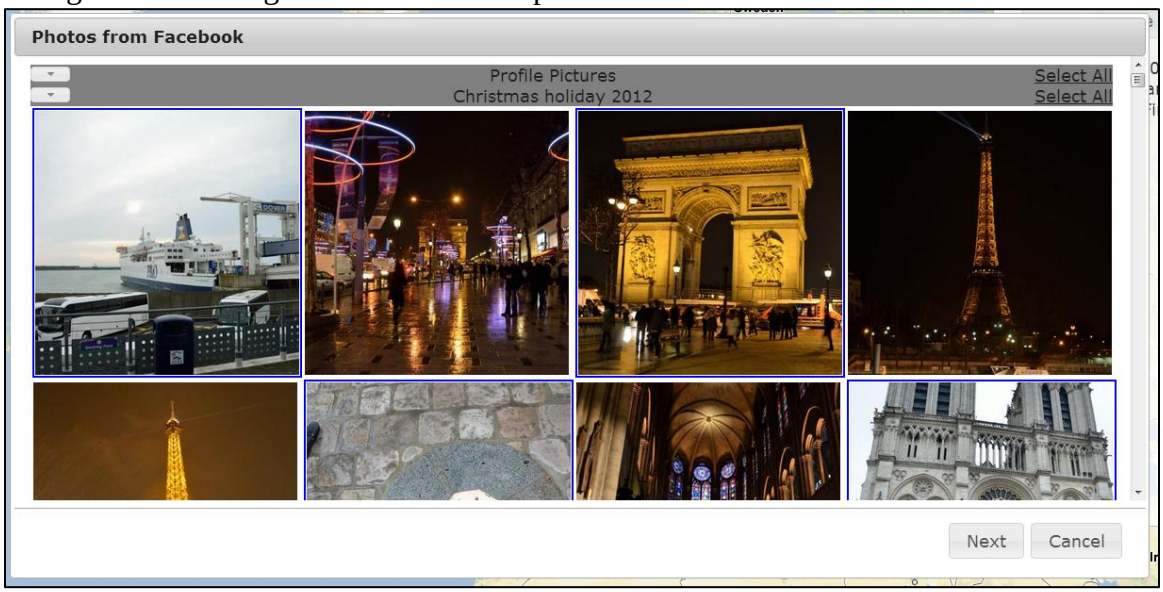


Figure 14. Choose photos from selected albums.

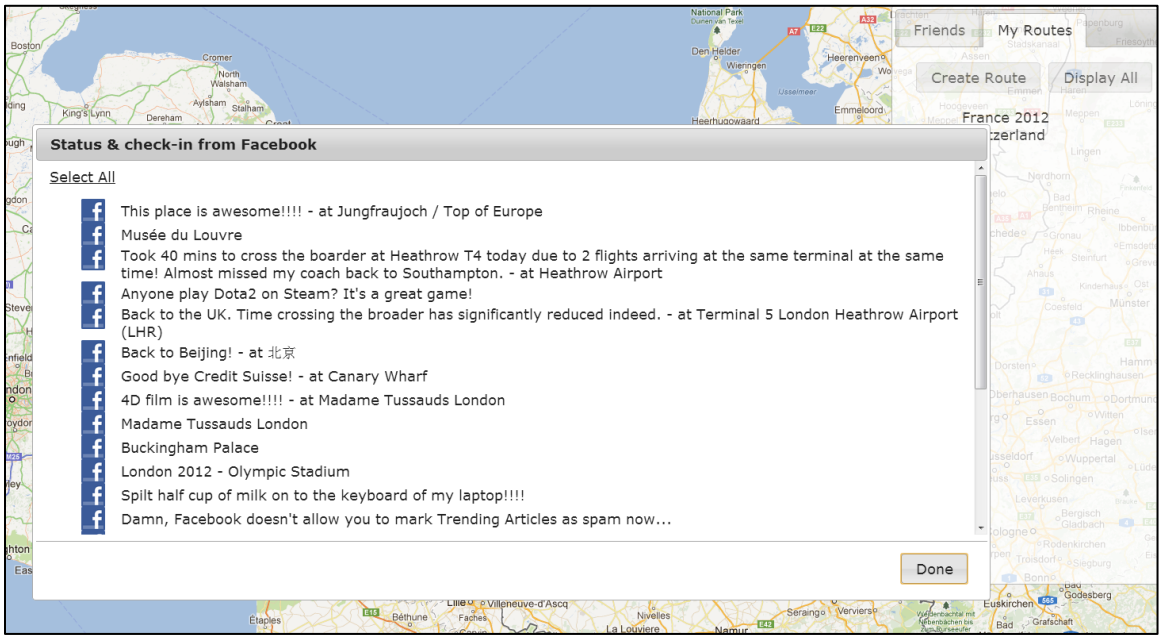


Figure 15. Choose statuses and check-ins from Facebook.

Then, the user can select check-ins and statuses as shown in figure 15. After the user clicks the Done button, a route will be shown on Google Map as shown in figure 16. All buttons and dialogs are all implemented using jQuery UI.

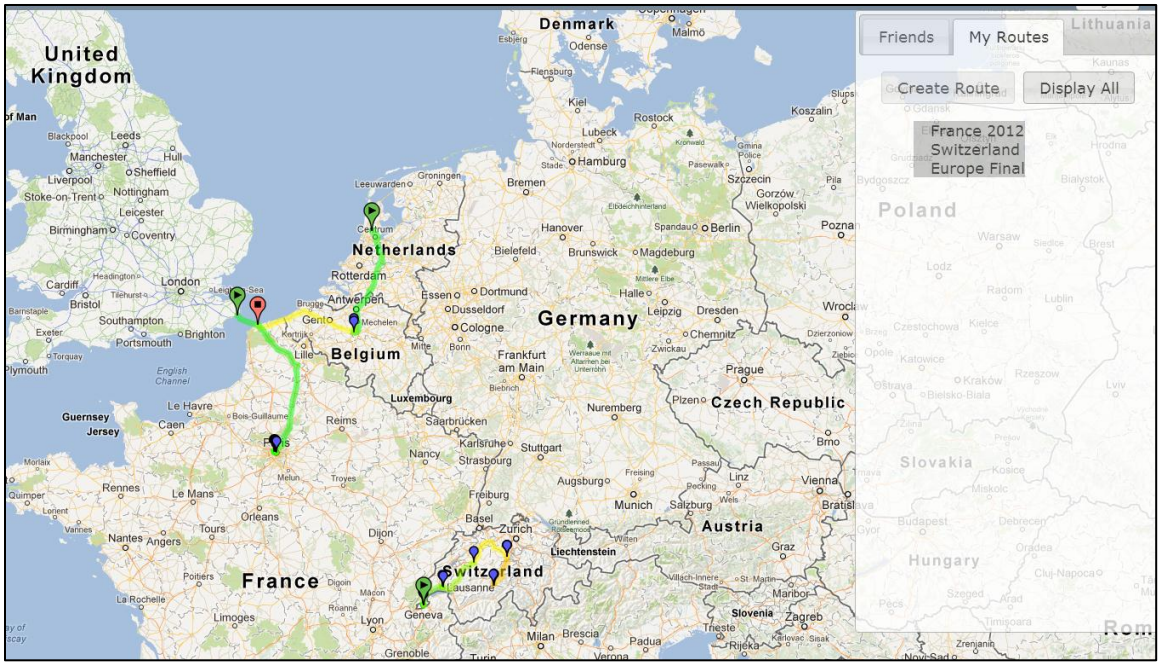


Figure 16. All routes of a user on Google map.

As illustrated in figure 17, when user clicks on the marker, photos, check-ins and statuses on that location will be shown. A tool called fancyBox (Skarnelis, J, 2013) is used to display the items on the map. It is built on jQuery and run on the client side. It provides an elegant way to scale images and slide between images.

