



**NTNU – Trondheim**  
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# User Experience and Technical Solutions for Location Based Push Commercials

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Master of Science in Communication Technology

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**Title:** User Experience and Technical Solutions  
for Location Based Push Commercials

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**Problem description:**

How is location based push messaging done today, and how is the user experience?  
Which technologies are utilised to track the user?

Would a service that gathers location based push messages actors into a single system, where the user can choose which to subscribe to, make for a positive user experience?

On the technology side, is there any reason why established technologies GPS + Wifi or Google Location API aren't being used for location based applications?

A simple prototype using GPS+Wifi/Google Locationing API shall be developed on Android in order to demonstrate to test users how such an app would give the user notifications when the user is near a subscribed business venue.

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## Abstract

This project focuses on the creation of an Android app for location based push commercials, which henceforth will be called an offers app. The idea of the app is the following: Users are allowed to chose which actors they want to subscribe to, and they only receive offers from that actor when entering one of their physical stores. Actor meaning any business with a storefront in this setting. The hypothesis was that if you let users chose who they get ads from, and only get them when entering a physical store, they would give users such a good user experience that they would be willing to download and use an app which only purpose is to give offers.

To achieve this the author has usability tested prototypes of the offers app and interviewed subjects about it. After doing this and landing on a fitting design a questionnaire was given to acquaintances of the author through social media in order to collect some measurement on how people perceive the app. Google Locationing Application Programming Interface (API) was field tested in order to determine if it was suited for tracking and triggering ads when users enters a storefront of an subscribed actor. Other tracking technologies were also looked at in order to find a tracking technology that fit the purpose of the app.

From the usability testing, interviewing and questionnaire we have found a solution people are willing to try, and seemingly have a quite positive feeling about. From field testing we have found that Google Locationing API is not suited for detecting when the user enters an actors storefront. The research of alternative tracking technologies and solutions suggests that Ibeacons using Bluetooth Low Energy would be a fitting technology for tracking when users enter stores.



## Sammendrag

Dette prosjektet fokuserer på opprettelsen av en Android app for lokasjonsbasert push reklame, som heretter vil bli referert til som en tilbudsapp. Ideen til appen er følgende: Brukere får velge vilke aktører de vil abonnere på, og de får kun reklame fra abonnerte aktører når de går inn i en abonnert aktørs fysiske butikker. Aktør betyr i denne sammenhengen en forretning med fysisk butikk. Hypotesen var at hvis man lar brukere velge hvem de får tilbud fra, og de kun får reklame når de faktisk går inn i fysisk butikk, så ville brukere få en så god brukeropplevelse at de ville være villige til å laste ned og bruke en app som har som eneste funksjon å gi reklame.

For å oppnå dette har forfatteren brukbarhetstestet og gjennomført intervjuer rundt prototyper av tilbudsappen. Etter å ha landet på et passende design ble en spørreundersøkelse gitt til bekjente av forfatteren gjennom sosiale media for å samle tall på hvordan folk oppfatter tilbudsappen. Google sitt Locationing API ble felttestet for å undersøke om det ville være passende for å spore brukere og gi de tilbud i det øyeblikket de går inn døren i en abonnert butikk. Andre sporingsteknologier ble også sett på for å finne en sporingsteknologi som passet til bruksområdet til tilbudsappen.

Fra brukbarhetstesting, intervjuene, og spørreundersøkelsen har vi funnet en løsning folk er villige til å prøve, og tilsynelatende har en positiv innstilling til. Fra felttesten har vi funnet at Google sitt Locationing API ikke er passende for å spore når brukere går inn døren til butikker. Gjennom undersøkelsen av alternative sporingsteknologier og løsninger foreslår vi å i stedet gå for Ibeacons som bruker Bluetooth Low Energy teknologi for å spore når brukere går inn fysiske butikklokaler.





## Acknowledgments

I would like to thank my counselor, Rolv Bræk, who has helped me with ideas for the project, which direction to go, proofreading, and much more. He has been helpful every step of the way, and invaluable to the existence of this thesis.

I would also like to thank my supervisor, Ole Markus With from Trådløse Trondheim, who has also helped me find the direction for the project, given valuable input about questions underway of the project. Trådløse Trondheim also deserves special thanks for the initial idea which evolved into the idea for this project.



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# List of Acronyms and Abbreviations

**LBA** Location-based advertising

**API** Application Programming Interface

**GPS** Global Positioning System

**ISO** International Organization for Standardization

**SUS** System Usability Scale

**SDK** Software Development Kit

**HTML5** HyperText Markup Language version 5

**CSS3** Cascading Style Sheets version 3



# Chapter 1

## Introduction

### 1.1 What Is Location Based Commercials?

From Wikipedia<sup>1</sup>:

«Location-based advertising (LBA) is a new form of advertising that integrates mobile advertising with location-based services. The technology is used to pinpoint consumers location and provide location-specific advertisements on their mobile devices».

This project bases itself upon location based *push* commercials, meaning that the commercials will be pushed to the users device, based on their location.

### 1.2 Motivation - Why User Experience and Technologies?

This project has focused on the user experience of the proposed app, and secondly tried to find out if there already is a suiting technology to implement it. The heavy focus on the user experience is motivated by the fact that this would be completely essential for the success of such a new system of delivering commercials, since the user him-/herself choses to install or use the app or not. If unhappy with it, it would be uninstalled or never installed at all.

The author wished to make a working prototype of the proposed app. This gave way for the motivation for looking at already existing technologies for implementing the tracking of the users, which was needed for the app.

In summary the author wished to arrive at a design and interface which gave users the needed positive user experience, and the cheapest possible way of implementing this.

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<sup>1</sup>[http://en.wikipedia.org/wiki/Location-based\\_advertising](http://en.wikipedia.org/wiki/Location-based_advertising), Friday 30<sup>th</sup> May, 2014.

### 1.3 Motivation - Economic Aspects and Gains to Society

The authors motivation for the project is two parted. There are the rather big economic and business prospects for it, and there's the possibility to create something that really could gain society.

#### 1.3.1 Economic Aspects

The global advertising spending of 2013 is a mind staggering 509 billion US\$<sup>2</sup>. Indeed, advertising is a core part of capitalism, as something can not be sold without somebody to buy. Businesses need to communicate their products in order to capitalise on them. New innovations in the field of advertising could offer potential enormous savings and increase in sales. Google is a prime example. With their information gathering and knowledge about each of their individual users, they could give them targeted ads so successfully that they grew into the online goliath they are today. As they are dominating ads on the Internet, wouldn't it be exciting to dominate the ads outside of it?

The idea of the precursor to this project was given to the author by a company in Trondheim, Norway called *Trådløse Trondheim*. They received indications from several customers that they are interested in sending ads to users mobile phones. They are not alone in this, and some indications suggest that indoor positioning systems are creating a \$10 billion market<sup>3</sup>.

In sum the author therefore would suggest that there is rather large economic potential for this project. If successful, actors have a way of reaching their target audience with gusto, without spamming those who are not interested. It might also prove to work as a sort of customer loyalty program, in making them visit stores more often for new offers.

#### 1.3.2 Gains to Society

The Western world is a society where there are ads and commercials all around us. On the television, radio, Internet, and other places. Many feel overloaded, spammed, and we change the channels and install adblocks. Is it possible to instead of bother commercial receivers give them such a good user experience that they actually want to get offers and ads? This project asks if there is a better way to do this, through the mobile platform. Wouldn't it be grand if receiving offers felt pleasant instead of feeling spammed? If this project in the end turned out to be grandly successful,

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<sup>2</sup><http://www.plunkettresearch.com/advertising-branding-market-research/industry-statistics>, Friday 30<sup>th</sup> May, 2014.

<sup>3</sup><http://goo.gl/XRPukT>, Friday 30<sup>th</sup> May, 2014.

to the fullest degree, maybe it actually would change the landscape of the world. Instead of large, flashy, billboards there would instead be a beautiful mural. Because if personal, targeted, advertising on the mobile platform became successful enough, maybe this would be *the* one channel to advertise outside of the web, eliminating many other "spammy" forms of advertising. It is a *very* hopeful thought and vision. The author isn't naïve and realises this won't happen anytime soon, but maybe this project will help take a step in the right direction.

### **Not just for Businesses**

"Actor" in this setting and project means any business with a storefront. This definition of actor could however be greatly expanded upon, and possibly include many other instances of organizations.

"Actor" could also include tourism agencies or agencies of state, or indeed any entity which might have location based information they wish to communicate. The application of the software could indeed easily be extended to be a general location based information platform. If integrated with a map and/or GPS we can image a system where users could see which information channels (aka *actors*) are nearby, and chose to get location based information from them. Such a system could be used for giving information to tourists, as an example. E.g. they would then subscribe to the actor "Visit Norway", and when entering the area of Odda in Norway, they would get information about how to get to Trolltunga (which is a common tourist destination in the region).

## **1.4 Time Limitations for the Project**

Since the author only has experience with the Android platform, and not enough with Ios, Windows or other, this project was limited to finding a suitable solution for the Android platform. The hope was to arrive at a solution which would turn out to also be possible to implement for other platforms.

The project also focused on using Google's Locationing API as possible technology for tracking the user, since this API incorporates both Wifi and Global Positioning System (GPS) technologies for tracking, is widely used, is completely free to use, and seemed very fitting for the needs of the project.

## **1.5 Existing Actors Within Location Based Commercials**

In regards to similar work there are already existing commercial businesses with products that have some similarities. There's Apple's Ibeacon technology<sup>4</sup>. This

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<sup>4</sup><http://en.wikipedia.org/wiki/IBeacon>, Friday 30<sup>th</sup> May, 2014.

#### 4 1. INTRODUCTION

doesn't gather the different actors in one single system, and rather is a tracking technology which need to be used in some way. Shopkick<sup>5</sup> is another product with some similarities. The Shopkick app does not however let you chose which actors you wish to follow, and uses a proprietary technology for tracking the user.

A fuller comparison of the different products already existing within location based commercials can be found in the author's precursor for the thesis, *Apps with push commercials based on Wifi location*.

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<sup>5</sup><https://www.shopkick.com/>, Friday 30<sup>th</sup> May, 2014.



