Vasualizing mobile phones data from an R envronment

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Abstract

This document will cover the development of an infrastructure for collecting and visualizing geolocalization data from mobile devices.

The project has been carried out under the supervision of profs. John Aasted Srensen and Ian Bridgwood, as part of a multidisciplinary project.

The content hereby presented follows this scheme: an introductory section containing the problem formulation and an overview of the resulting design, an analysis of the necessary requirements and tools, and comprehensive description of the implementation details. Conclusions will be drawn, assessing the overall results and the newly gained experience and skills.

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Chapter 1

Introduction

This introductory chapter will provide a description of the project in the form of assignment formulation, and a brief overview of the implementation, which will be elaborated further in the following chapters.

1.1 Problem formulation

The aim of the project is the application of methods for integrating mobile phone (Android, iPhone) sensor measurements and an R data visualization environment using the Google Cloud as buffer.

1.2 System description

The implemented system is composed of three main elements: a series of mobile devices, a remote server, and a user station.

The former are equipped with a custom-made application capable of transmitting geolocalization data to a remote destination.

The remote destination is represented by a *Google Sheet* document where such data is stored. This spreadsheet acts as a database for the collected data, and is accessible through the cloud.

The user can then query the server for the necessary data using the provided R scripts and an R environment such as *RStudio*.

Chapter 2

Analysis

The following sections aim to elaborate on the Problem formulation and create a more solid base to use as a guideline and template during the actual development. This analysis does not aspire to be exhaustive, but rather satisfactory in the level of detail required to establish the project.

2.1 Milestone plan

Here is the project milestone plan as formulated during the initial phases of the project. This version of the plan lists a series of achievements deemed necessary to accomplish the major functionalities. It is arranged in a progressive way, with a time axis roughly flowing vertically. Each task depends from its sub-tasks and — more indirectly — on the previous ones within its hierarchal level.

- Extract requirements and use cases

- Evaluate and choose remote hosting service

- Familiarize with necessary tools and languages

  - R and RStudio

  - Java and Android Studio

    - Acquire device location
    - Read and append content to the remote platform

- Software development

  - Configure remote service authorizations and keys

- Implement Android application
- Implement R script for visualizing data

- Integration and validation tests

- Compiling necessary documentation

2.2 Requirements

2.3 Tools

This section will cover various software tools that have been employed during the course of the project. These include development tool and software components or libraries used by the implemented code.

2.3.1 Android Studio

2.3.2 RStudio

2.3.3 R packages

2.3.4 Other tools

Chapter 3

Design

3.1 Infrastructure

3.2 Android

3.3 R

Chapter 4

Conclusions