Visualizing Mobile Phone Sensor Data in an R Environment

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Objectives

The aim of the project is the application of methods for visualizing mobile phone (Android, iPhone) sensor measurements in an R environment, using the *Google Cloud* as buffer. The system has to be able to:

- Collect GPS positioning data from mobile phones and store them remotely.
- Read the content of the spreadsheet from an R environment in real-time, and visualize spatial data on a map and other information on plots.
- Allow the user to interact with the data - filtering, zooming, scrolling, exporting...

Introduction

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

The implemented system is composed of three main elements: a series of end users' mobile devices, a remote host, and a *data analyst* station. The former are equipped with a custom-made application capable of submitting GPS data to a remote *Google Sheet* document, which acts as a database and is accessible through the cloud. The data analyst can then visualize the collected data in real-time, using the provided R scripts and a web browser.

Requirements

Here is a summarization of the *Software Requirements Specification*:

- The collected data shall include device ID, coordinates (latitude, longitude), altitude, speed, and timestamp.
- The mobile phone app shall submit data at a user-defined time interval.
- The R software shall visualize the spatial information using a map and any other data using a chart, in real-time.
- All the developed source code should be modular, reusable, and well-documented.

Tools

R is an open-source programming language and software environment for statistical computing, data analysis, and visualization.

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Implementation

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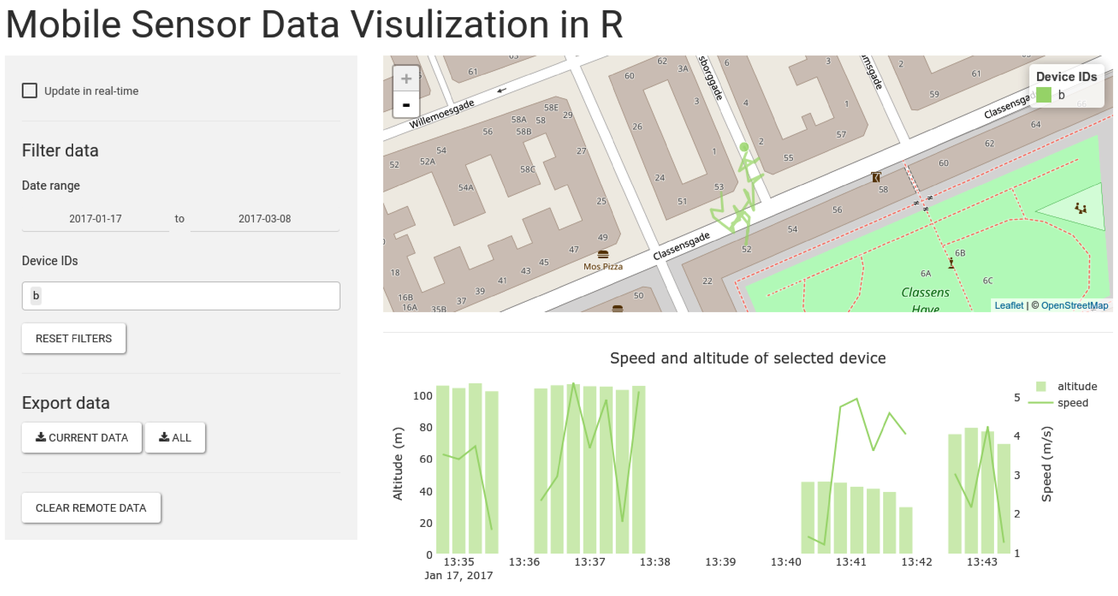

Verification

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Results and Conclusion

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References

[1] *Google Sheets API*. URL: https://developers.google.com/sheets/api/.
[2] *Introduction to Android*. URL: https://developer.android.com/guide/index.html.
[3] *Leaflet for R*. 2014. URL: https://rstudio.github.io/leaflet/.
[4] *Plotly R Library*. 2014. URL: https://plot.ly/r/.
[5] *Shiny, a web application framework for R*. 2012. URL: https://shiny.rstudio.com/.

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