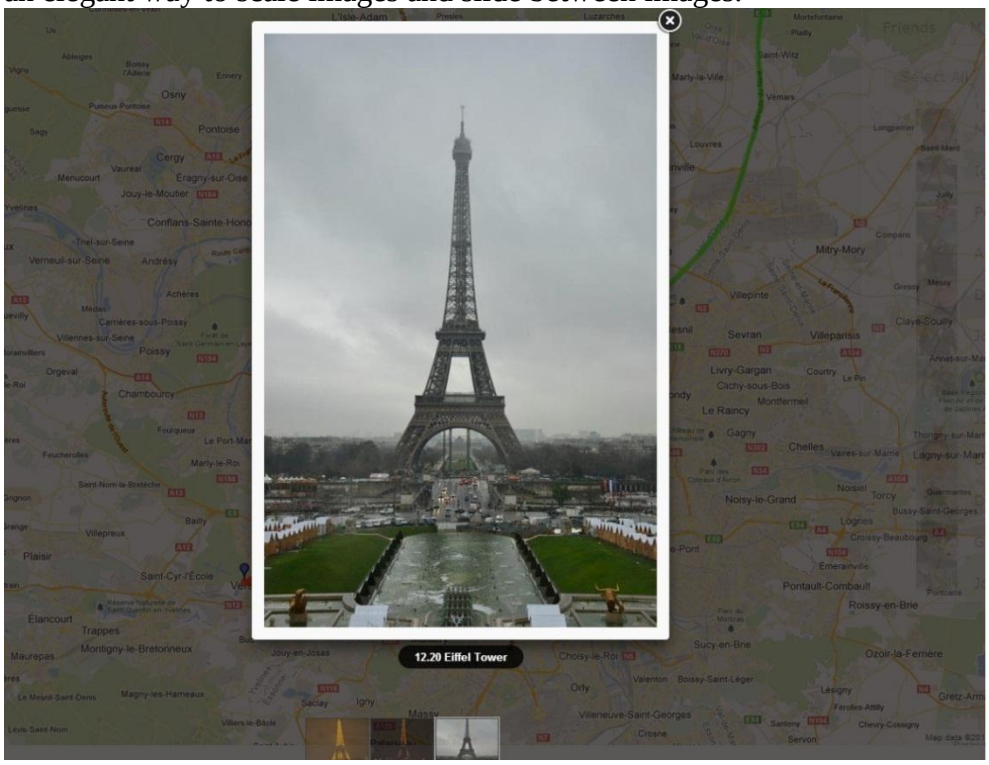


Figure 17. Photo displayed using FancyBox tool.

To see routes of friends, users can click on the name of their friends in the Friends tab. The selected friends are highlighted in grey. Users can see which places are popular by viewing the heatmap as shown in figure 18. Popular places are implemented in a heatmap layer provided by Google Map JavaScript API (Google, 2013). The most popular places are shown in red while less popular places are shown in green.

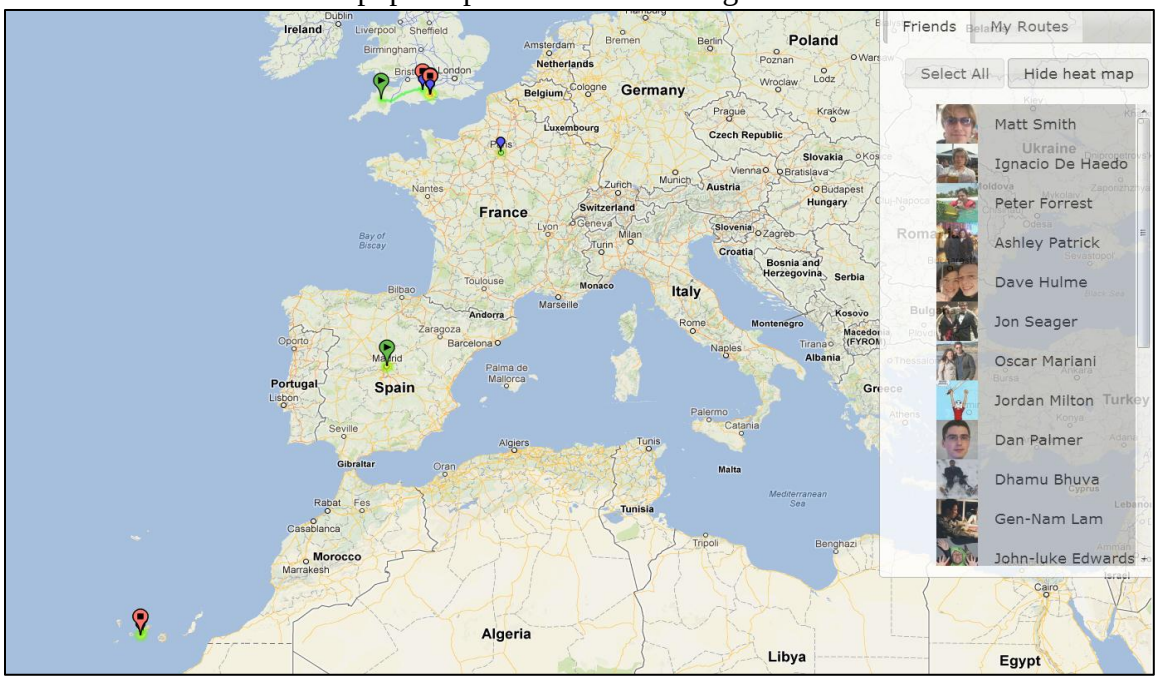


Figure 18. Heatmap layer showing popular places.

7. Testing

This section outlines the testing conducted on the application. Application with fewer bugs can deliver better user experience. Testing was conducted throughout the implementation process and after the application was finished.

7.1. Unit testing

After each main function was written, a unit testing was conducted on it and all of its helper functions. Although automated testing method was considered and tried, most functions were only manually tested. There was no automated test script written for unit testing because most of the functions require getting users data from Facebook or rendering on Google Map using Google API. The former requires user token, without which Facebook API will reject requests. The later could not be tested by automated test scripts because Google Map API returns huge amount of data in JSON format, there is no way to know all of the responses before sending the request. Therefore, only manual testing was possible and effort had been made not to miss any test case.

Chrome incognito window was used during all testing to ensure that the browser did not hold any information about the application. A testing tab among Friends tab and My Routes tab was created in the application. Testing buttons were put on this tab to trigger certain events, such as user requesting albums from Facebook API or the application requesting routes information from Google Map API. This tab is disabled when the code is deployed onto Google App Engine.

When requests were sent to Facebook API or Google Map API, all responses were written in the browser console. The data returned from Facebook can be checked on the Facebook Graph API Explorer. The data returned from Google Map API mainly consists of location information and routes details. Location information was checked on Google Map by typing in the geographical coordinated and checking if the locations were correct. Routes were displayed on the Google Map and checked if they were the intended routed.

7.2. Integration testing

Integration testing was done after unit testing of each main function. It ensures that the new function added to the application works with the rest function and it does not introduce new bugs to the application. As the same reason stated in the unit testing section, integration testing was done manually in Chrome incognito window.

7.3. System testing

After coding was complete and before the application was sent to evaluation participants, a system testing was conducted. It was also done in the Chrome incognito window. A testing Facebook account was used, pretending to be a real user and testing all the functionalities of the application. The database was checked after the user used application to ensure that data had been correctly written into the database.

8. Evaluation

The application developed in the project was evaluated to verify if it has achieved its goal of enhancing sharing experiences and actual travel experiences. The evaluation was also aimed at determine if the application specially designed for travel experience sharing and travel planning was better than existing sharing sites and existing travel guide sites. The usability of the application was also evaluated.

8.1. Method

The evaluation process of the application consisted of a questionnaire and a trial. Both qualitative and quantitative responses were gathered. The questionnaire studied how participants share their travel experiences and how they make their travel plan. In the section of travel experiences sharing, it asked how often they travel each year, how they take photos during their trips and how they share their travel experiences on social networks. In the travel planning section, the participants were asked about services or websites they have used before traveling, trustworthiness of recommendation from friends and generic travel guide, and whether they check the photos of their friends before traveling.

After filling out the first questionnaire, participants could decide if they wanted to take part in the trial. The trial asked them to use the application developed in this project and other similar tools. Their experiences of using the application and other tools were recorded through another questionnaire. First, they were asked to create a route using the application, and then they were asked about their experiences of using the application for sharing routes. Next, they were asked to use TripAdvisor, WikiTravel, Flickr, Google Street View and this application separately to find the top five most popular places in Paris and friends activity in Paris. How easy to achieve the tasks and how they felt after using the tools were also asked. At the end of the trial, participants were allowed to give general comments about the application.