# Chapter 2

## Usability Testing Round One

### 2.1 Introduction

#### 2.1.1 Reasoning For The Usability Test

From Wikipedia:

«ISO 9241-210[1] defines user experience as "a person's perceptions and responses that result from the use or anticipated use of a product, system or service". According to the International Organization for Standardization (ISO) definition, user experience includes all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviors and accomplishments that occur before, during and after use. The ISO also list three factors that influence user experience: system, user and the context of use. Note 3 of the standard hints that usability addresses aspects of user experience, e.g. "usability criteria can be used to assess aspects of user experience". Unfortunately, the standard does not go further in clarifying the relation between user experience and usability. Clearly, the two are overlapping concepts, with usability including pragmatic aspects (getting a task done) and user experience focusing on users' feelings stemming both from pragmatic and hedonic aspects of the system. Many practitioners use the terms interchangeably.»

From this the reasoning was that measuring the usability and also measuring the users feelings about the product would in sum tell us about the user experience of the product. The usability testing would measure the pragmatic, i.e. the efficiency and effectiveness. The feelings for the system would be somewhat measured through the usability testing and post testing interview, but also from an online questionnaire. The online questionnaire follows later in its own chapter.

### **2.1.2 Users, Purpose of the Test, Use of the Results, and Resources**

Targeted customer/user: A regular shopper, who might visit any brick and mortar (physical) store, but whom are also technology savvy. I.e. the user must own a mobile phone. Many demographics fit this description, but it seems to the author that young people are often faster to adapt new technologies, and thus were given the main focus.

Purpose: The purpose of the test is to determine if the user interface has a high degree of usability, i.e. that it is effective, efficient and has a high user satisfaction. Is it effective in delivering offers and efficient in doing so, while the user is satisfied with the experience?

Use of the results: The results will be used to determine if the System Usability Scale (SUS)-score is high enough in average so that we confidently say it has high usability (see Wikipedia for more information on SUS<sup>1</sup>). The feedback from the post testing interview will be used as suggestions for changing the prototype, but also to help form the online questionnaire.

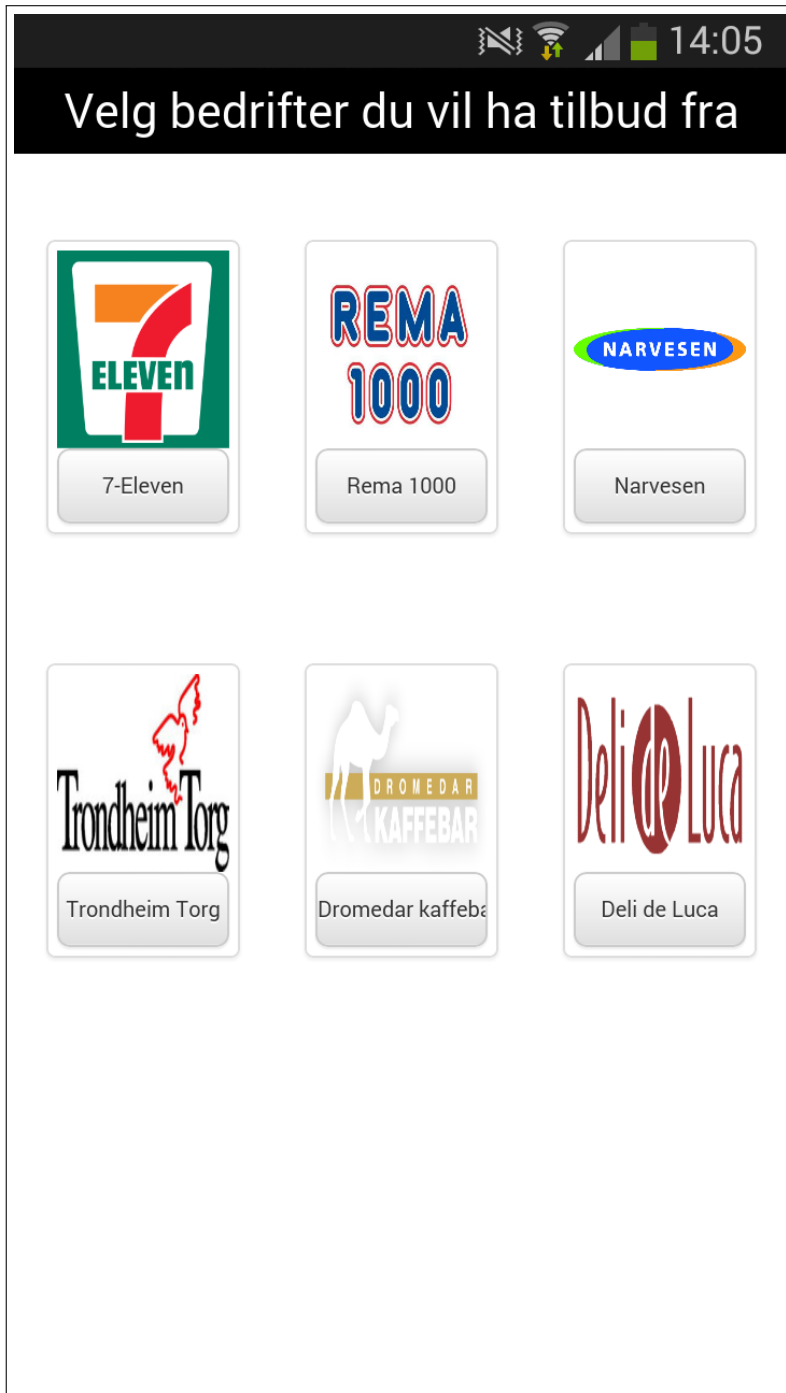
Resources: The only resources needed is an Android smart phone with access to the prototype, which is split into two apps for testing purposes. For the sake of this test the authors Samsung Galaxy S3 was used. The first app will let the users chose which actors they wish to get offers from. The second one will be used to fake that the device has entered a store, in order to give them an offer.

## **2.2 Description of the User Interface**

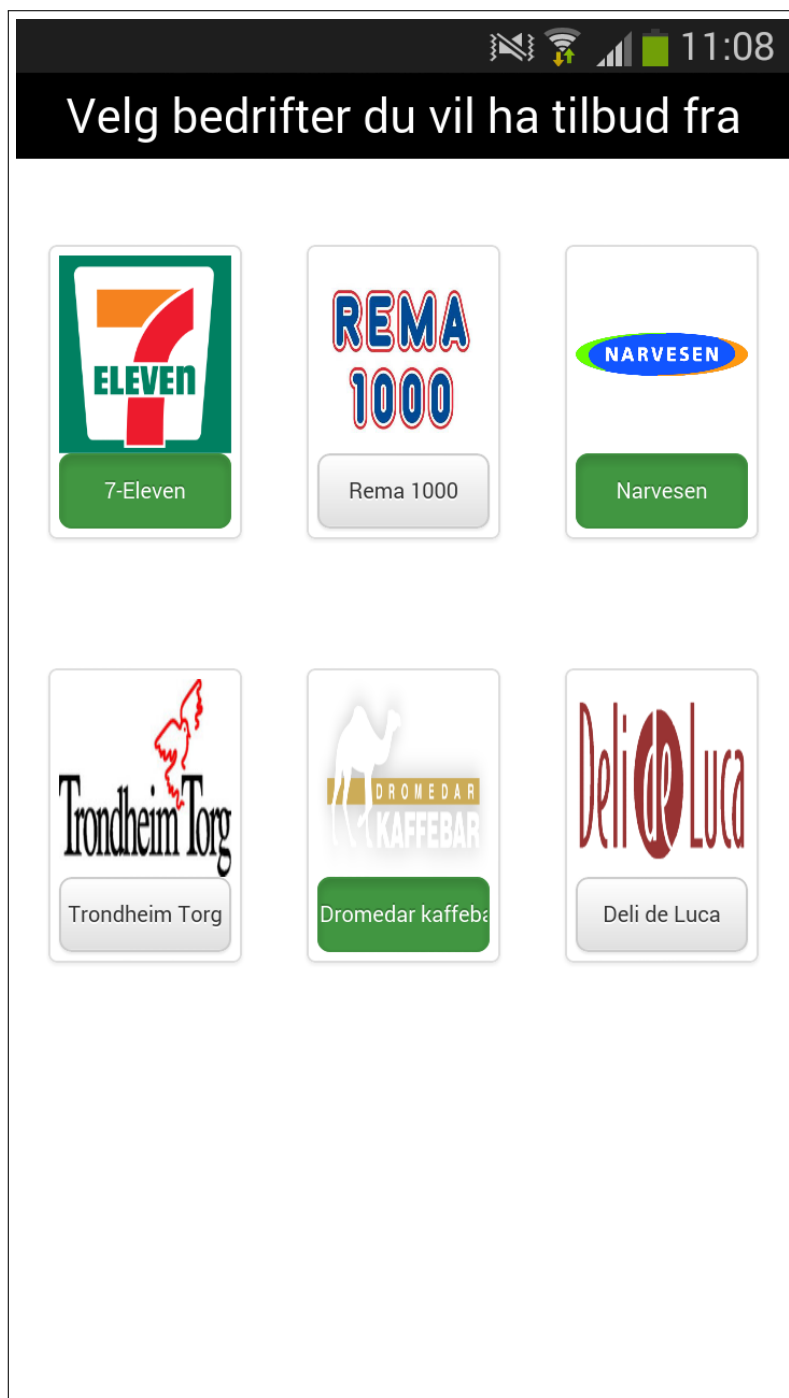
The description of the prototype can be seen in the figures 2.1, 2.2, 2.3, 2.4, 2.5, on pages 7-11. The user may of course be a he or a she, but for convenience only the male form will be used henceforth in this text.

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<sup>1</sup>[http://en.wikipedia.org/wiki/System\\_usability\\_scale](http://en.wikipedia.org/wiki/System_usability_scale), Friday 30<sup>th</sup> May, 2014.



