Bilkent University

Department of Computer Engineering

Senior Design Project

Touravel: The Ultimate App for Traveling & Activities

Project Specifications Report

Gokhan Cetin, Gokhan Guler, Utku Bozoklu, Ekrem Dogan

Supervisor: Can Alkan

Jury Members: Fazli Can and Selim Aksoy

Table of Contents

1. Introduction

There is a highly populated community in the world: The traveling people. Traveling is a passion for some. Many backpackers have placed the idea of being on the road to the center of their lives and that is the motivation that directs them in their survival. With a slightly milder approach, considering not only the radicals but also all the outgoing and active people who like traveling; then there is an even greater amount of people to talk about. Sightseers, vacationers, travel bloggers, social media users, event-goers and much more - all those people are currently in a need of a technological solution to carry on their interest in the best way, which would solve their various problems using the state-of-the-art advances at the cutting edge.

People with high mobility have some requirements, constraints and preferences. There are many issues to think about such as transportation, accommodation, catering, entertainment and so on when traveling is the matter. Even if there is some service to solve all the problems, there are some constraints with the device, like the mobility, power concept, accessibility, etc. Furthermore, as experienced travelers, we can state that some usability goals and other details should also be met in order to satisfy the demands of the active people. Touravel is the one to solve travel-related problems of such people.

1.1 Description

Touravel is the ultimate mobile application designed to be used for all kinds of traveling and go-outs. Apart from backpackers, globetrotters and the low-budget travelers who have been primarily targeted as main users, all the active and out people are the potential users for the app.

Basically, the idea is to generate content out of the tour experiences of the users and enable them to share that content, which includes various data and stats such as the path followed, places visited, activities done and so on. The vision behind the mechanism is that all the data gathering process will be automatized as much as possible so that the app meets the usability goals in the highest level. Furthermore, the social platform side of the app will uniquely serve for any traveling and activity purposes. Touravel is hopefully going to be the all-in-one service that satisfies any kind of demands on the road.

To have a better idea on what Touravel does and how, let us imagine that one downloads the app to the mobile device in use. After the first launch, the app starts to run in the back ground automatically. Collects, parses, processes, evaluates data without requiring any intervention. Creates a path from the area that the user covers, filling it with other details such as where they stop, what they do and the pictures they take. Optimizes the power and any other sources with the minimum possible amount of interaction. In the end, Touravel offers its user a great variety of data and statistics regarding the traveling stories of one, in a neat way. In the next step, Touravel offers a social platform in which people can share their experiences, look for others', ask for advice, exchange knowledge, give tips and useful information with the rest of the community.

1.2 Constraints

There is a list of constraints in phase of developing Touravel. Each are described in detail below. Since Touravel is a mobile application, the constraints applying to the project are namely power consumption, Internet usage, security, privacy and APIs issues.

Power Consumption

Battery life of a mobile phone is limited. Just like every other app that runs in the background, Touravel will consume power constantly for background jobs. Research by Purdue University into energy consumption by apps [1] found that some apps only devote a small proportion of energy used to their core function. It is clearly stated in the paper: "Free apps like Free Chess and Angry Birds spend under 25-35 percent of their energy on game play, but over 65-75 percent on user tracking, uploading user information and downloading ads." The research reveals that every background job that is done by app is a cost to battery. In Touravel, we are going to process high computation demanding tasks whenever phone is being charged. Moreover, we are going to limit background tasks whenever charge of the battery is under %15.

Internet Usage

In Touravel, cellular data management is something to ponder on. Each user of Touravel will have limited cellular access in theory. Some of them may be on quota limitations on their cellular Internet packages. It makes each byte of Internet data usage is precious. According to Imielinski and Badrinath from Rutgers University mobile data consumption may be reduced by detecting and eliminating replicated queries [2]. Solution they offer is caching the data in local devices. In Touravel, we are going to cache query results in order to eliminate Internet usage problems. There are several more benefits of caching on power consumption and off-line usage. The part that drains most of the battery is 3G chips [3]. Each time we eliminate a replicated query we save some battery power, too.

Security

Data that is collected by each single user will be stored in our servers. We have to store users' data securely. In order to ensure security we are going to take all precautions we can. Each user will have an encrypted access token that is attached to their queries. In that way, we will virtualize web services that we are going to implement to users. Users will not be able to reach the data that does not belong to them. Users will be secured with their username and password pairs. We are planning to implement a fingerprint system for mobile phones of each user; therefore we will be able to keep track of the mobile phones that are used by certain individuals. Bottom-line, we will decrease the possibility of third parties reaching information they are not supposed to.