Participants were mainly recruited from Facebook as the application requires the participants to login with their Facebook accounts. Testing accounts were also created just in case if the participants did not want to use their own accounts.

8.2. Results

The first questionnaire received 34 responses and there were 21 people participated in the trial.

8.2.1. Travel experience sharing

The questionnaire shows that 71% of the participants take photos to all places they travel. 59% of the participants have camera with GPS function, while 35% of them does not have GPS enabled camera. The rest of them were concerned about battery capacity or did not have the habit of attaching GPS information to photos.

91% of participants said that they would upload travel photos to social networks such as Facebook, Twitter or Google Plus. However, Only 16% participants would add location

information to all photos while most participants, i.e. 58%, added location information only to only a few photos.

After using the application to share routes, participants gave answers to how they felt about this application as shown in figure 19 and 20. More than half of the responses revealed that it was easy to generate a route. Although only 43% of participants stated that it was likely that they would use this application to share travel experience, 86% of them reckoned that sharing travel routes was a better way of sharing travel experiences in another question.

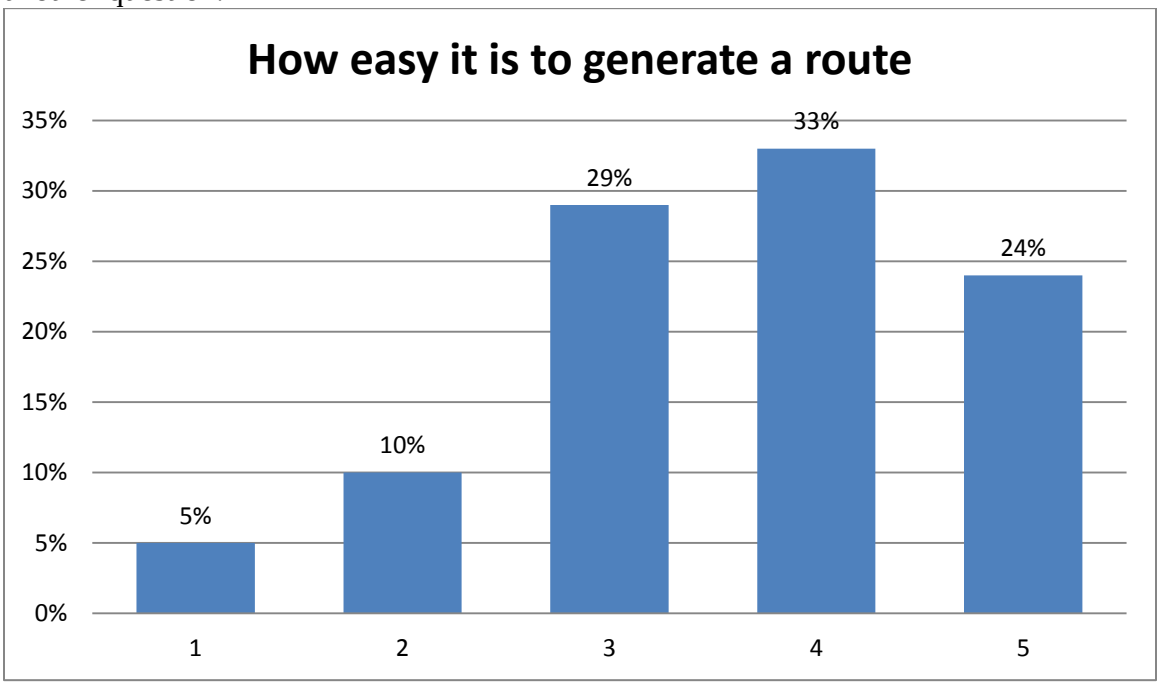


Figure 19. Response to how easy it is to generate a route. (5 – very easy)

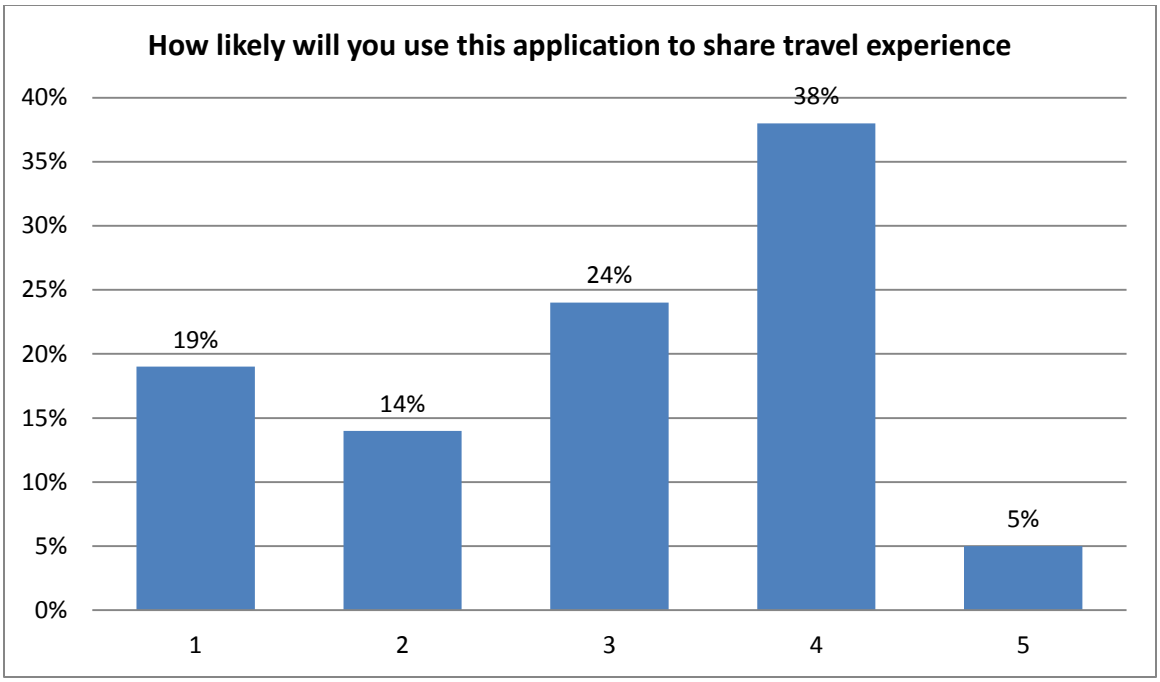


Figure 20. Response to how likely will you use this application to share travel experience (5 – very likely)

8.2.2. Travel planning

The questionnaire shows that 94% participants search for the places they are going. Nearly half of them had visited TripAdvisor before and some of them had used WikiTravel and Google Street View. 53% of the participants trusted recommendation from friends more than generic travel guide, while another 44% of the responses stated that it depended on the friends. However, 75% of the participants revealed that they checked travel photos of their friends before going on to their trip.

After using TripAdvisor, WikiTravel, Flickr, Google Street View and this application for planning trip, participants answered the second questionnaire. Figure 21 shows the distribution of answers to how easy it is to use each application to find popular places and figure 22 shows the average score to the question.