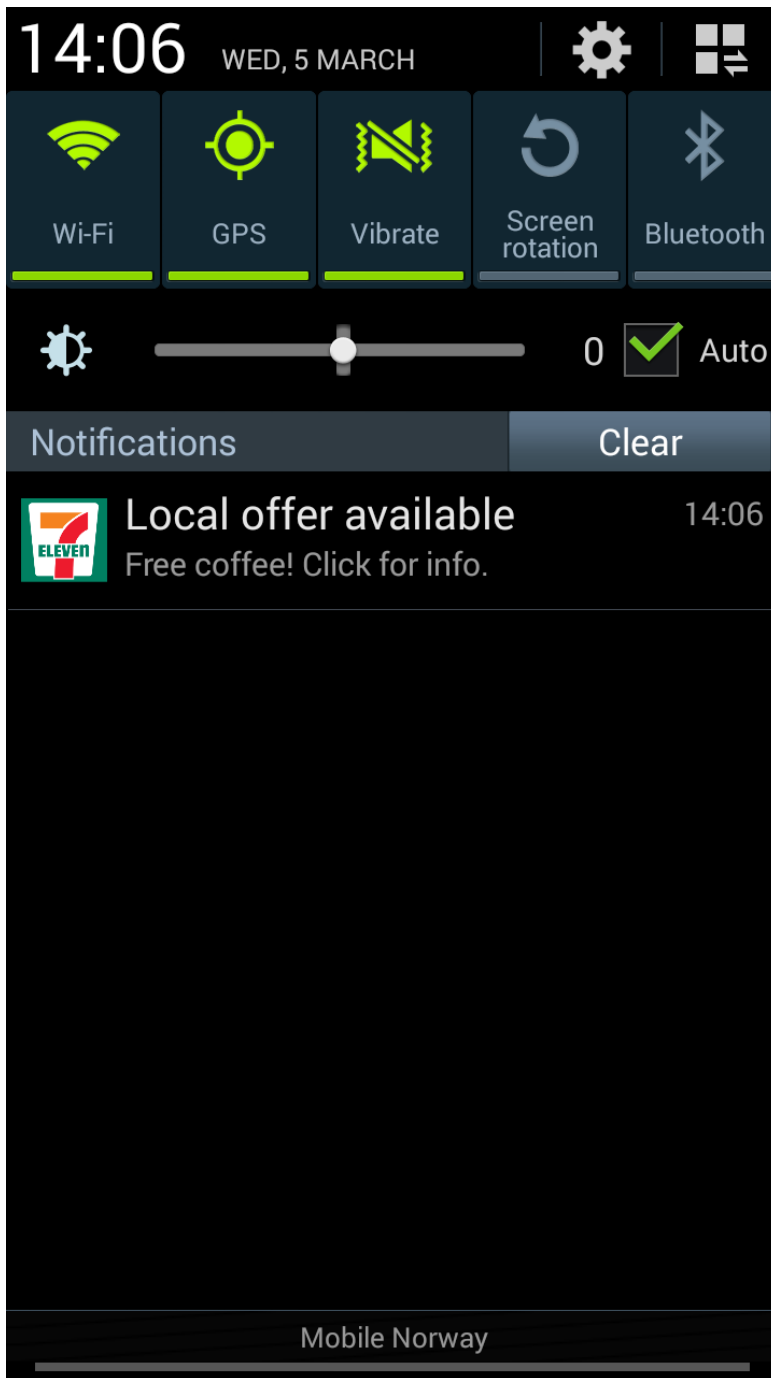
**Figure 2.1: Usability Test One: After App Launch, Selecting Actors.** Upon launching the app from the Android platform this is the view the user first sees, prompting him at once to select actors he wishes to get offers from.



**Figure 2.2: Usability Test One: Actors Selected.** In the first prototype the actors were selected and saved simply by clicking on the picture of them or the button with their respective names. The button with the name of the actor turning green signified which actors were selected.



**Figure 2.3: Usability Test One: Receiving a Notification.** After a user entered an actors store the user would get a notification, as seen in the top left corner, as in this example would be the logo for 7-Eleven.



**Figure 2.4: Usability Test One: Viewing a Notification.** The user can then view and consider the offer in a short notification form, and if he chooses to, access more information about the offer by clicking it.



**Figure 2.5: Usability Test One: Viewing the Full Offer.** This was the example offer given for the first round of usability testing, which is actually an official web page of 7-Eleven. The offer states that if you review coffee from 7 Eleven you can get coffee for free.

## 2.3 Description of the Scenarios

### 2.3.1 Scenario #1 - Selecting Actors

#### Functionality

Selecting actors to subscribe to.

#### Description

In order to receive offers one must first subscribe to a given actor. When you later enter a store of a subscribed actor one would get an offer. E.g. if you have subscribed to 7-Eleven and entered one of their stores you would get an offer from them. Since it wasn't practical to test in an actual store, this first test would only cover starting the app and subscribing.

#### Operations

1. Start the app from the desktop shortcut on the phone.
2. Select that you would like offers from 7-eleven, Narvesen and Dromedar Kaffebar.

### 2.3.2 Scenario #2 - Viewing an Offer

#### Functionality

Receiving an offer and viewing it.

#### Description

As it wasn't practical to test in an actual store, this second test would fake that the user entered a 7-Eleven store. The phone would then vibrate and give the user a notification as seen in figure 2.3. The user was then tasked with simply considering (viewing) the offer.

#### Operations

1. Walk into the room with the 7-Eleven logo on the door (pretend you entered a 7-Eleven store).
2. The phone will notify you of an offer.
3. View the offer you have received.



## 2.4 How the Usability Test Was Conducted

The test was conducted in the back room of NTNU IT's Orakeltjenesten, which is in essence a lunchroom. The author works here, and the room, as well as the test users, were by and large used for their convenience. Although not recommended for an ideal usability test, the author, who also was the developer for the prototype, was the test leader.

The test leader conducted the test by first giving an introduction to the app and its purpose, and thereafter explaining the first test scenario to the test user. After the user had finished scenario #1, scenario #2 was explained and tested. Any problems detected were noted as they came during the test, and after the tests the user was shortly interviewed and given a SUS to fill out.

## 2.5 Feedback and Results

Average SUS: 81.

See table 2.1 on page 14 for a table of the feedback results of the usability test.

## 2.6 Conclusion From The Usability Test

The conclusion from the first round of usability testing was that the app needs to alert or notify the user that the saving of selected actors is happening, as many did not understand this.

We also need a more appropriate offer even for testing purposes, as the one from this usability test was confusing to the test users.

Elaboration on this follows in the following subsections.

### 2.6.1 Need To Alert Or Notify

Though the button field containing the name of the actor turned green to indicate that the actor was saved this was not an obvious enough indicator for the test users. It was concluded that the next prototype should alert the user of the saving happening, instead of a save button that was also suggested, because saving immediately and notifying seemed to the author to be a more sophisticated and better solution than a save button.

Person	SUS Score	Feedback Scenario #1	Feedback Scenario #2
Martin	85	<ul style="list-style-type: none"> <li>- Save button is wanted.</li> <li>- Or something that says it's being saved.</li> </ul>	<ul style="list-style-type: none"> <li>- The notification can go away when I click it. Or when I'm done at 7-Eleven.</li> </ul>
Anne-Siri	82.5	<ul style="list-style-type: none"> <li>- Misses feedback when saving.</li> </ul>	<ul style="list-style-type: none"> <li>- Was not familiar with how to open the Android notification area.</li> <li>- Rema 1000 offers would be nice, but I'm not actually interested in 7-Eleven and similar.</li> </ul>
Jon-Arne	67.5	<ul style="list-style-type: none"> <li>- I would like a response or a save button.</li> <li>- Can I just exit the app now?</li> </ul>	<ul style="list-style-type: none"> <li>- Not familiar with Android notification area, but I thought it worked well.</li> <li>- The offer was too wordy.</li> <li>- Would use it if the offers were good and presented in a fast and consistent way.</li> </ul>
Pernille	90	<ul style="list-style-type: none"> <li>- Difficult to see if you're done when you've clicked something.</li> </ul>	<ul style="list-style-type: none"> <li>- Found the notification at once.</li> <li>- The offer needs to be more concise.</li> </ul>
Kenneth H.	80	<ul style="list-style-type: none"> <li>- Easy to use.</li> </ul>	<ul style="list-style-type: none"> <li>- Some problems finding the offer (uses Iphone normally).</li> <li>- Is it normal to use notifications?</li> <li>- If I have to check notifications that's a hassle for me.</li> <li>- What kind of offers are there? Do I get access to anything extra?</li> <li>- Can I be sure the offers are up to date?</li> <li>- It all depends on the kind of offers I'm getting.</li> <li>- Could I view the offers before entering the store?</li> </ul>

**Table 2.1: Feedback and Results of Usability Testing Round One.** On the first test scenario many test users found that the app did not give enough feedback for them to confidently feel that they had completed the task with certainty. On the second part it was noted that one needed prior knowledge of how the Android notification area worked, among other things.

### **2.6.2 New Test Offer**

Even though the offer was not intended to be part of the system, as it would be entirely dependent on any given actor to create the offer, it became apparent that a more suitable test offer was needed. A lot of the test users were confused by this original test offer because there was so much text that they didn't immediately understand what they were supposed to do with the offer.

### **2.6.3 Android Knowledge Was Needed From The Users**

It came apparent that prior knowledge of the Android notification system was needed in order to find the offers without too much confusion for the test users who didn't use Android daily. However, for the test users who had better prior knowledge of the Android system this offered no problems, and they were able to find the offers quickly and found it obvious were to look for them.

It was concluded that since notification systems varies from platform to platform, and users basically just have to learn each of them, and it worked perfectly fine for those with prior knowledge of Android, not to make any changes to how the notifications worked. It was however noted that ideally the app could notify the user in even more ways. But due to the limited time of the project these changes were not prioritized.

## **2.7 Source Code Listing**

See appendix A on page 59.



# Chapter 3

## Usability Testing Round Two

### 3.1 Reasoning For The Second Usability Round Two

Seeing as there were a lot of confusing elements in the first prototype it was decided that another usability test was needed in order to reach a design that was clearly understandable. The thinking went that if we wanted to successfully measure peoples feeling towards the idea we first had to make sure it was clearly understandable. The app had to be somewhat polished in order to filter out negative emotions due to poor design, so that we would only get feedback on the core idea.

