Bilkent University
Department of Computer Engineering

Senior Design Project

Project Specification Report

Project Name: Nomad

Group Members: Gülnihal Muslu
Berk Ataç
Can Ozan Kaş
Ali Kemal Özkan
Tarık Emin Kaplan

Supervisor: Uğur Güdükbay

Jury Members: H. Altay Güvenir, Özcan Öztürk

Innovation Expert: Veysi İşler

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1. Introduction

Nowadays, travelling is an easy and usual activity for people[1]. Everybody wants to explore places that they have never been. However, there are a lot of buildings and places or activities to do in a country/city. Therefore, people have to choose the best of them according to their interests because they usually have a limited time to see a city. Deciding which place is worth seeing or which food is worth eating can be tricky in most times due to people usually preferring to explore cities that they have never seen before. There are some applications and websites for that, but they have never been enough for people that are such travel lovers.

To solve that problem, we thought of a project where people can give trip advice to other people. In this project, a person can create a route in a city or country and s/he can give advice on that trip. Users will have a chance to select a trip from a list of trips that are created by other users and they can follow that path step by step. Since trips can be seen before and they can be scored, interpreted; people can choose their trip easily and more close to their dream trip. With this project travels will become easier and more fun.

1.1. Description

Nomad is a mobile application, first will be published in Play Store, App Store, will be coded in Java/Javascript. It will be addressing to people who want to travel and tour companies. With this application, users can create trip

routes, which will be held in a database, as traveling by using GPS in their cell phones. While users are creating a route trip, they can place an object with augmented reality, like a coin or a token, when they arrived where they want to go. These objects are checkpoints for other users who will use routes created by other users.

The trip routes created by users are designed to follow a certain path, which means users are able to see where to go first, then second and then third. This way, they will not struggle finding the way as mostly, people travel to places which they have not been there before and Nomad will show the way to the checkpoints. While users are taking a trip created by other users, they can collect objects, which were put by the creator of that trip, using their phones' camera. By collecting more tokens, users can unlock achievements showing that they are actually travelling a lot. Achievements of a user can be seen by other users. Therefore, as people unlock more and more achievements, their comments will be more valuable. Once, a user completes a trip route, s/he can rate it according to different criteria such as the money spent, view beauty or transportation ease. Thus, trip routes and trip creators have their own ratings and people can see them.

Nomad enables users to give advice to other users as well as take advice from other users. This provides users a better trip experience as every user can have different interests. To illustrate, if a user wants to take a nature

trip and all the high rated places are historical places, s/he can still find a trip that s/he can love from the trip route list of the place s/he visit.

1.2. Constraints

1.2.1. Economic constraints

- Storage of the data can be a problem because there will be no deletion of data. Every route that users produced will be recorded and won't be deleted. Due to that, server costs can be relatively high [2] .
- Our application will use GPS to keep track of the users' traveling path. That will require a good Internet connection. A change for ISP may be needed.
- When a user creates a path, the cost of the way will also be a parameter of our system. Another user who wants to try this path should consider the cost of the path too.

1.2.2. Social constraints

- This app will help more people to communicate directly. In other applications gives spots based on the top-rated paths but our application will be based on fully user paths.
- Since our user paths include the cost too, it can separate people economically. Some users may not be able to effort the other user's paths.

1.2.3. Sustainability constraints

- Our application highly relies on users for developing. Any policy that makes users uncomfortable can blow up our application but at the same time, it becomes so easy to develop if users like our product.
- Since it depends on people, we probably will not face idea problems.

1.2.4. Environmental constraints

- Our application will include lots of places and if those places will include also natural places, this may cause environmental pollution.
- Since some routes of the users will be more rated than the others, some roads will be used so much that is another cause for environmental pollution in cities.

1.3. Professional and Ethical Issues

- Augmented reality becomes hard when there is a moving object. Because of that, we may not be able to add places that have lots of moving objects such as cars and people. The objects that we add should not touch to them.
- Since the places we choose should be static, some places may not be simulated. Some people may not allow us to simulate the places. Recording those places is possible but it can only be done hiddenly and this creates the ethical issues. We should be careful when implementation comes to that point.

- User account information we hold should be kept secure and should not be shared with third parties. Infos, if needed, should be used anonymously.

2. Requirements

2.1. Functional Requirements

- Users will be authenticated by creating an account with an email or with their social media accounts (facebook, twitter, google).
- Users can create their own routes, and they can set it either public for other people to use it or private if they don't want to share it.
- Users can follow existing routes created by other people and can vote the routes according to various criteria such as richness of scenery spots, ease of access, money requirement.
- While creating routes, users will be able to specify "stops" that act as checkpoints for various points of interest. While a user is following that route they can checkmark those stops after visiting them.
- Routes may have "themes" if users specify them on creation. For example a route with a "relaxation" theme will have stops at parks, coffee shops etc. whereas a route with a "historical" theme will have stops at historical sightseeing points.
- To gamify the app with AR, while creating a route, the users may drop tokens on the route using their phone cameras, and the users travelling these routes will be notified of the existence of such tokens while they

are near them, then they can find and obtain these tokens to get achievements and unlockables.

- When displaying routes for a place the user specifies, the routes will be sorted depending on public routes with most votes, but users can also sort the routes according to the previously mentioned criteria and themes.
- Information about routes such as distance and estimated time to finish the route will be provided.
- Routes for biking will also be provided (they will have a longer distance, and will have fewer stops overall).
- Existing routes can be updated over time by the creator user.
- Users can comment on routes after completing them (for example, to ask for an update at a specific location in the route).
- Preferences of the user will be asked to personalize the app and routes.
- According to preferences, alternative detours may be offered to users when they are on a route suitable for such detours. We may or may not use some sort of machine learning methodology for this.

2.2. Non Functional Requirements

- **Extensibility**:
    - Nomad should allow adding new functionalities, features, components and so forth.
    - The system should be kept up to date.

- **Availability**:
    - Nomad will be available 24/7 for the users.
- **System**:
    - Nomad will be an Android application.
    - Application will require an Internet Connection to work.
    - A smooth, minimalistic and fast user interface will be designed.
- **Performance**:
    - Nomad should not take more than 5 seconds to log in.
    - Application should not take more than 15 seconds to get ready after app icon is clicked.
- **Scalability**:
    - Nomad will support large number of users.
- **Security**:
    - Nomad needs to secure user information from any possible threats.
- **Reliability**:
    - Nomad needs to be stable and crash free.

- **Usability:**
    - Application should be easy to use for all user types because anyone who can use a mobile phone is possible user of this application. Thus, we need to provide user friendly and simple user interface.
    - Application should clearly explain what it is aim and why user should use this app.

3. References

[1] J. Fund, “Travel Is So Much Better Than It Was,” *National Review*, 02-Jan-2017. [Online]. Available: www.nationalreview.com/2017/01/international-travel-today-much-easier-cheaper-it-was/. [Accessed: 12-Oct-2019].

[2] Ramakrishnan, Raghu, and Johannes Gehrke. *Database Management Systems and Solutions Manual*. 3rd ed., vol. 6, Cornell University, 2011. pages.cs.wisc.edu/~dbbook/openAccess/thirdEdition/solutions/ans3ed-oddonly.pdf