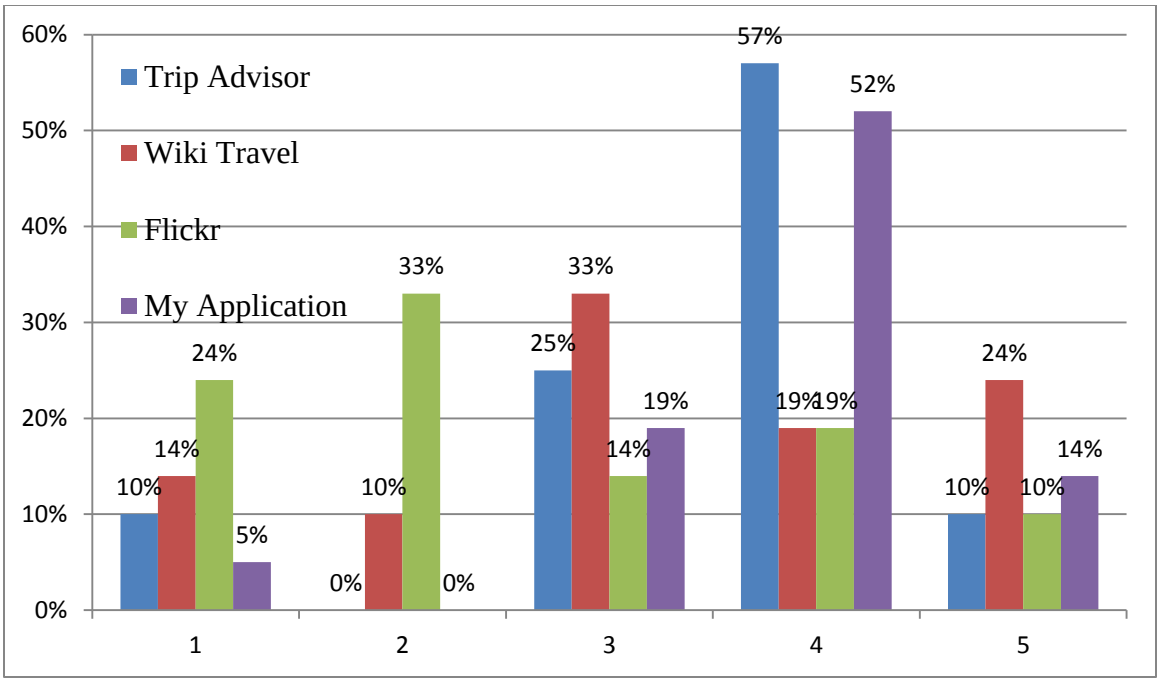


Figure 21. Answer distribution of how easy it is to find top 5 most popular places in Paris (5 for "Very Easy").

Figure 22. How easy it is to find the top 5 most popular places in Paris (scale from 0 – 5, 5 for "Very Easy".)

Then, the participants answered how they felt about their trips after using the 5 applications. The distribution of the answer is shown in figure 23 and the average score is shown in figure 24.

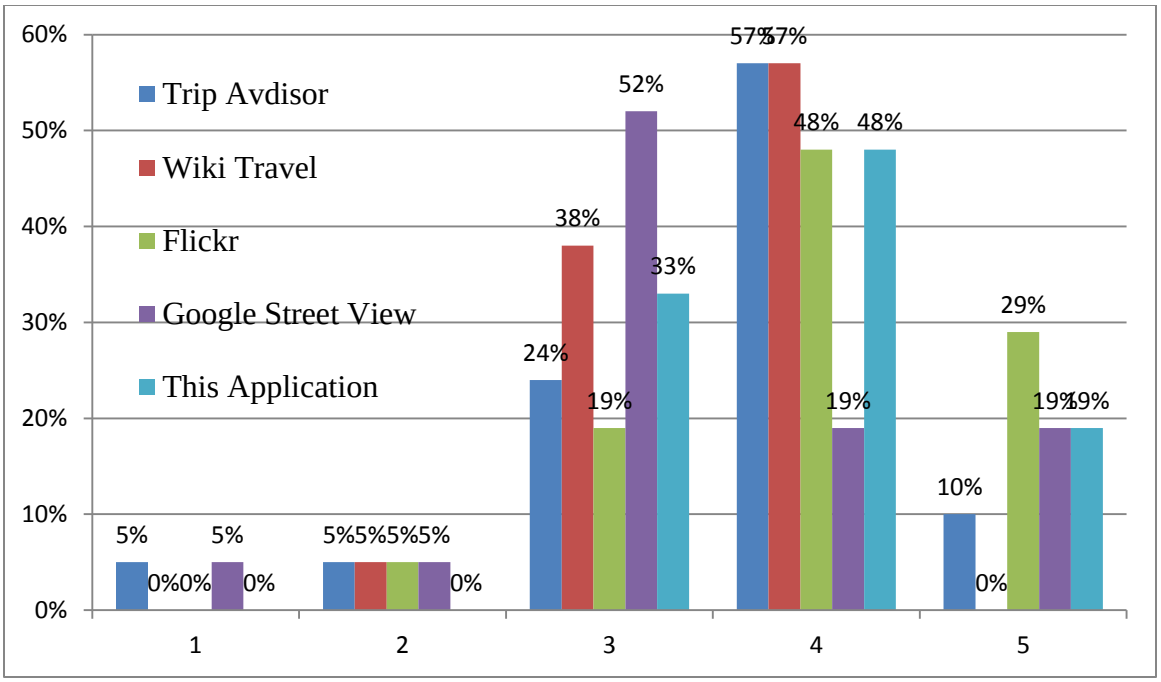


Figure 23. How do you feel about your trip after using each of the 5 services (5 for More excited/Look forward).

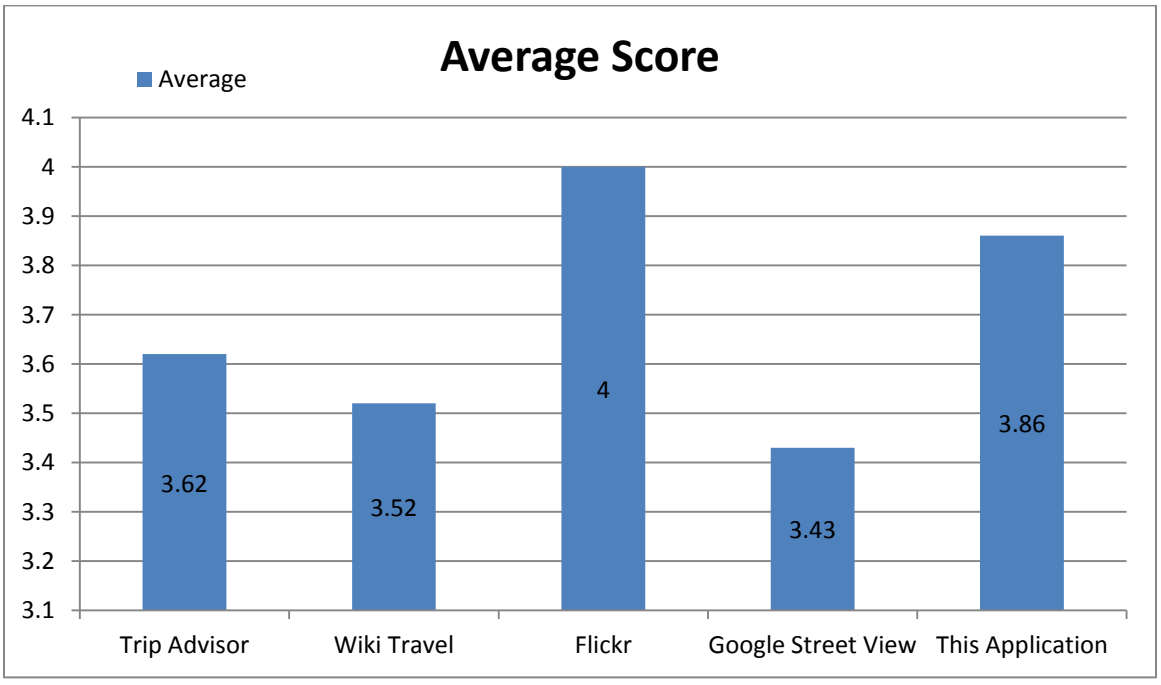


Figure 24. Average score of how participants felt after using the 5 applications

Then participants answered if their travel experiences would be enhanced after using the 5 applications as shown in figure 25.