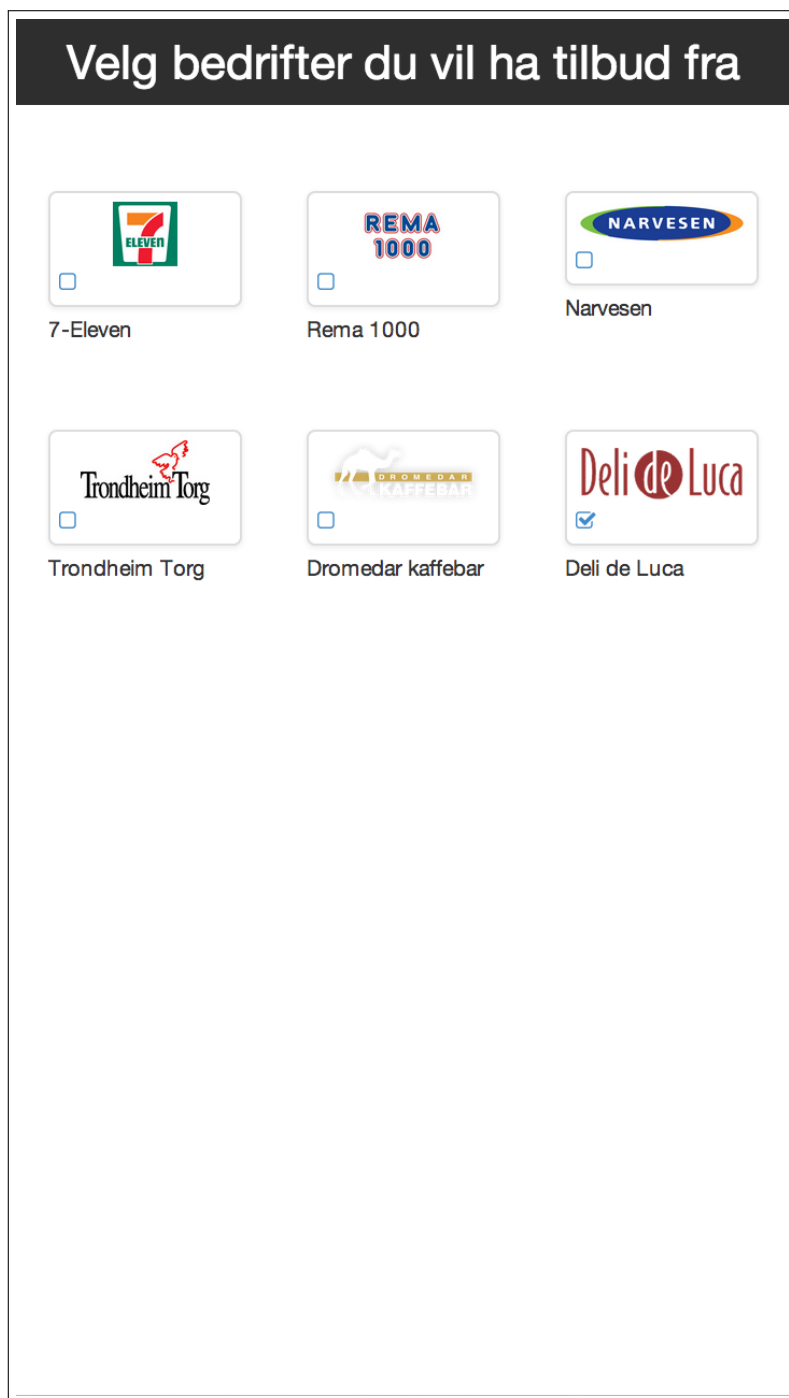
Even in the first usability test, where users were told the offer was given by the actor, and not part of the system, this still influenced a lot of the test users feelings about the app.

### 3.2 Description of the User Interface

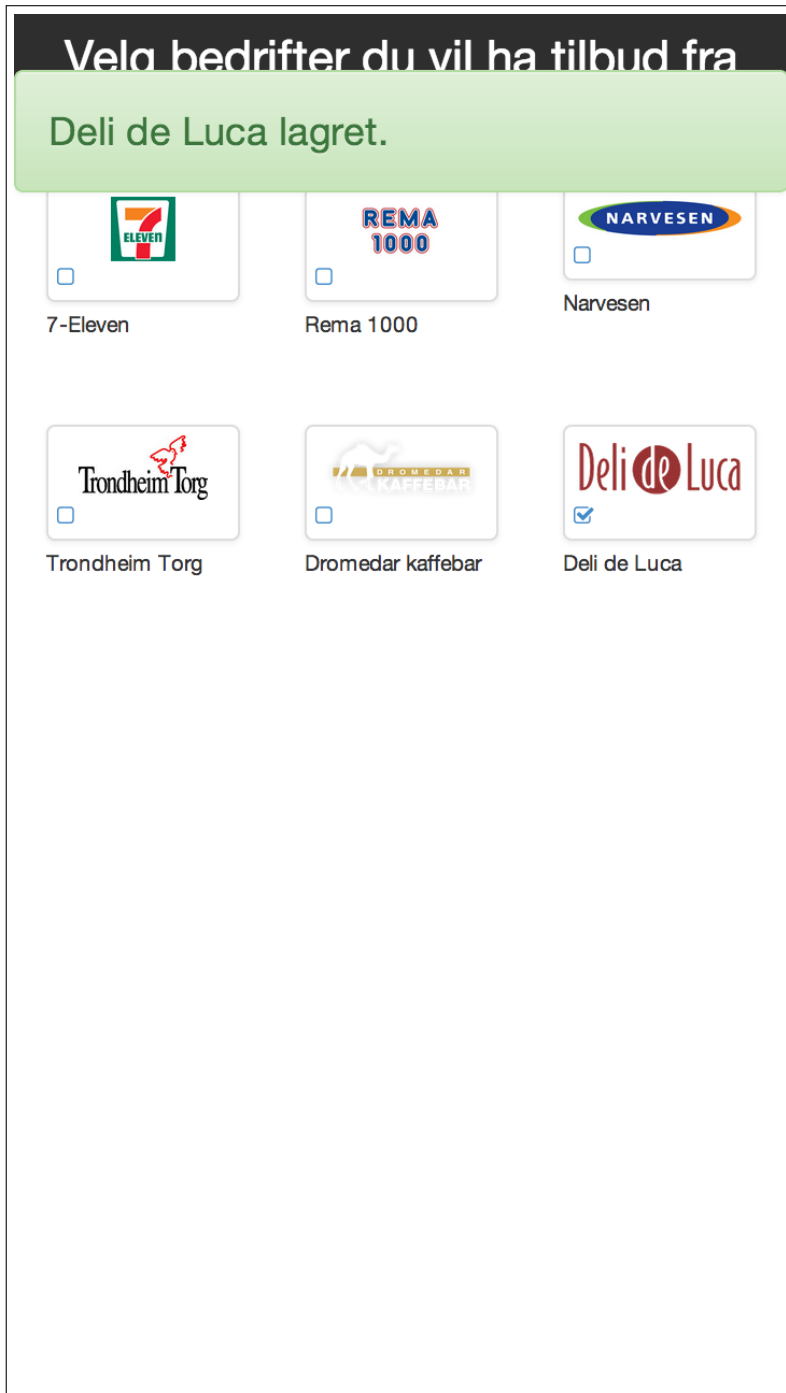
The description with images of the prototype can be seen in the figures 3.1, 3.2, 3.3, 3.4, on pages 18-21.

From the first usability test to the second the most major change was the offer shown when users opened the notification. The way the users got notifications was still the same as in the first test (see figures 2.3 and 2.4).

The other major change was how the app notified the user of actors being saved. Instead of a button with the name of the actor turning green when pressed, there now was a checkbox under the logo of the actor, and when an actor was pressed there would be a green popup.



**Figure 3.1: Usability Test Two: After App Launch, Selecting Actors.** Again, upon launching the app this is the view the user sees, prompting to select actors he or she wishes to get offers from, much like in figure 2.1. The images were made smaller in order to align them in a more esthetic way.



**Figure 3.2: Usability Test Two: Selecting Actors.** In the second prototype the actors were selected and saved still by clicking on them. The green notification popping up by the top of the screen saying the name of the actor is saved was intended to signify this. In addition the checkbox (here on Deli de Luca's frame) in the bottom left corner is checked.



**Figure 3.3: Usability Test Two: Deselecting Actors.** To remove actors you would want to receive notifications from you would deselect them by clicking them again. A blue popup at the top with the message '<name of actor> deactivated' was intended to signify this, as shown here.





**Figure 3.4: Usability Test Two: New Test Offer.** Since very many of the test subjects in the first usability test were confused by the first offer (2.5 on page 11), and found it too wordy, this test offer was created in order to demonstrate a more representative and concise offer of how the offers were intended to look like.

Person	SUS Score	Feedback Scenario #1	Feedback Scenario #2
Silje	85	- Do I have to click the checkboxes?	- Everything's fine.
Morten	87.5	- Took a couple of seconds after pressing the actors before noticing that saving was happening. - Could be a save button instead.	- Longer vibration time is needed to notice it. - Most commercials try to get you to the store, this doesn't work that way. - Almost like a customer loyalty program (depending on the offers).
Sigvart	82.5	- Misses a save button. - Also wants some text to tell he is now subscribed to the service.	- No comment in particular.
Peter	87.5	- Misses save button. - Want bigger pictures/logos. - The top bar's color makes it interchangeable with the android notification bar.	- There could be a notification on the lock screen. - If the phone is in use when entering the store a notification could be shown on the middle of the screen. - Badges on the notification could be useful.
Tomas	87.5	- Kind of small, missing some more information. - Feel like this is a subfunction of a larger app. - Maybe intro first, then subscribing? - Maybe a new page which say you are now subscribing?	- I like that the logo in the notification is the same as that of the store that I'm entering. - "Local offer available", the text in the notification, is also good.

**Table 3.1: Feedback and Results of Usability Testing Round Two.** Even though there now was a popup to tell the user saving was happening/done users still felt this was not clear enough. There were still test users that were uncertain what to do next after they've finished subscribing to actors. The scenarios of the usability test were still the same as the first round of usability testing.

