



VILNIUS UNIVERSITY
FACULTY OF MATHEMATICS AND INFORMATICS
INSTITUTE OF COMPUTER SCIENCE
INFORMATION TECHNOLOGIES STUDY PROGRAM

Problem-Based Project

Leisure Map Application

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Abstract

The purpose of this project is to create an application to provide users with a rich set of utilities that would considerably facilitate a selection between desired leisure places located particularly in the Vilnius city area. These features within the app would significantly improve efficiency and lower the time consumption while making the choice.

Keywords: Android Application, Leisure, Maps

Santrauka

Laisvalaikio Žemėlapis programėlė

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Introduction

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1 Analysis

The following analysis consists of advantages, disadvantages and a general sense of feeling of the user with the aim to compare the competitiveness of other similar Android applications in the market. Three different Android applications were taken into account to determine this situation. Essentially, analyses that were taken into consideration were completed by our team. Therefore, there is a possibility that our opinions will not match users' opinions.

1.1 Analyzed applications

1.1.1 "Google Maps" by Google LLC

Advantages

- Large selection of categories - objects are categorized into different categories which makes searching for locations quicker and easier.
- "Google Maps" provide a street view which allows users to check the visual view of the location they are searching for.
- Objects have star classifications. This helps users to visually see the ratings of objects and to form expectations according to other people's reviews.

Disadvantages

- No disadvantages were found.

Conclusion

Overall "Google Maps" has a great functionality and covers most of the users' needs. Application also provides users a lot of information about objects such as pictures, ratings and reviews which helps to form overall opinion about particular place before going there.

1.1.2 "Bikemap" by Bikemap GmbH

Advantages

- Function to see different layers of map (3D, Night, Satellite). That helps to plan your routes depending on terrain and environment.
- Function to save routes is very useful and allows user to go through that route many times.
- Function to share routes with other users.

Disadvantages

- Most of the functions are paid. Because of this application lacks some important features like seeing different layers of the map or using offline maps.
- Annoying advertisement which promotes "Bikemap premium" every time you open the application. This is definitely the worst feature of the app.

Conclusion

Overall "Bikemap" gives clear example on how application should look like. Functionally of the application is great, although most of the functions are paid. Function layout is clear and comfortable for everyday use. "Bikemap" gave few great ideas for our project like using few map layers instead of one.

1.2 Analysis conclusion

Analyzed applications helped us to generate more ideas for our team's project. It allowed us to see how similar applications look from users' perspective and which functionalities fit user's needs the best.

2 Preliminary design

3 System architecture

4 Technologies and Tools

This section describes programming languages, tools, APIs used in the project.

4.1 Programming languages

- Java will be the only programming language used in the process of Android application development.
- SQL is a standard language, it will be used for storing and retrieving data in databases.
- XML will be used for the user interface part of the application

4.2 Tools

- OpenNebula is an open-source Cloud Computing Platform that is will automate operations and manage virtual machines on a single shared environment.
- Android Studio is used for developing Android application.
- PostgreSQL is an object-relational database management system that will be used in data processing and storage.
- PostGIS is a spatial database extension for PostgreSQL object-relational database. It provides support for geographic objects allowing location queries to be run in SQL. Due to the fact that our project relies on geographical data, therefore, PostGIS database extender will significantly facilitate our work.
- QGIS is an open-source Geographic Information System that has features such as creating, editing, analyzing and visualizing geospatial information. It will be mostly used for validation purposes to check whether the data was successfully imported or sort different types of objects.
- pgAdmin is the software that features open-source administration and development tools for PostgreSQL.

4.3 APIs

- Overpass API - API provided by OpenStreetMap which gives the ability to see different locations on the map.
- Google My Business API - API for getting or leaving reviews and ratings of locations.
- Vilnius Events API - API providing information about events in Vilnius city.
- Meteo API - API providing information about weather in Vilnius city.

5 Functional Requirements

5.1 Sign In/Sign Up features

- Users will have the ability to create accounts.

5.2 Live/open source map

- Users will have the ability to see their current location and look for leisure places.

5.3 Search of leisure places

- Users will have the ability to search for specific objects particularly in Vilnius and will be provided with additional information such as working hours, reviews and busy times.

5.4 Quickest routes

- Users will have the ability to search for the quickest routes to reach their desired leisure place.

5.5 Reviews about leisure places

- Registered users will have the ability to leave feedback about leisure places.

5.6 Rating leisure places

- Registered users will have the ability to rate leisure places from one to five stars.

5.7 Saving favorite locations

- Registered users will have the ability to save locations.

5.8 Check leisure place's busy hours

- Registered users will have the ability to provide/check information about leisure place's busy hours.

5.9 Finding the most optimal solution for the user

- Corresponding to users' current location, preferable type of activity and leisure place's rating the algorithm will find the most suitable options for users to spend their free time.

5.10 About

- Users will have the ability to familiarize with general information about the app.
- Users will have the ability to look through security and privacy policies.

6 Non-functional Requirements

6.1 Compatibility

- The app will be compatible with Android 9.0 and greater. No future plans to make the application compatible with iOS.

6.2 Internationalization

- The app supported language by default will be English. More languages will be implemented in the future updates.

6.3 Usability

- The application features will be implemented in a way so that people of any age could use it without any confusion.

6.4 Reliability

- The application should not have any performance issues or any bugs that would prevent user from using the application.

6.5 Security

- Sign up feature will not use any real names, e-mail addresses, phone numbers in order to prevent users personal information.

7 Algorithm

8 Testing

Conclusions and Recommendations

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