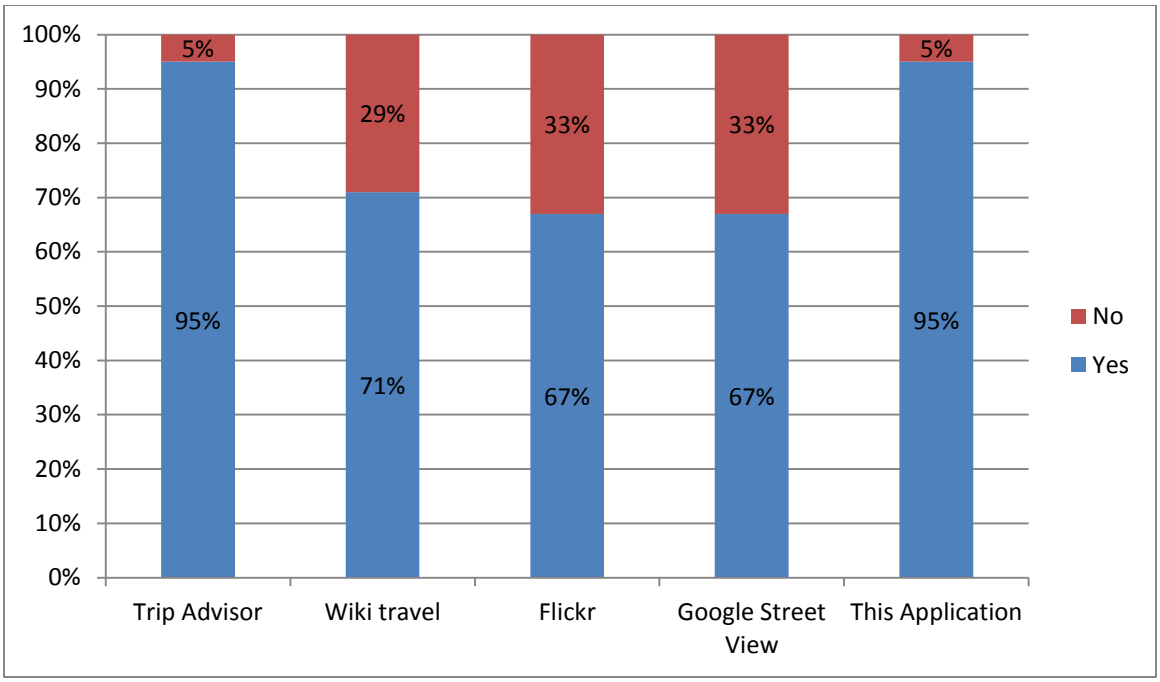


Figure 25. Would the travel experience be enhanced after using each of the 5 applications.

The participants were also asked if using the combination of the 5 applications would enhance the travel experience and 90% of then gave the answer Yes.

8.3. Discussion

8.3.1. Travel experience sharing

The questionnaire clearly shows that people are willing to share travel photos. However, some photos are less likely to have location information associated either because their cameras cannot record GPS information or because people do not add location information to all of the photos due to laziness. Therefore, if the application could detect the location information or develops some ways to encourage users to add location information, the user experience of the application could be improved.

The trial shows that sharing routes is a better way of sharing travel experience, but less than half of the participants said that they would use this application to share travel experience. One participant commented that without more work being done on the application interface, he or she would not recommend friends to use this application. In the comment of some other participants, they stated that the interface needed to be improved. Therefore, more work needs to be done on the application interface to improve user satisfaction.

8.3.2. Travel planning

The comparison of Trip Advisor, Wiki Travel, Flickr, Google Street View and this application shows that Trip Advisor was the most popular tool among participants, but browsing photos on Flickr made the participants more excited about their trips and this application provided the best function for searching popular places. The trial verified that

these tools including the new developed application which provides routes browsing enhance travel experiences.

The trial also found that not everyone trust their friends travel recommendation. It is revealed that only half of the participants trust more of recommendation from friends while some said the trust was dependent on which the friends were. Participants commented that they trusted friends with the similar taste in destination. At the same time, one participant said recommendation from friends without similar taste would not affect the travel plan. These responses show that recommendation of places is more reliable from friends with similar taste of destination.

Most participants (74%) checked photos of their friends and were more willing to go to the place if they have seen the photos. However, reasons for not checking photos of friends are worth mentioning. One common reason was that their friends might not have been to the same places. Another reason given by one participant was that touristic photos were usually amateurish and might not make the destination interesting. Other reasons such as that they just wanted to see the places after getting there or too lazy to check other's photos were also given. The application can possibly allow users to make their routes public, which can solve the problem where the friends of users have not been to the same place. In terms of the quality of photos and routes, a rating and comment system can be implemented.

9. Project management

In general, the project was implemented according to the original Gantt chart which is shown in appendix B. However, the implementation of the application started about 3 weeks after the planned date because during the Christmas holiday, two and half weeks were spent on travelling in Europe. It was a good opportunity to experience how travel experiences were shared on social networks and how to make a travel plan using existing travel guide sites. After the trip, another half week was spent on organising and uploading photos to Facebook and adding location information manually on Facebook so they could be used for testing of the application. After the development starts, everything was back on track. Appendix C shows the actual Gantt chart.

Git was used for version control and the application code was hosted on Github. Other project related documents such as the report, were backed up on Dropbox. These precautions reduced the risk of losing work due to disk failure or laptop being stolen.

10. Conclusion and future work

Although many social networks have been developed in recent years, there is not one that aims at visualizing travel routes on a map. In terms of travel guide, most of them are mainly designed to provide general guidance and recommendation. Recommendation based on the experiences of friends has not been fully supported although sites such as Trip Advisor have social integration where users can see where their friends have been to. An application that specially designed for travel experiences sharing and travel planning based on the experiences of friends is needed and thus implemented in this project.

After a comparative evaluation of the application, it is concluded that the application has achieved the goal of enhancing travel experiences. First, the trial verified that sharing routes is a better way of sharing travel experiences. Second, recommendation from friends is more trustworthy for most people than generic travel guide and browsing routes from friends will enhance travel experiences.

Although the application has achieved its goal of enhancing travel experience, there are still improvements that can be done in the future. The user interface needs to be significantly improved. One participant commented that the control panel was sometimes obstructive when zooming in or out of the map. Another participant mentioned that elements that were clickable on the control panel were not obvious. More serious comment stated that the application was useful but without some more work on the interface, he or she would not recommend it to his or her friends.

The usability can also be improved by auto detecting the location of where the photos were taken due to the fact that some cameras still do not have GPS function built in and also because users do not usually add location information to all travel photos on Facebook.

More existing content from Facebook can be loaded onto the routes such as the comment of photos or the reply to statuses and check-ins. Ratings of routes and photos can also be implemented as one of the participants mentioned that bad quality photos do not make places look appealing. It can also reduce the time for searching good routes.

Study on Trip Advisor is also necessary as it is the most popular tool among participants and some of its features can be implemented to the application. One participant mentioned that the rating scheme on Trip Advisor makes it easy to find popular places.

If more work can be done on the application in the future, it will be a useful application for travellers.

11. Reference

Akcora, C. G., & Ferrari, E. (n.d.). *Graphical User Interfaces for Privacy Settings*. Retrieved from http://www.academia.edu/2017132/Graphical_User_Interfaces_for_Privacy_Settings

BloombergBusinessWeek. *Facebook: The Making of 1 Billion Users*. [Online] Available from: http://www.businessweek.com/articles/2012-10-04/facebook-the-making-of-1-billion-users. [Accessed 28th November 2012]

Bmander.com (2011). *Census Dotmap*. [Online] Available at: http://bmander.com/dotmap/index.html [Accessed: 26 Apr 2013].

Boehm, B. W. (1991). Software risk management: principles and practices. *IEEE Software*, *8*(1), 32–41. doi:10.1109/52.62930

Boyd, D. M., & Ellison, N. B. (2007). Social Network Sites: Definition, History, and Scholarship. *Journal of Computer-Mediated Communication*, *13*(1), 210–230. doi:10.1111/j.1083-6101.2007.00393.x

Brewer, C. A., MacEachren, A. M., Pickle, L. W., & Herrmann, D. (1997). Mapping Mortality: Evaluating Color Schemes for Choropleth Maps. *Annals of the Association of American Geographers*, *87*(3), 411–438. doi:10.1111/1467-8306.00061

CBC (2013). *Dangerous travel: Countries to avoid*. [Online] Available at: http://www.cbc.ca/news/interactives/travel-warnings/ [Accessed: 26 Apr 2013].

Currency (2013). *Convert Dollars to Pounds | USD to GBP*. [Online] Available at: http://www.currency.me.uk/convert/usd/gbp [Accessed: 24 Apr 2013].