### 3.3 Feedback and Results

Average SUS: 86.

See table 3.1 on page 22 for a table of the feedback results of the usability test.

### **3.4 Conclusion From The Usability Test**

The conclusion drawn from the second usability test was that although technically more sophisticated, and faster and easier for a user who knew how the app worked, the background JavaScript which saved the actors pressed without the need for a save button was confusing for the user.

It also became apparent that even though users were told how they app worked before using it, a lot of people were insecure about what to do after they have selected and saved actors. "What now?" was frequently asked.

The redesign (mostly new information) follows in the next chapter.

### **3.5 Source Code Listing**

See appendix B on page 71.



# Chapter 4

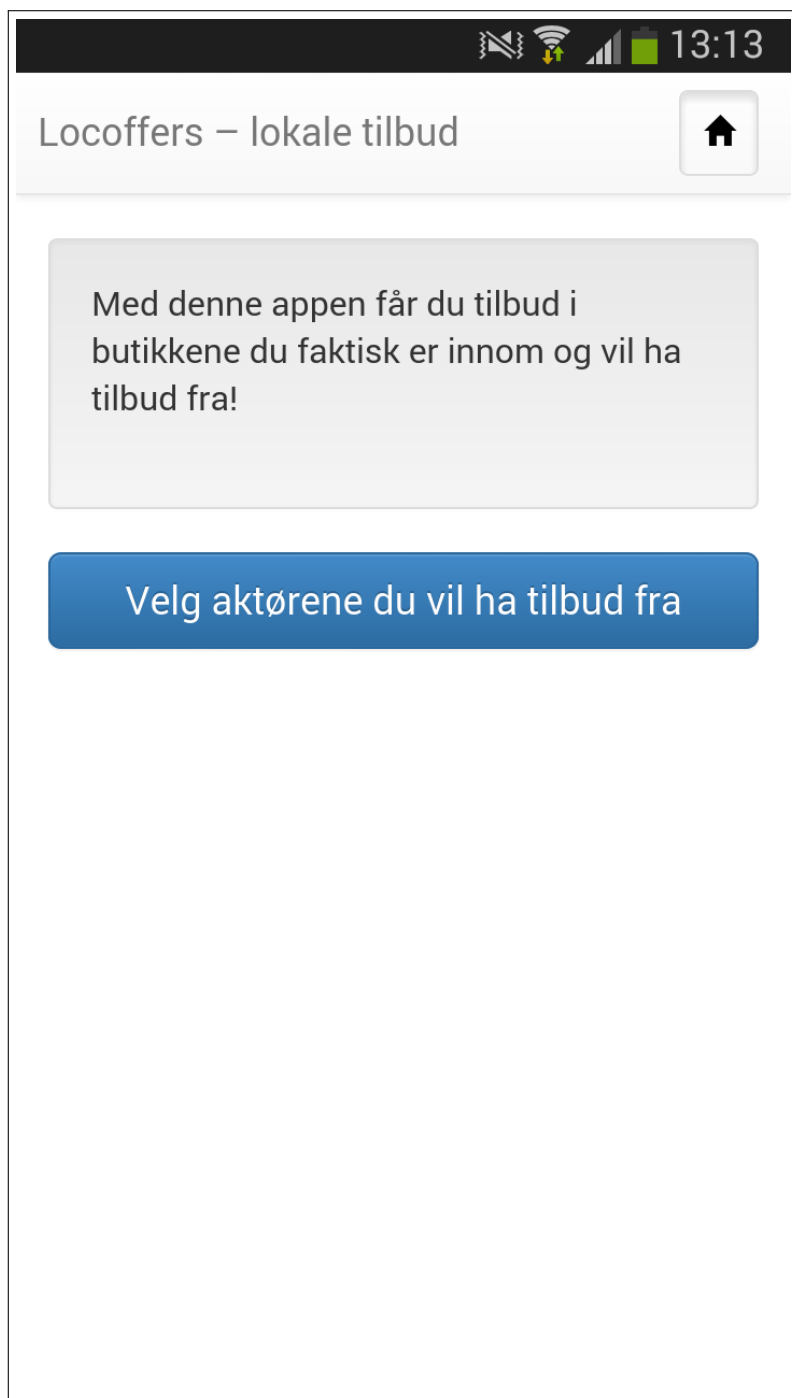
## Finalized User Interface

### 4.1 Look and Design

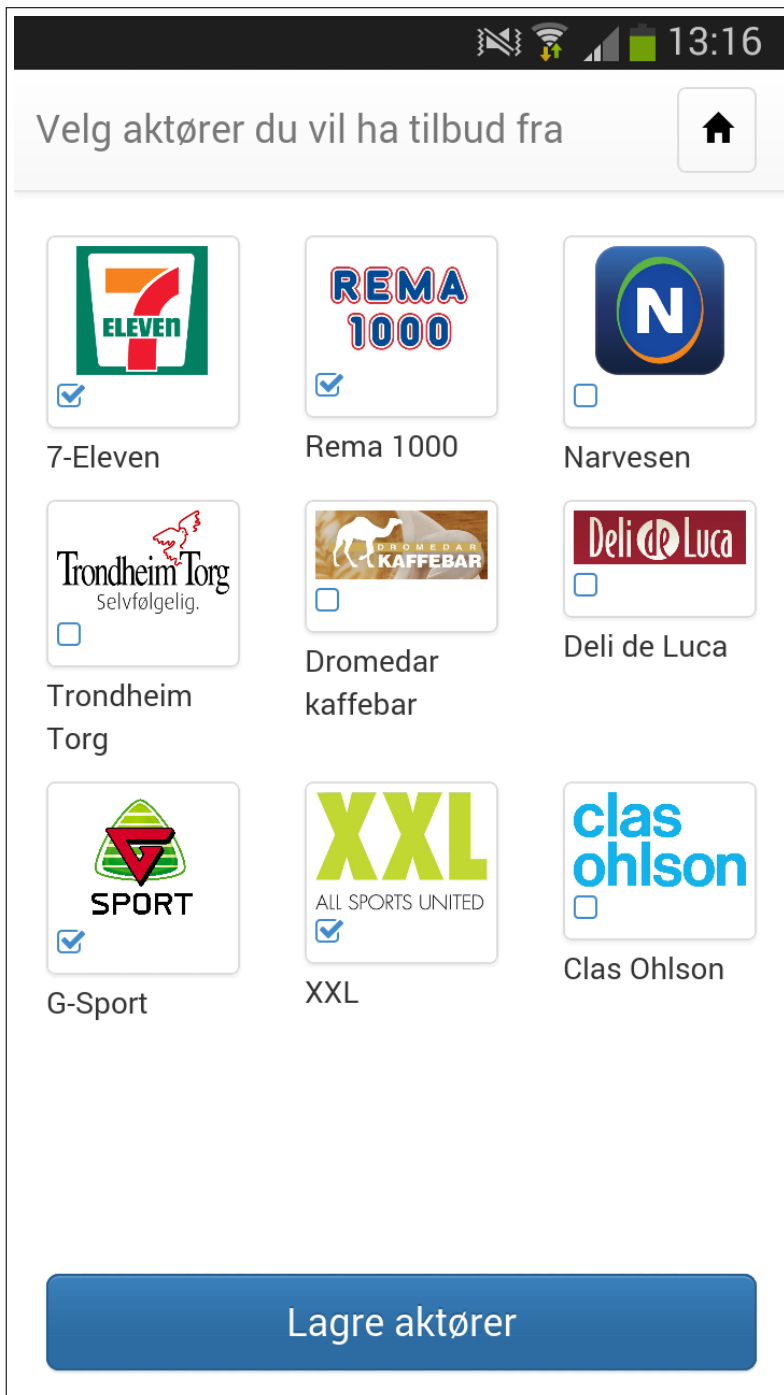
The final user interface is described through figures 4.1, 4.2, 4.3 on page 26-28.

The offer created for the second usability test (figure 3.4) and notifications were still the same as before.

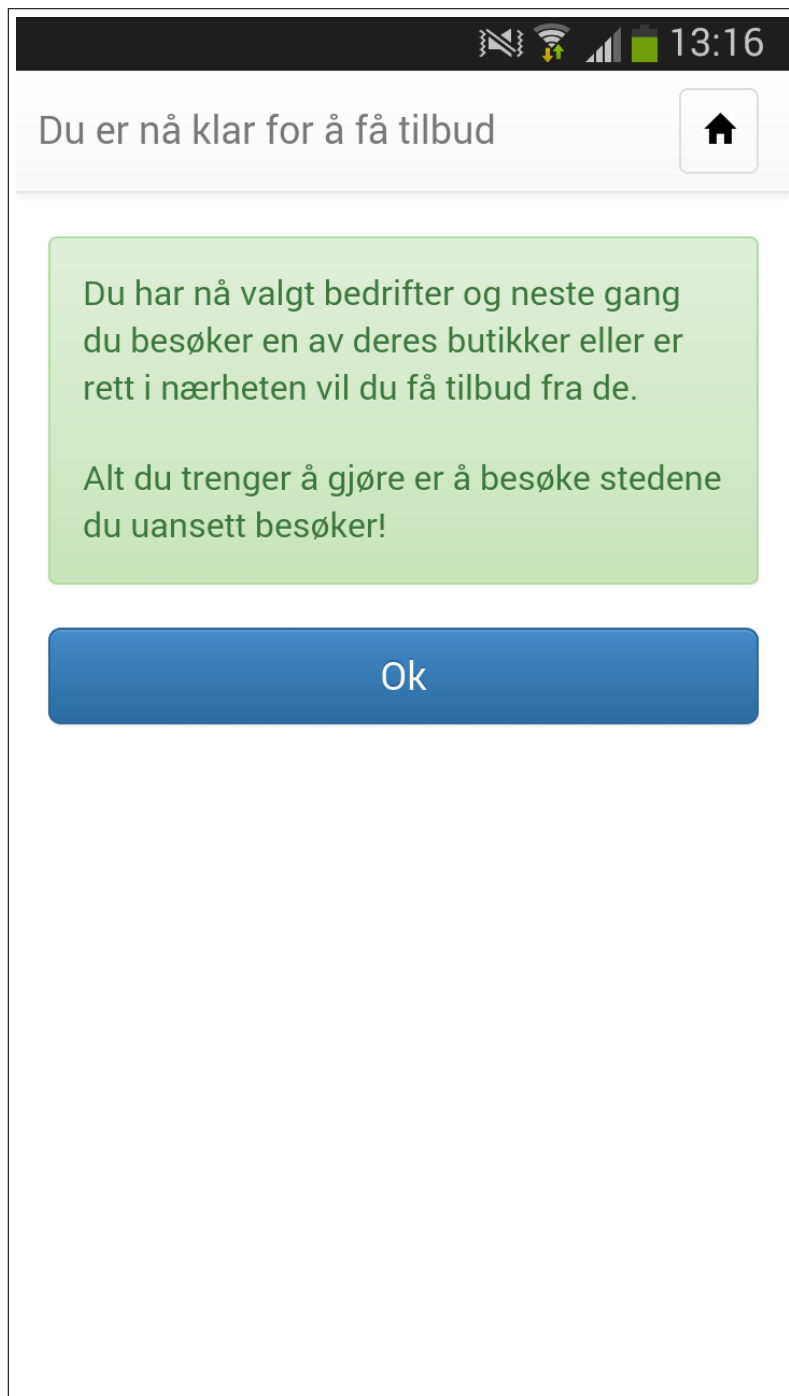
This finalized user interface was never usability tested due to lack of time, but the author felt confident in the redesign due to the extensive feedback saying two things were wanted: (1.) a save button, and (2.) more information and something that made the app seem more whole (or larger). With this redesign, and the already confidently high average SUS score of 86 on the last test, the author was confident in using the finalized user interface for demonstrating the app in the online questionnaire.



