

Data Sharing in Participatory Social Sensing

Master Thesis Ramapriya Sridharan September 3, 2016

Advisors: Prof. Dr. Dirk Helbing, Dr. Pournaras Evangelos Department of Computational Social Sciences, ETH Zürich

Contents

Co	onten	ts		i		
1	Intr	oductio	on	3		
2 Related Work						
3	Exp	erimen	tal Model	7		
	3.1	Introd	luction	7		
	3.2	Mode	l Intricacies	7		
		3.2.1	Categorization of the Features	7		
		3.2.2	Categorization of the Sub-Features	7		
		3.2.3	Weight Matrix Calculation	7		
		3.2.4	Cost Matrix Calculation	7		
		3.2.5	Cost and Privacy Metrics	7		
		3.2.6	Improving the Metrics	7		
		3.2.7	Summarization of Collected Data	7		
	3.3	Analy	rsis of the Model	7		
		3.3.1	Setup	7		
		3.3.2	Results	8		
4	Exp	erimen	t Methodology	9		
	4.1^{-}	Prepa	ratory Phase	9		
		4.1.1	Pre-Survey	9		
		4.1.2	Sub-Features	9		
		4.1.3	Privacy Options	9		
		4.1.4	Question Structure	9		
		4.1.5	Budget and Experiment Duration	9		
	4.2	Entry	Phase	9		
		4.2.1	Collecting General User Information	10		
		4.2.2	Categorization of Features	10		

Contents

		4.2.3 Categorization of Sub-Features	10 10			
	4.3	Core Phase	10			
		4.3.1 Improve Privacy or Credit	10			
		4.3.2 Answering Questions with Incentives	10			
	4.4	Exit Phase	10			
	4.5	FairDataShare Web Portal	10			
		4.5.1 Data Generator's Portal	10			
		4.5.2 Stakeholder's Portal	10			
5	Expl	lanation of the System	11			
	5.1	The Building Blocks	11			
	5.2	The Mobile Application	11			
		5.2.1 Local Storage	11			
		5.2.2 Alarms	11			
		5.2.3 Privacy and Credit Improvement	11			
		5.2.4 Recommendations	11			
		5.2.5 Recording User Choices	12			
		5.2.6 Sensor Data Collection and Summarization	12			
		5.2.7 Server Synchronization	12			
	5.3	The Server	12			
		5.3.1 Kinvey Data Storage	12			
		5.3.2 FairDataShare Web Portal	12			
6		Pre-Survey	13			
	6.1	Motivation	13			
	6.2	Introduction to the Survey Data	13			
	6.3	Methodology and Findings	13			
7	Ana	lysis of the Experiment	15			
8	Con	clusion	17			
A	Appendix					

Abstract

This example thesis briefly shows the main features of our thesis style, and how to use it for your purposes.

Introduction

Related Work

Experimental Model

3.1 Introduction

what, why we need the model. What we aim it to achieve and see

3.2 Model Intricacies

explian the model

- 3.2.1 Categorization of the Features
- 3.2.2 Categorization of the Sub-Features
- 3.2.3 Weight Matrix Calculation
- 3.2.4 Cost Matrix Calculation
- 3.2.5 Cost and Privacy Metrics

explain how the cost and privacy are calculated per question and in total

3.2.6 Improving the Metrics

How the imporve privacy and credit button implemented overview

3.2.7 Summarization of Collected Data

3.3 Analysis of the Model

3.3.1 **Setup**

the sensors, stakeholders, and contexts and other special parameters such as number of options and all

3.3.2 Results

graphs depicting how the model varies with various different inputs from user

Experiment Methodology

4.1 Preparatory Phase

4.1.1 Pre-Survey

4.1.2 Sub-Features

For each sensor,dc and context show graphs from the presurvey why each of them was chosen

4.1.3 Privacy Options

what privacy option are chosen

4.1.4 Question Structure

structure of the question

4.1.5 Budget and Experiment Duration

budget and experiment duration

4.2 Entry Phase

explanation of screen shots

- 4.2.1 Collecting General User Information
- 4.2.2 Categorization of Features
- 4.2.3 Categorization of Sub-Features
- 4.2.4 Answering Questions with No Incentives
- 4.3 Core Phase
- 4.3.1 Improve Privacy or Credit
- 4.3.2 Answering Questions with Incentives
- 4.4 Exit Phase

link to appendix exit survey

4.5 FairDataShare Web Portal

Screen shots and explanations of the portal how to use and all

- 4.5.1 Data Generator's Portal
- 4.5.2 Stakeholder's Portal

Explanation of the System

5.1 The Building Blocks

explain with diagram what interacts with what

5.2 The Mobile Application

- 5.2.1 Local Storage
- **5.2.2** Alarms

Going to the Next Data Sharing Day

Notifications

5.2.3 Privacy and Credit Improvement

5.2.4 Recommendations

how privacy credit is imporved

- 5.2.5 Recording User Choices
- 5.2.6 Sensor Data Collection and Summarization
- 5.2.7 Server Synchronization
- 5.3 The Server
- 5.3.1 Kinvey Data Storage

Security

Table Store

Bussiness Logic

5.3.2 FairDataShare Web Portal

The Pre-Survey

- 6.1 Motivation
- 6.2 Introduction to the Survey Data

basic statistics about the data, plots to explain the data

6.3 Methodology and Findings

Analysis of the Experiment

Conclusion

Appendix A

Appendix



Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich

Declaration of originality

The signed declaration of originality is a component of every semester paper, Bachelor's thesis, Master's thesis and any other degree paper undertaken during the course of studies, including the respective electronic versions.

respective electronic versions.						
ecturers may also require a declaration of originality for other written papers compiled for their courses.						
hereby confirm that I am the sole author of the written work here enclosed and that I have compiled it n my own words. Parts excepted are corrections of form and content by the supervisor.						
Title of work (in block letters):						
Authored by (in block letters): For papers written by groups the names of all authors are re	equired.					
Name(s):	First name(s):					
With my signature I confirm that - I have committed none of the forms of plagi sheet.	iarism described in the 'Citation etiquette' information					
I have documented all methods, data and pI have not manipulated any data.	processes truthfully.					
- I have mentioned all persons who were sign	nificant facilitators of the work.					
I am aware that the work may be screened elect	tronically for plagiarism.					
Place, date	Signature(s)					

For papers written by groups the names of all authors are required. Their signatures collectively guarantee the entire content of the written paper.