Fisher, D. (2007). *How We Watch the City : Popularity and Online Maps*. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.122.2444&rep=rep1&type=pdf

Flickr.com (2010). *Flickr: Explore everyone's photos on a Map.* [online] Available at: http://www.flickr.com/map [Accessed: 29 Apr 2013].

Google App Engine (2013). *Google App Engine Pricing*. [Online] Available from: https://cloud.google.com/pricing/ [Accessed 24th April, 2013]

Google App Engine. *Why App Engine.* [Online] Available from: https://developers.google.com/appengine/whyappengine [Accessed 28th November 2012]

Google Map JavaScript API v3 (2013). *Layers*. [Online] Available from: https://developers.google.com/maps/documentation/javascript/layers#JSHeatMaps [Accessed 17th April, 2013]

Google Map JavaScript API v3 (2013). *Visualize Geospatial Data*.[Online] Available at: https://developers.google.com/maps/visualize [Accessed 11th December, 2012]

Hall, W., & Tiropanis, T. (2012). Web evolution and Web Science. *Computer Networks*, *56*(18), 3859–3865. doi:10.1016/j.comnet.2012.10.004

Keenan, A., & Shiri, A. (2009). Sociability and social interaction on social networking websites. *Library Review*, *58*(6), 438–450. doi:10.1108/00242530910969794

Lee, J., Kim, J., & Lee, H. (2011). Design and Implementation of the Geo-Context Engine for Semantic Social Media Service. *2011 International Conference for Internet Technology and Secured Transactions* (pp. 383–387).

Lindqvist, J., Cranshaw, J., Wiese, J., Hong, J., & Zimmerman, J. (2011). I'm the Mayor of My House: Examining Why People Use Foursquare - a Social-Driven Location Sharing Application. *Proceedings of the 2011 annual conference on Human factors in computing systems - CHI '11* (pp. 2409 – 2418). New York, New York, USA: ACM Press. doi:10.1145/1978942.1979295

Lu, X., Pang, Y., Hao, Q., & Zhang, L. (2009). Visualizing textual travelogue with location-relevant images. *Proceedings of the 2009 International Workshop on Location Based Social Networks - LBSN '09*, (c), 65. doi:10.1145/1629890.1629904

Luo, J., Joshi, D., Yu, J., & Gallagher, A. (2010). Geotagging in multimedia and computer vision—a survey. *Multimedia Tools and Applications*, *51*(1), 187–211. doi:10.1007/s11042-010-0623-y

Miguéns, J., Baggio, R., & Costa, C. (2008). Social media and Tourism Destinations : TripAdvisor Case Study. *Advances in Tourism Research* (pp. 26–28). Retrieved from http://www.iby.it/turismo/papers/baggio-aveiro2.pdf

Panoramio.com (2013). *Panoramio - Photos of the World.* [online] Available at: http://www.panoramio.com/ [Accessed: 29 Apr 2013].

Sinha, R., & Swearingen, K. (2001). Comparing Recommendations Made by Online Systems and Friends. *Proceedings of the Delos-NSF workshop on personalization and recommender systems in digital libraries*. Retrieved from http://pdf.aminer.org/000/148/586/comparing_recommendations_made_by_online_systems_and_friends.pdf

Skarnelis, J. 2013. *FancyBox* [Online] Available from: http://fancyapps.com/fancybox/ [Accessed 17th April, 2013]

The Huffington Post (2013). *Mapping the Dead: Gun Deaths Since Sandy Hook*. [online] Available at: http://data.huffingtonpost.com/2013/03/gun-deaths [Accessed: 26 Apr 2013].

Tussyadiah, I. P., & Fesenmaier, D. R. (2009). Mediating Tourist Experiences. *Annals of Tourism Research*, *36*(1), 24–40. doi:10.1016/j.annals.2008.10.001

Viana, W., Filho, J. B., Gensel, J., Oliver, M. V., & Martin, H. (2007). PhotoMap – Automatic Spatiotemporal Annotation for Mobile Photos. *Web and Wireless Geographical Information Systems* (pp. 187–201). Springer Berlin / Heidelberg. doi:10.1007/978-3-540-76925-5_14

Walden, P., Carlsson, C., & Papageorgiou, A. (2011). Travel Information Search - The Presence of Social Media. *2011 44th Hawaii International Conference on System Sciences*, 1–10. doi:10.1109/HICSS.2011.458

Xiang, Z., & Gretzel, U. (2010). Role of social media in online travel information search. *Tourism Management*, *31*(2), 179–188. doi:10.1016/j.tourman.2009.02.016

Yeung, C. A., Liccardi, I., Lu, K., Seneviratne, O., & Berners-lee, T. (2006). Decentralization : The Future of Online Social Networking, *2*.

Zhang, J., & Shi, H. (2007). Geospatial visualization using google maps: a case study on conference presenters. *Second International Multi-Symposiums on Computer and Computational Sciences (IMSCCS 2007)*, 472–476. doi:10.1109/IMSCCS.2007.9

Appendix A. Project Brief

Appendix A.1. Problem

Nowadays, everyone shares experiences and posts photos on social networks when they travel but usually photos and updates are not linked together to present the whole journey. Thus, their friends do not usually get the same level of enjoyment. There is a need to better the sharing experience.

Also, when people plan for their journey, they might want to see what their friends have been to or which places are the most popular. There is not a way to visualize this information clearly on a map.

Appendix A.2. Goals

Use Google Map and Social networks API to design a web application which allows users to plan their routes based on what their friends have been to or even which places are popular among all users. The web application will also allow users to record their journey. They can link their accounts with popular social networks. Their status updates, photos and check-ins will be automatically shown on Google Map and form the routes of their journey.

Appendix A.3. Scope

The APIs of Facebook, Twitter, Foursquare, Google+ and Instagram will be used so the photos, status updates and check-ins of users can be used.

Routes will be automatically drawn on Google Map based on the geotag and time of photos, status updates and check-ins. Users will also be able to manually modify the routes.

With the paths and social network integration, the users can allow their friends to browse where they have been to.

When planning for the journey, users will be able to see not only where their friends have been to but also which places are popular. The popularity of places will be shown in different colours. Red will represent a site as most popular.