Privacy

Privacy is a subject that has a high potential to cause severe future headaches. As data collector we must keep users' private data unshared with third parties. Collected data will be precious, as it will have high potential to be commercialized. Advertising, tourism and marketing agencies will want to know users' preferences. This data is the part we can make real money. Therefore privacy is the most important constraint to spend time. A legal consultancy may be needed in future situations.

APIs

Touravel will use a series of public APIs provided by other companies. For example, we are going to use Foursquare API to fetch names of the places and locations. We, also, are going to use Maps API by Google. Therefore our application will depend on several APIs.

1.3 Professional and Ethical Issues

Once the project is completed and Touravel has taken place in the market, we are aware that we will have some responsibilities such as professional and ethical issues. This is a very important part of the process; so it should be taken very carefully.

Professional Issues

There are many professional responsibilities to carry on in development phase, sales and after sales. This project can easily be converted into a business with a well-designed business model and therefore adopting a professional approach would be required. There are several parts of the project that have commercial value. For example, Touravel may be added to mobile stores for a certain price. Moreover, it might offer in-app purchases to its customers. All those options bring a professional responsibility as well. Whatever the case is, the users should be well informed about what they purchase, what they get and what they pay since it is a professional service from that time. In addition, maintaining the service, which was agreed to serve the users for a certain period after the sale should be operated properly in order not to cause any legal issues. Those should and will be carried out with user terms.

Apart from this, there are some responsibilities for us in the development stage. We hereby confirm that our source code will not be pirated from any running commercial products, we will be using official and licensed development tools and we will agree with the terms of usage in our interactions with platforms we will present Touravel on.

Ethical Issues

User preferences and collected data are often argued whether should be considered as a monetary source provided with supplying to the third parties in exchange of money. The positive view raises a very critical ethical issue. Users will not be happy when they will learn their data is used by and an organization or a corporation that user do not like. Legally, data that is collected by each user will belong to us. However, regardless of being legal or not, selling data of users will always be an ethical problem. Therefore, we are going to be sensitive with the ethical side of the problem all the time.

Whatever our decision is going to be with the data and the statistics policy, the personal information of the users will never be shared with third parties. Since it is going to be a very crowded social platform, we will have a serious responsibility here. In the worst case, useful information might be shared as anonymous travel statistics; but the private information that the users provided us by trusting us will not be shared in any circumstance.

2. Requirements

The requirements for Touravel are like the following:

2.1 Functional Requirements

- The system shall have an authorization system that allows the users to log into their accounts.
- The system shall ask the users permission for being able to use location info, camera usage, photo gallery access and data transfer. For a proper usage of the system, all the permissions should be achieved from the users.
- The users shall be enabled to see their traveling experiences in a map view and also in a storyboard.
- The users shall be asked to identify frequently visited places by push notification messages sent periodically.
- The system shall prepare a travel history of a place for the user when requested.
- The system shall allow the users to built social circles with different features and different sharing and privacy preferences.
- The system shall provide an effective communication service to maintain the interaction between the users of the system.

2.2 Non-Functional Requirements

- The system shall run on Android platform.
- The app shall take place in Google Play Store and the price of the app shall not exceed 3$, which is the statistically upper limit for similar most popular travel apps.
- The system shall have a cloud server where most of the operations are done.
- The system shall run in the background and operate without the presence of Internet connection.
- The upload of the pictures and other big-sized files should be ensured with wi-fi connection only.
- The response time for any task in the system shall not exceed 2 seconds.
- The users shall be provided a chance to visit desktop website of the app as well, to update their profiles and view their extended statistics.

3. References

1. *Where is the energy spent inside my app? Fine Grained Energy Accounting on Smartphones with Eprof.* **Abhinav Pathak, Y. Charlie Hu, Ming Zhang.** New York : EuroSys '12 Proceedings of the 7th ACM european conference on Computer Systems, 2012. ISBN: 978-1-4503-1223-3.

2. **Tomasz Imiel̃inski, B. R. Badrinath.** Data Management for Mobile Computing. *ACM SIGMOD Record.* 1, 1993, Vol. 22, 1.

3. *Energy consumption in mobile phones: a measurement study and implications for network applications.* **Niranjan Balasubramanian, Aruna Balasubramanian, Arun Venkataramani.** New York : IMC '09 Proceedings of the 9th ACM SIGCOMM conference on Internet measurement conference, 2009. ISBN: 978-1-60558-771-4.