

Location-Based Alerts for Passengers in Public Transport

Antonia Stieger



BACHELORARBEIT

eingereicht am
Fachhochschul-Bachelorstudiengang

Mobile Computing

in Hagenberg

im Juni 2024

Advisor:

Dr.-Ing. Jens Krösche

© Copyright 2024 Antonia Stieger

This work is published under the conditions of the Creative Commons License *Attribution-NonCommercial-NoDerivatives 4.0 International* (CC BY-NC-ND 4.0)—see <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

Declaration

I hereby declare and confirm that this thesis is entirely the result of my own original work. Where other sources of information have been used, they have been indicated as such and properly acknowledged. I further declare that this or similar work has not been submitted for credit elsewhere. This printed copy is identical to the submitted electronic version.

Hagenberg, June 25, 2024

Antonia Stieger

Contents

Declaration	iv
Abstract	vii
Kurzfassung	viii
1 Introduction	1
1.1 Motivation	1
1.2 Problem definition	1
1.3 Definition of goals	1
1.4 Structure of thesis	1
2 Related Work	2
2.1 Geofencing Technologies	2
2.1.1 What is Geofencing?	2
2.1.2 Limitations of Geofencing	2
2.2 Using Geofencing in Public Transportation	2
2.3 Challenges for Alert Systems	2
2.3.1 Delays and Bus Shortages	2
2.3.2 Missing Real-Time Locating Capabilities	2
3 Alert Solutions	3
3.1 Time-Based Mode	3
3.1.1 Scheduling Alerts Based on Specific Times	3
3.1.2 Evaluating Alert Accuracy	3
3.2 Station-Based Mode	3
3.2.1 Monitoring Stations Using Geofences	3
3.2.2 Evaluating Alert Accuracy	3
3.3 Distance-Based Mode	3
3.3.1 Nesting Geofence Regions Around the Destination	3
3.3.2 Evaluating Alert Accuracy	3
3.4 4th ominous Mode	3
4 Implementation	4
4.1 Introduction	4
4.2 Problem of Data Gathering	4

Contents	vi
4.3 GeofenceManager using CLLocationManager	4
4.3.1 Permissions and Capabilities	4
4.3.2 Start Monitoring Region	4
4.3.3 Stop Monitoring Region	4
4.4 Displaying Route on Map	4
5 Discussion and Conclusion	5
5.1 Interpretation of Findings	5
5.2 Implications for Public Transportation	5
A Supplementary Materials	6
A.1 Source Code	6
A.2 Online Sources (PDF Captures)	6
References	7
Online sources	7

Abstract

This should be a 1-page (maximum) summary of your work in English.

Kurzfassung

An dieser Stelle steht eine Zusammenfassung der Arbeit, Umfang max. 1 Seite. ...

Chapter 1

Introduction

1.1 Motivation

1.2 Problem definition

1.3 Definition of goals

1.4 Structure of thesis

Chapter 2

Related Work

2.1 Geofencing Technologies

2.1.1 What is Geofencing?

2.1.2 Limitations of Geofencing

2.2 Using Geofencing in Public Transportation

2.3 Challenges for Alert Systems

2.3.1 Delays and Bus Shortages

2.3.2 Missing Real-Time Locating Capabilities

Chapter 3

Alert Solutions

3.1 Time-Based Mode

3.1.1 Scheduling Alerts Based on Specific Times

3.1.2 Evaluating Alert Accuracy

3.2 Station-Based Mode

3.2.1 Monitoring Stations Using Geofences

3.2.2 Evaluating Alert Accuracy

3.3 Distance-Based Mode

3.3.1 Nesting Geofence Regions Around the Destination

3.3.2 Evaluating Alert Accuracy

3.4 4th ominous Mode

Chapter 4

Implementation

4.1 Introduction

4.2 Problem of Data Gathering

4.3 GeofenceManager using CLLocationManager

4.3.1 Permissions and Capabilities

4.3.2 Start Monitoring Region

Geofence Level 1: Notification

Geofence Level 2: Vibration

Geofence Level 3: Alarm

4.3.3 Stop Monitoring Region

4.4 Displaying Route on Map

Chapter 5

Discussion and Conclusion

5.1 Interpretation of Findings

5.2 Implications for Public Transportation

Appendix A

Supplementary Materials

List of supplementary data submitted to the degree-granting institution for archival storage (in ZIP format).

A.1 Source Code

A.2 Online Sources (PDF Captures)

Path: /online-sources

Reliquienschrein-Wikipedia.pdf [1]

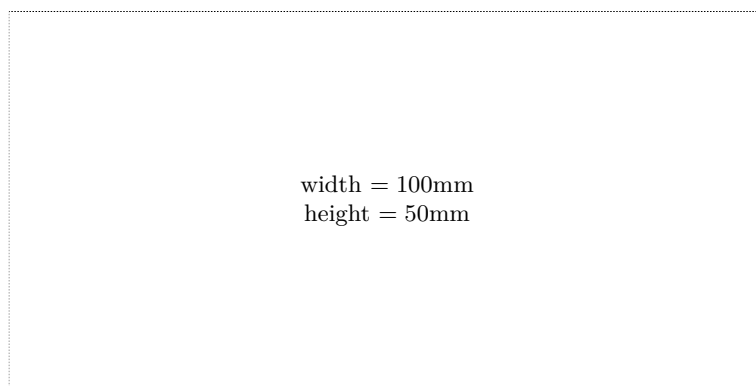
References

Online sources

- [1] *Reliquienschrein*. Sept. 22, 2023. URL: <https://de.wikipedia.org/wiki/Reliquienschrein> (visited on 11/06/2023).

Check Final Print Size

— Check final print size! —



— Remove this page after printing! —