Appendix B. Estimated Gantt chart

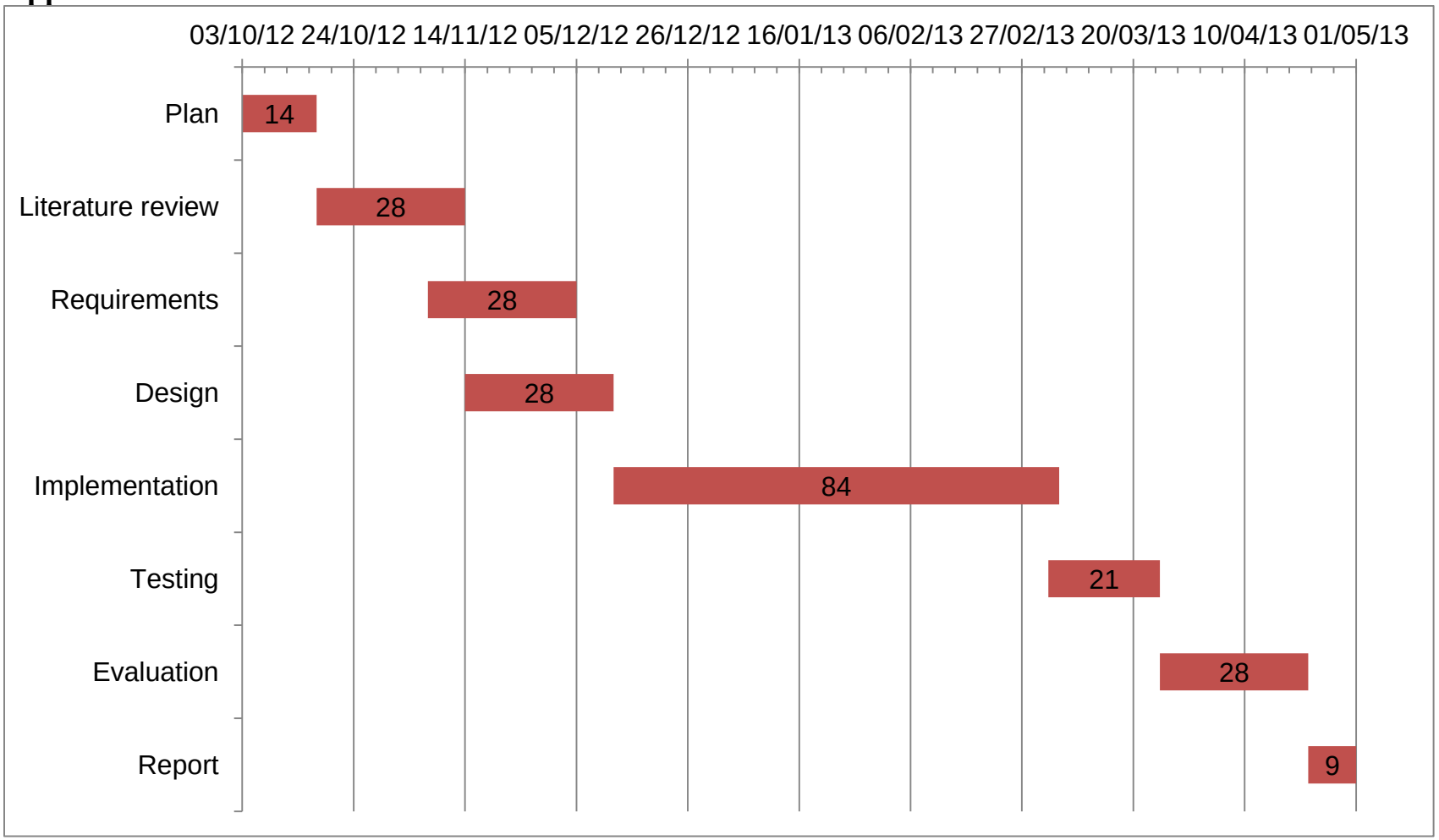


Figure 26. Estimated Gantt chart

Appendix C. Actual Gantt chart

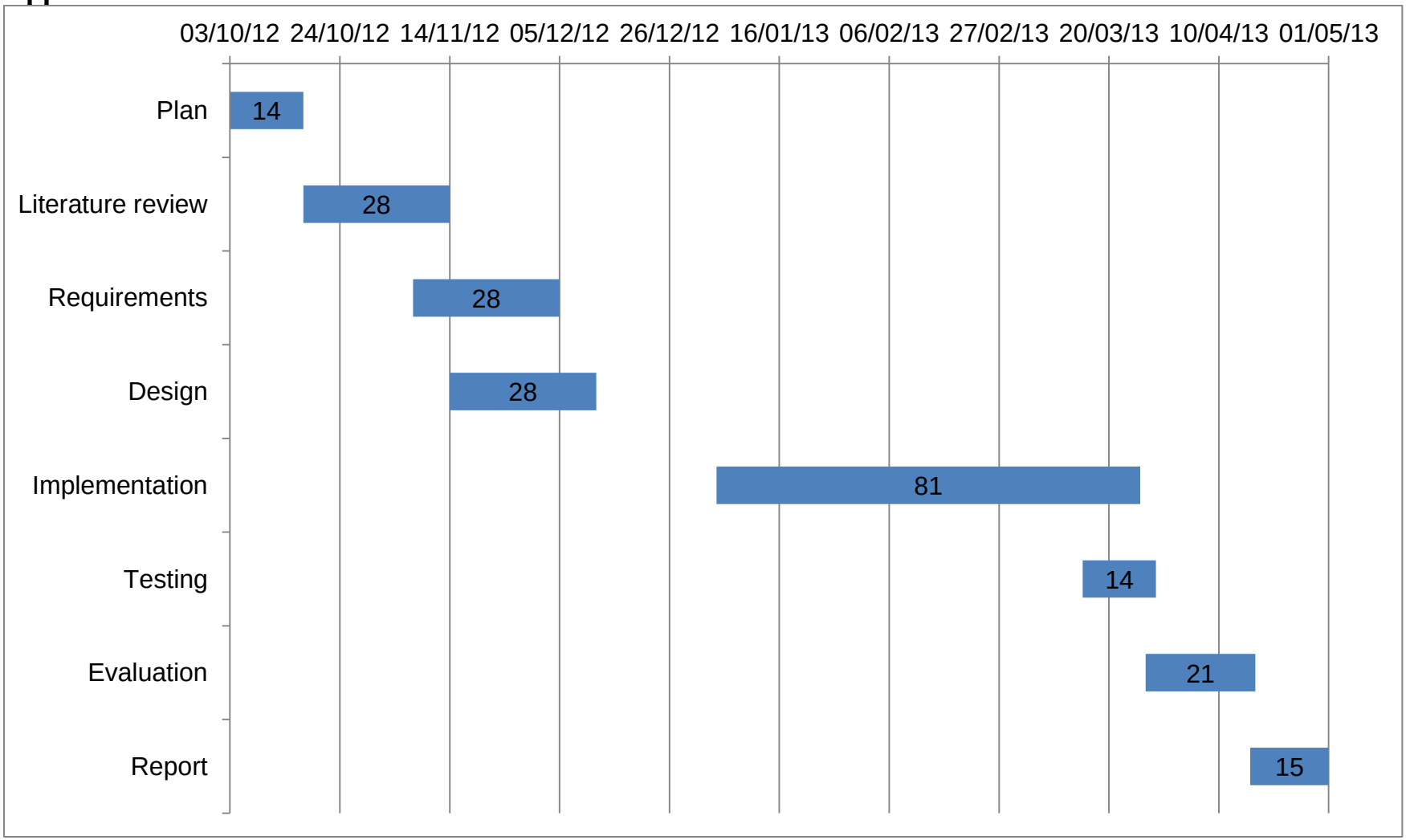


Figure 27. Actual Gantt chart

Appendix D. Trial questionnaire one:

Travel experience sharing

You will be asked about how you share your travel experience.

How often do you travel to another country or city for tourism purpose? *

- Less than once a year
- 1 - 3 times a year
- More than 3 times a year

During your travelling, do you take photos? *

Travelling for tourism purpose

- Take photos to all the places I travel.
- Only take photos to places I have not been to.
- Rarely take photos.
- I don't take any photo.
- Other:

If you take photos, do the photos contain GPS information? *

Photos can be taken from cameras or phones. GPS contains information about where you take the photos.

- Yes, the camera (or phone) can record GPS information.
- No, because the device cannot record GPS information.
- No. My camera (or phone) has the function but I don't allow it to record GPS information. Please specify why you do not allow your phone to record location information about your photos in the next page.

If you take photos, do the photos contain GPS information?

You chose "No. My camera (or phone) has the function but I don't allow it to record GPS information". Please specify reasons in this page.

Do you upload your travelling photos to social networks? *

- Yes
- No. Please specify the reasons in the next page.

Why do you not share your travelling photos on social networks?

Do you upload your travelling photos to any of the following social networks? *

- [ ] Facebook
- [ ] Twitter
- [ ] Google+
- [ ] Instagram
- [ ] Flickr
- [ ] Other:

Do you create new album/albums for your travelling photos? *
We assume that you upload photos after you finish your travelling.

- (•) Yes, I will upload all new travelling photos into a new album.
- ( ) Yes, I will upload photos into many new albums based on WHERE I take the photos.
- ( ) Yes, I will upload photos into many new albums based on WHEN I take the photos.
- ( ) No, I will just upload photos to existing albums.

Do you add location information to your photos when you upload them? *
For example, Facebook allows you to add location to each photos in albums.

- ( ) Yes, I will add location information to all photos
- ( ) Yes, but I will only add location information to a few photos.
- ( ) No, I am not bothered.

Travel planning

You will be asked about how you plan you travelling.

Before you travel as a tourist, do you search for the places you are going to beforehand?

- ( ) Yes.
- ( ) No.

Do you use any of the following travel guides before you travel? *

- [ ] Trip Advisor - tripadvisor.com
- [ ] Wiki Travel - wikitravel.org
- [ ] Virtual Tourist - virtualtourist.com
- [ ] Street View (www.google.com/streetview)
- [ ] Other:

Do you trust more of the recommendation from your friends than generic travel guide? *

- ( ) Yes.
- ( ) No.
- ( ) Depends on the friend.