**Figure 4.1: Finalized User Interface: After App Launch, Introduction to the App.** Seeing as so many test users had problems understanding what they were doing when they selected actors to follow, this intro screen was added in order to give a brief introduction to how the app worked. Clicking the button simply takes the user to the actor selecting page.



**Figure 4.2: Finalized User Interface: Selecting Actors.** The final actor selecting page finally got a save button at the bottom, which users could click after they've selected the actors they wish to subscribe (or unsubscribe) to. A new row of actors was added in order to make it seem like there would be a large(r) array of possible actors to follow.



**Figure 4.3: Finalized User Interface: Saved Message.** After the user has saved which actors he wishes to follow he then is displayed the save message shown in the figure above. The message states that the actors are now successfully saved, and when you now visit one of their stores, you will now get offers. It closes saying that the only thing you need to do is visit the stores you normally would visit anyways.



## 4.2 Source Code

See appendix C on page 79.



# Chapter 5

## Questionnaire

### 5.1 Introduction

For the sake of trying to measure and gauge the user experience of the app it was needed to really look closer at how people feel about it. The usability tests had covered it somewhat, but made it hard to put any sort of objective measure on it. And since the term *user experience* covers a larger set of terms than *usability*, mostly around feelings, it was deemed necessary to further investigate this.

An online questionnaire demonstrating the app and then asking questions about it was chosen as it seemed to be the best way to get a large amount of answers to the questions. A good feeling of which sort of questions to ask on the questionnaire was given to the author through the many (albeit informal) interviews of the test users that followed the usability tests. That way the questionnaire could focus on measuring how many people felt the same way as some of the usability test users felt.

### 5.2 The Form For The Questionnaire

The questionnaire had a demonstration first, and secondly a series of questions.

#### 5.2.1 The Demonstration of the App

The demonstration went as following:

1. Firstly there was a basic introduction of the idea for the app in text, and explained that 7-Eleven would be used as an example.
  - You can yourself select which actors you wish to follow.
  - You only get offers (or commercials) when you're in the actual store of such an actor or very close by.

2. After that followed the three pictures from the finalized user interface, figures 4.1, 4.2, 4.3 as seen on page 26-28, and an explanation of what happened at each screen.
3. Then there was a picture of a 7-Eleven store and a map location pointing at a 7-Eleven, saying "and when you're actually there..."
4. Finally in the demonstration of the app there was a picture of the example offer created (figure 3.4 on page 21) saying "you will get an offer on your phone".

### 5.2.2 Questions on the Questionnaire

After this followed the actual questions for the questionnaire:

1. Would you be interested in such an app (yes/no)?
2. Check the statements you agree with and leave the ones you disagree with blank (checkboxes).
  - a) I think it would be useful/I like the idea.
  - b) I like that I can select the actors I wish to follow.
  - c) If I chose to *download* the app depends on what kind of offers I can get.
  - d) If I chose to *use* the app depends on what kind of offers I can get.
  - e) I feel the app is pointless.
  - f) I'm skeptical about such an app.
3. How positive/negative do you feel about such an app? (scale 1-10, 1 being "hate the idea" 10 being "I love the idea").
4. What do you think about such a product (free text)?

If the users said "no" to being interested in using such an app (question 1.) they were sent to an extra page with the following questions:

1. Why wouldn't you use/download such an app (checkboxes)?
  - a) Not interested in more commercials.
  - b) Worries about privacy.
  - c) Reduced performance on my phone.
  - d) Don't think it would work in real life.
  - e) Already use a competing product.

f) Other (text field).

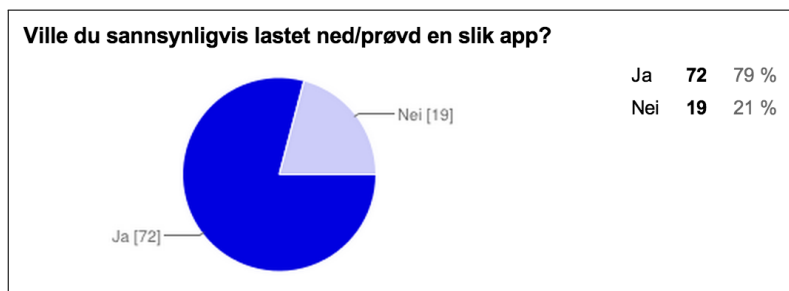
2. What would make such an app good enough for you to use it (text field)?

After this followed a simple demographic page with questions about your gender, age, and which kind of phone you're using. A final text field for any other comments was also included.

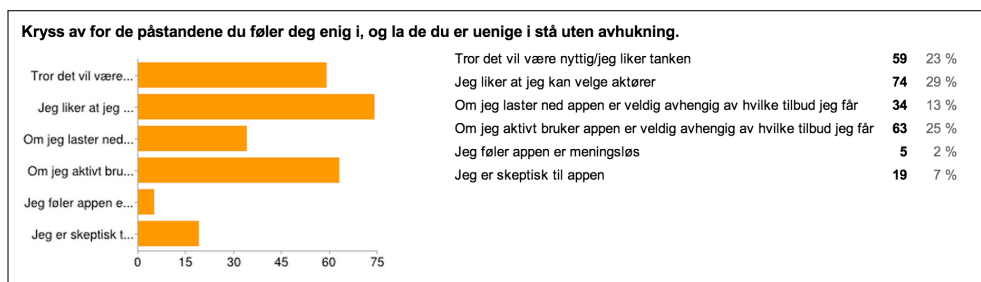
### 5.3 Results

A summary of the most relevant results can be found in figures 5.1, 5.2, 5.3 and 5.4 on pages 33-35.

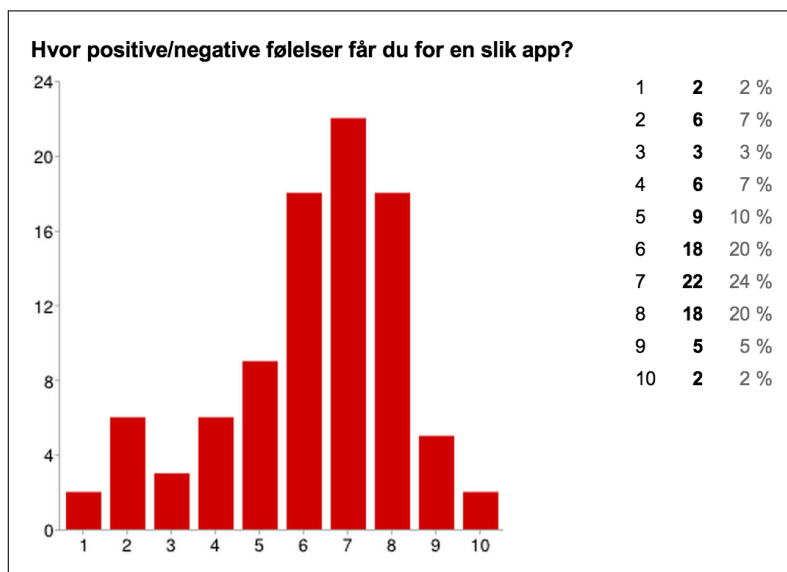
The complete set of answers to the questionnaire can be found in appendix D on page 91.



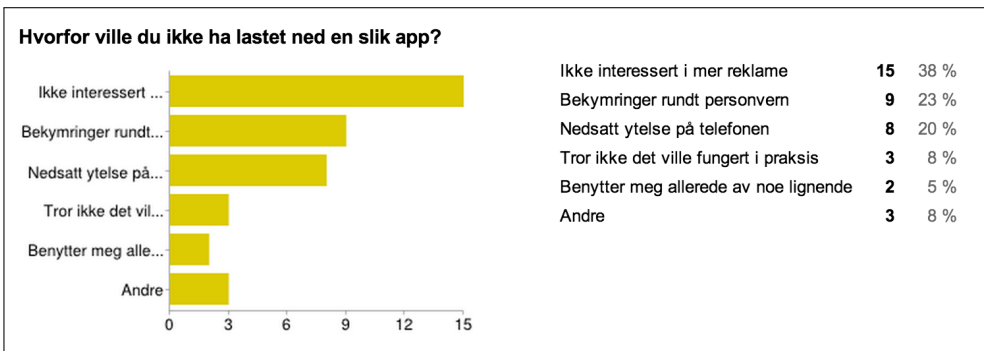
**Figure 5.1: Would You Download/Try Such An App?** 79 percent answered that they would download/try the app while 21 percent said no. The bold numbers, here **72** and **19**, signify in numbers rather than percentages how many answered what.