Do you check out your friends travelling photos of the places you are going to before you travel?

- ( ) Yes
- ( ) No. Please specify the reasons in the next page.

Please specify the reasons that you do not check your friends photos of the places you plan to travel.

Follow up trial - http://routes.donglinpu.me

A web application has been developed during the past 5 months. It allows users to share their travel experiences by showing their travel routes on a map. Photos, updates and check-ins can also be viewed on the map. People can also plan their travel route based on where their friends have been to. The link to the application: http://routes.donglinpu.me. The application uses existing data (photos, status updates and check-ins) from Facebook. You can either use your account or use our testing account to login. The testing Facebook account details can be here: http://routes.donglinpu.me/testingAccount.

Appendix E. Trial questionnaire two:

Travel experience sharing

After you log into the application, generate a route about one of you travelling and rate on how easy it is to generate a route. *

Press Create Route -> Choose photos from Facebook. Photos with location information will be automatically drawn on map. For photos without location information, you will have chance to enter the information.

	1	2	3	4	5	
Very difficult	○	○	○	○	○	Very easy

**Do you think sharing travel routes is a better way of sharing travel experiences? ***In comparison with photo albums on Facebook, or photos displayed on a map e.g. flickr.com/map

○ Yes

○ No

How likely will you use this application to share travel experience? *

	1	2	3	4	5	
Not likely	○	○	○	○	○	Very likely

Travel planning

In this section, assuming that you are travelling to a city/country as a tourist and you are selecting the places you plan to go. You will be asked to perform certain tasks on TripAdviror, WikiTravel, Flickr and Google Street View. Then you will be asked to use this application and compare your experience with the four websites.

Go to TripAdvisor.com and find the top 5 most popular places in Paris or any other place that you plan to travel to. Rate on how easy it is to achieve the task. *

TripAdvisor is a travel guide website where you can search for popular places to go for a country or city.

	1	2	3	4	5	
Very difficult/no information	○	○	○	○	○	Very easy

**Still on TripAdvisor.com, how easy it is to find your friends activity in Paris or the places you plan to travel to? ***For example, if they have taken any photos in Paris.

	1	2	3	4	5	
Very difficult/no information	○	○	○	○	○	Very easy

How does using Trip Advisor make you feel about your trip? *

Assuming that you visit TripAdvisor before you start your trip.

	1	2	3	4	5	
I don't want to go any more	○	○	○	○	○	I look forward to the trip

Do you think using TripAdvisor before your trip will enhance your travel experience? *

Travel experience can be the coverage of sites, how easy it is to go to the places, how satisfied are you with your trip etc.

- Yes
- No

Go to wikitravel.org and find the top 5 most popular places in Paris or any other places you plan to travel to. Rate on how easy it is to achieve the task. *
WikiTravel is a wiki-like travel guide website which provides detailed description to each city.

	1	2	3	4	5	
Very difficult/no information						Very easy

How does using Wiki Travel make you feel about your trip? *

	1	2	3	4	5	
I don't want to go any more						I look forward to the trip

Do you think using Wiki Travel before your trip will enhance your travel experience? *

- Yes
- No

**Go to flickr.com/map and find the top 5 most popular places in Paris or any other places you plan to travel to. Rate on how easy it is to achieve the task. ***Flickr is a photo sharing website. They provide a map on which you can view where photos were taken.

	1	2	3	4	5	
Very difficult/no information						Very easy

How does browsing photos of the places you are going on Flickr make you feel about your trip? *

	1	2	3	4	5	
I don't want to go any more						I look forward to the trip

Do you think browsing photos of the places you are going on Flickr before your trip will enhance your travel experience? *

- Yes
- No

If your friends have uploaded their travel photos of the places you are going to on Flickr and you have seen them, how will it affect your travel plan? *

- If my friends have been there and I have seen their photos, I am more willing to go to that place.
- If my friends have been there and I have seen their photos, I am less willing to go to that place.
- My decision is not based on where my friends have been to.
- Other: _____

**Use Google Street View to browse the places you want to go, how does it make you feel about your trip? ***Instruction: go to maps.google.com, search for the places you are going, drag the little yellow man

icon on the top left corner of the map on to the street. Now you are on street view and you can explore the area.

	1	2	3	4	5	
I don't want to go any more	○	○	○	○	○	I look forward to the trip

Do you think using Google Street View to browse the places you are going before your trip will enhance your travel experience? *

- ○ Yes
- ○ No

If you use the combination of the services mentioned above before your trip, does it improve your travel experience? *

Services mentioned above: Trip Advisor, Wiki Travel, Flickr and Google Street View

- ○ Yes
- ○ No
- ○ Other: [ ]

Use this application to search for the top 5 most popular places in Paris among your friends. How easy it is to achieve the task? *

Go to the website: routes.donglinpu.me, select Friends tab, click on the names of your friends to view their routes.

	1	2	3	4	5	
Very difficult	○	○	○	○	○	Very easy

After browsing your friends' routes of the places you are going, are you becoming more excited about your next trip or less excited? *

	1	2	3	4	5	
Less excited	○	○	○	○	○	More excited

Do you think browsing your friends' routes of the same places you are going will enhance your travel experience? *

- ○ Yes
- ○ No

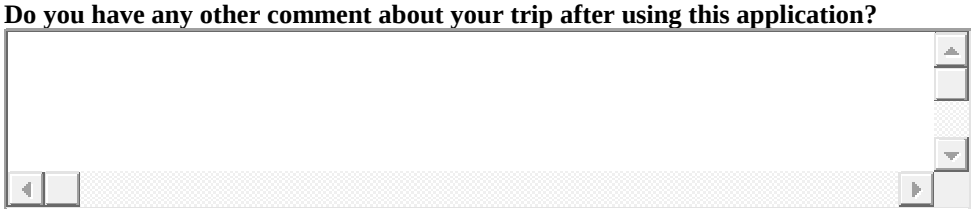
Please explain your answer to the previous question.

Will you recommend this application to your friends? *

Yes

No

Do you have any other comment about your trip after using this application?



Do you have any other comment about this application?
Whether it is useful, how the design can be improved, what function do you expect etc. Anything you want to comment.

About Your Data

There are two sets of data collected about you. One is the questionnaires. All information collected in the questionnaires will be deleted after the project is finished which is around June 2013. The second part of the data is stored in the database of the application. It stores your basic information from Facebook and routes information. When your Facebook friends log into the application, they will be able to see your routes. The following questions are about the data stored in the database of the application.

**When do you want us to delete all of your information stored in the application database? ***Only your Facebook friends can see your routes when they use the application if your data is stored in the database.

After I submit this form.

After the project is finished which is around June 2013.

Please keep the data as I want to use it in the future.

Please provide your email address that you use to login to the application which is the one you use to log into Facebook.
We will keep the record in the database. If you change your mind, you can email us (dp1e10@ecs.soton.ac.uk) to remove it at any time.

Appendix F. Source Code

app.yaml
main.py
/templates/base.html
/templates/home.html
/templates/login.html
/static/channel.html
/static/facebook_logo.png
/static/friend.js
/static/googlemap.js
/static/login.js
/static/main.js
/static/marker_blue.png
/static/marker_end.png
/static/marker_start.png
/static/css/base.css
/static/css/home.css
/static/css/login.css
/static/external/fancybox/helpers/fancybox_buttons.png
/static/external/fancybox/helpers/jquery.fancybox-buttons.css
/static/external/fancybox/helpers/jquery.fancybox-buttons.js
/static/external/fancybox/helpers/jquery.fancybox-media.js
/static/external/fancybox/helpers/jquery.fancybox-thumbs.css
/static/external/fancybox/helpers/jquery.fancybox-thumbs.js
/static/external/fancybox/blank.gif
/static/external/fancybox/fancybox_loading.gif
/static/external/fancybox/fancybox_overlay.png
/static/external/fancybox/fancybox_sprite.png
/static/external/fancybox/jquery.fancybox.css
/static/external/fancybox/jquery.fancybox.js
/static/external/fancybox/jquery.fancybox.pack.js
/static/external/fancybox/jquery.mousewheel-3.0.6.pack.js
/static/external/fancybox/jquery-1.9.0.min.js