**Figure 5.2: Which Statements Do You Agree With?** Follows the structure in list "check the statements you agree with and leave the ones you disagree with blank".



**Figure 5.3: How Positive/Negative Do You Feel About Such An App.** The figure shows the distribution of feelings for the app, from a scale 1-10, where 1 is "I hate the idea" and 10 is "I love the idea".



**Figure 5.4: Why Wouldn't You Use/Download Such An App?** This question was only asked to those who said they were not interested in downloading/try the app, to try to find out which common reasons they had.

## 5.4 Discussion of Results

### 5.4.1 Many 8's, 7's and 6's

As seen from figure 5.1 and 5.3 we see that the majority of questionnaire participants apparently have a pretty positive attitude towards trying/using the app. Seeing as 10 is "I love the idea", and love being a very strong emotion, this suggests that the large percent of participants answering 8, 7 and 6 are quite positive and happy about the idea of such an app.

### 5.4.2 A Spike In 2's

We also see from figure 5.3 that there is a spike in the graph at the rating of 2. This might suggest that many of those who are negative towards the idea are strongly so. As we see from the graph in figure 5.4 we see that the most common reason for this is because people are not interested in more commercials. In other words, it is likely they feel the app would spam them in some way. Hatred towards spam is very understandable. It is however the hope that this app would give the users such targeted offers that the user would not feel it was spam, since the user can themselves select whom they get offers from, and they only get offers from stores they actually visit anyways.

### 5.4.3 People Seem Happy That They Can Select Actors

We see that "I like that I can select the actors I wish to follow" feature gets the highest percentage out of the answers in figure 5.2. From appendix D we see that out

of the 72 that answered "yes" to "would you be interested in such an app?" all but 6 said they like the feature. This equals to  $1 - (6/72) = 91.7$  percent. This makes it easy to suggest that this feature is quite important in regards to the user experience of the app.

#### 5.4.4 People Are Willing To Try The App

From figure 5.2 we see that the bar for the "if I chose to *download* the app depends on what kind of offers I can get" option is almost twice as large as "if I chose to *use* the app depends on what kind of offers I can get" option suggests that people are indeed willing to try the app. These kinds of statements also appear numerous times in the free text feedback and was also mentioned several times in the post usability testing interviews. This implies that for very many people the quality of the offers is *the* most important aspect of the app. This is something that permeates the entire idea of the app: If the offers aren't good enough then the user experience for the app will also be low.

There is no "fix-all" solution to this intrinsic problem. However, you can enforce a (strict) policy on the app's actors so that all offers meet a certain, high, standard.

Another possibility would be making personalized offers, perhaps based on the users previous shopping patterns. The user would of course have to agree to this and there would be a technical aspect of it to take care of.

#### 5.4.5 Other Feedback

##### Might Create Loyalty

As one user pointed out (and as the author already had ideas about) the app might act like a sort of loyalty program. If you get offers from one store but not a competing one, you might visit the one you get offers from more often in order to get offers. If this turns out to be true this would serve as a nice counter balance and substitute to the fact that normal commercials aim to draw customers in to the store by sending you offers when you are not in the store.

##### Concerns About When You Get Commercials

Several users commented concerns about when they get offers. Some would like to tune the radius, others would be able to turn them off. For some the offers would have to come *only* when in store, for others they say they should only be triggered when in an "appropriate" range. It's hard to say anything for certain about what would give the best user experience, and there should probably be more usability tests done on this concern alone in order to say anything conclusive.



Too large trigger radius also seems to be a big concern for many of the people who were negative towards the app.



# Chapter 6

## Field Test

### 6.1 Introduction

#### 6.1.1 Reasoning

A hypothesis around the creation of the app in this thesis was that it would be possible to track the users with enough accuracy through the use of GPS and/or Wifi positioning for the app. Seeing no need to "reinvent the wheel" and in order to greatly cut down a potentially long development time, the author concluded it would be advantageous to use and test an already existing Google API, which uses both Wifi and GPS in its positioning.

#### 6.1.2 Google's API

Google offers Location and Geofencing APIs that seemingly offers everything the app needs in terms of tracking the user in a suiting way. As it states on Google's webpage<sup>1</sup>, the API's are simple but powerful, are power-efficient, and adjusts location updates based on user's proximity to the geofence and user's modality (still, walking, driving, and so on). This was basically everything the app needed.

#### 6.1.3 Geofences

A geofence is a virtual perimeter for a real-world geographic area<sup>2</sup>. The arguably simplest form of a geofence is a point location with a radius, simply visualised as a circle on a map. The Android web page<sup>3</sup> states that (Android/Google) Location Services treats a geofences as an area rather than as a points and proximity. This allows it to detect when the user enters or exits a geofence. The author thought this sounded like exactly what was wanted, and concluded this was what should be tested.

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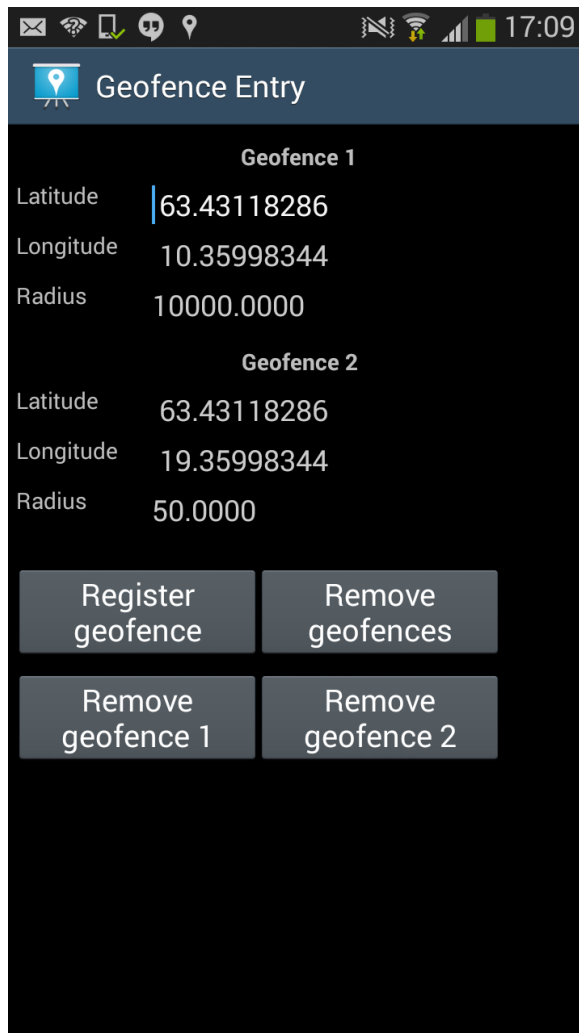
<sup>1</sup><http://developer.android.com/google/play-services/location.html>, Friday 30<sup>th</sup> May, 2014.

<sup>2</sup><http://en.wikipedia.org/wiki/Geo-fence>, Friday 30<sup>th</sup> May, 2014.

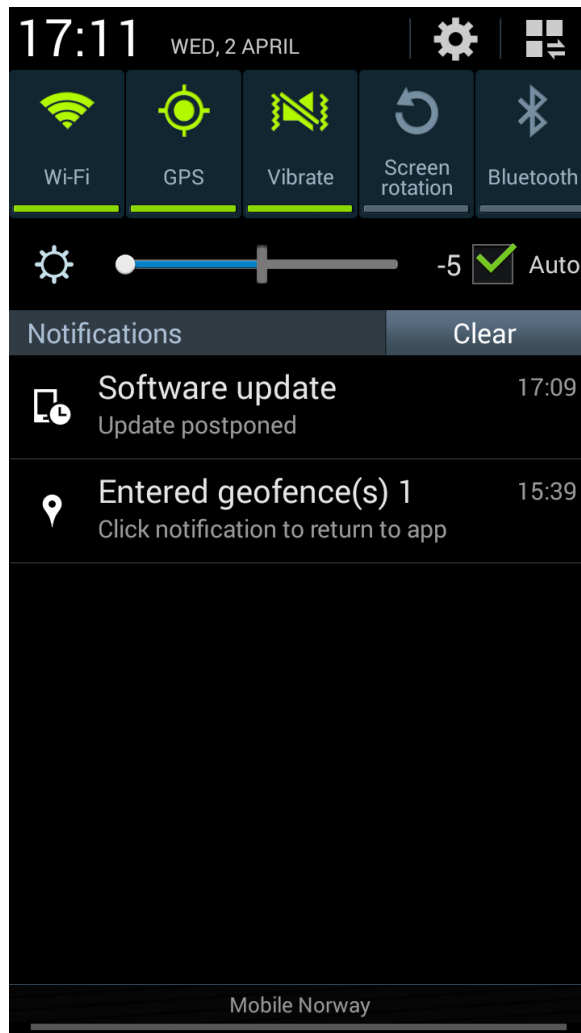
<sup>3</sup><http://developer.android.com/training/location/geofencing.html>, Friday 30<sup>th</sup> May, 2014.

### 6.1.4 Google's Code

The same web page<sup>3</sup> also offered a sample code which compiles into an Android app that allows the user to define and create geofences with positions (latitude and longitude) and radiuses, and notifies the user when he enters or exists one of the geofences. The interface can be seen in figures 6.1 and 6.2. This was indeed very fitting functionality to test if the Google API would be suited for tracking users for the app.



**Figure 6.1: Google's Example Geofence App: Interface.** This is how Google's sample geofence app's interface looked like, which was used for the field test.



**Figure 6.2: Google’s Example Geofence App: Notifications.** Google’s sample geofence app notifications can be seen, as the second notification on the list, in this figure.

## 6.2 How The Field Test Was Conducted

### 6.2.1 Positioning Geofences

Since the offers app means to give users offers when they walk in the store in an optimal circumstance, and not when they walk by, this was the focus of the test. There were two tests: One with the center of the geofence right outside the

test store's door, and the other with the center in the middle of the test store's location. For both tests the radius of the geofences was the only thing that was changed.

The reasoning for these two placements was that the accuracy of the positioning should be better right outside the shop, since GPS is available. However, seeing as the store might be big, and the accuracy inside may be okay, maybe it would be better to put a geofence over the entire store.

From the test the author hoped to find the optimal placement of geofences in order for the offers app to trigger at the right time, i.e. when the user enters the store.

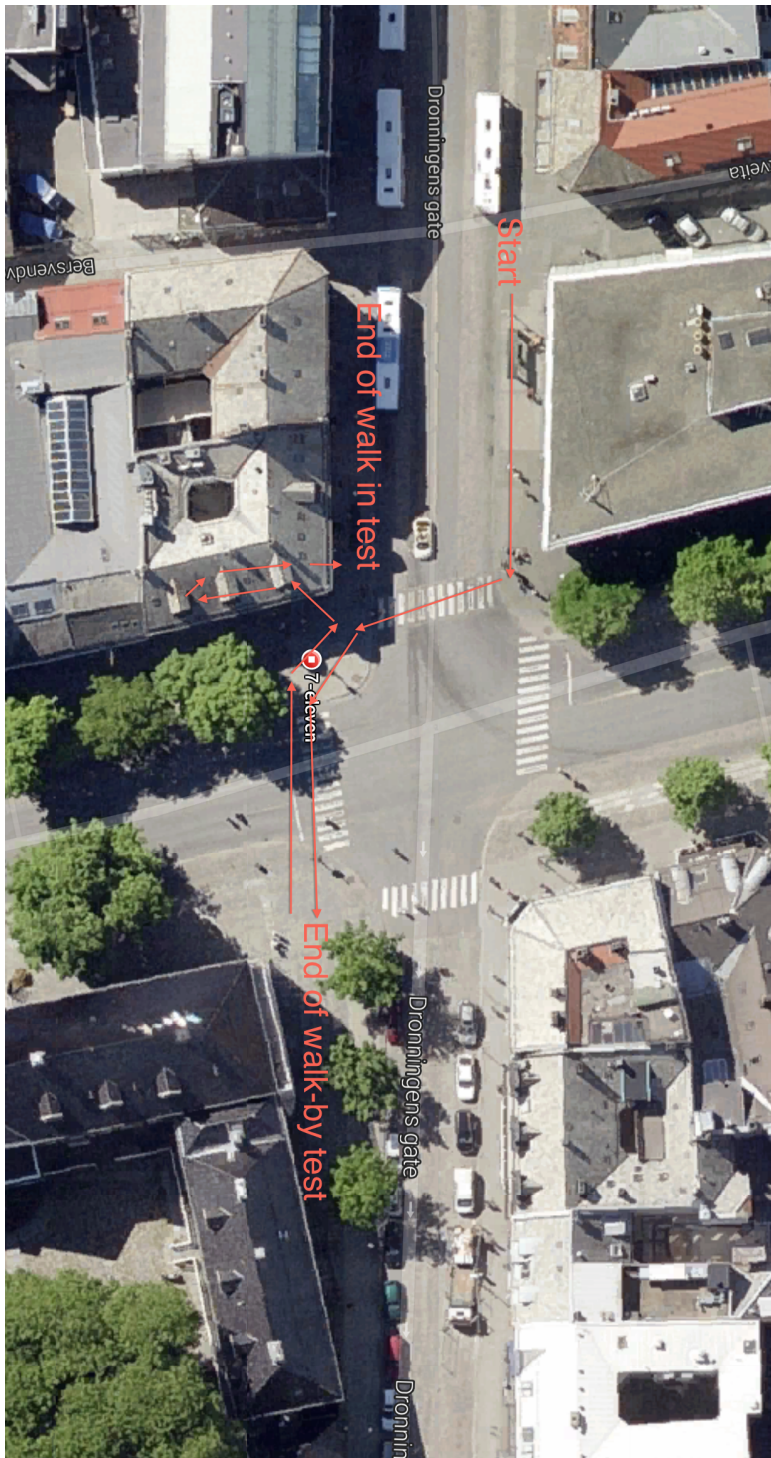
### 6.2.2 Location of the Field Test

The location for the field test was outside a 7-Eleven in central downtown Trondheim. A picture of the street view of the location can be seen in figure 6.3 on page 43. Many participants in the questionnaire had concerns about trigger range of the offers app (as noted in 5.4.5). Because of this the field test centered on walking two routes and seeing if the Google geofences app would trigger on this. The first route, the "walk-by" route, had the test user (the author) walk closely by the store, passing the street two times. The second route, the "walk-in" route, had the test user walking inside the store. The optimal performance for this would of course be that the app triggers on walking in, but not walking by. The route can be seen on figure 6.4 on page 44.

On figure 6.5 on page 45 you can see a visualization of a geofence centered on the stores entrance. Similarly you can see a visualization of a geofence placed on the center of the store in figure 6.6 on page 46.

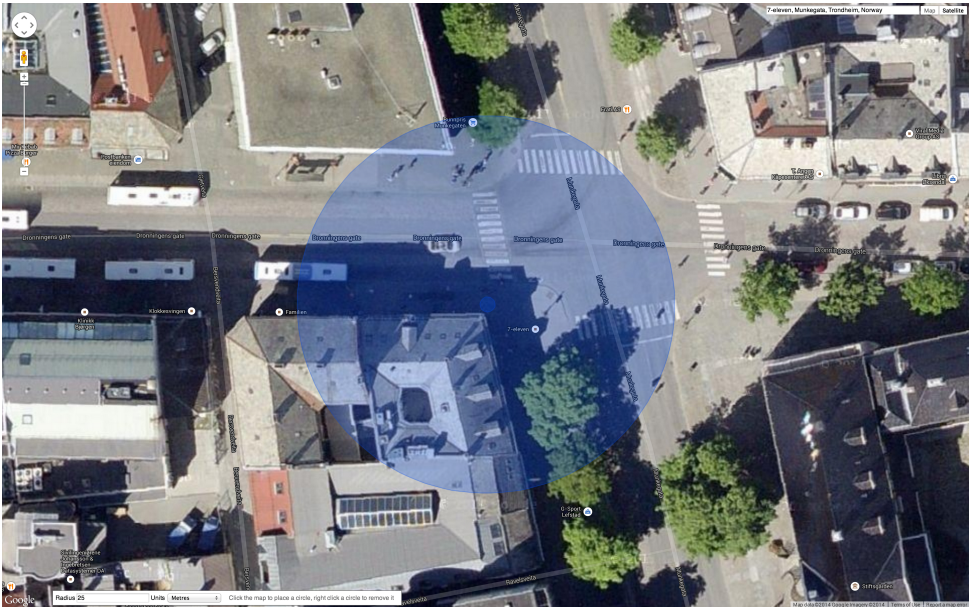


**Figure 6.3: Street View Of The Location.** In this picture we can see the street view of the shop that was used as a testing location, related to figure 6.4.

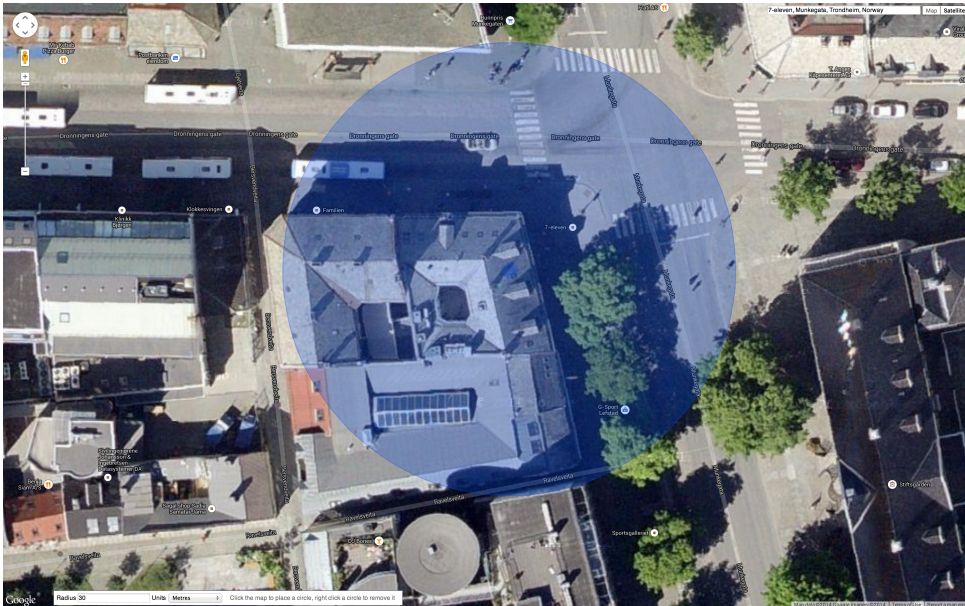


**Figure 6.4: Route For The Field Test.** This was the route that was used in the field test to test the proximity triggering of the geofences placed on top of or at the door of the 7-Eleven test store.





**Figure 6.5: Visualization of One of The Geofences Placed By the Store Entrance.** Above you can see one of the geofences placed outside the entrance of the store, in order to test if it triggered for the walk by and walk in test. The small dot in the middle (although it has a radius) represents the point position, while the large circle shows the geofence with its entire radius.



**Figure 6.6: Visualization of One of The Geofences Placed On the Store Center.** Above you can see one of the geofences placed on the center of the store, rather than by the entrance, but still similar to figure 6.5.

### 6.3 Results of the Field Test

The results of the field test can be seen in tables 6.1 and 6.2 on pages 47 and 47.

### 6.4 Conclusion and Discussion of the Field Test

The general conclusion of the field test was that Google's API (through the use of their example code) was very unstable, and not suited for the offers app, if the offers app intend to give users offers only when they are inside a store.

A radius of from 100-50 meters of the entrance seems to be necessary to trigger at all, but then it will trigger for both if the users walks by and walks in.

If Google's API is to be used one would at least have to add some sort of artificial intelligence to the app to help predict when the user actually is in the store. This could maybe be done by noting the direction he is heading and then triggering the offer when the accuracy goes drastically down, which would assume he was indoors and lost GPS. This would of course not work for large indoor malls and

Geofence Radius	Walk By Triggered?	Walk In Triggered?
100m	yes	yes
75m	yes	yes
60m	yes	no
50m	yes	no
40m	no	no
30m	no	no
20m	no	no
15m	no	no

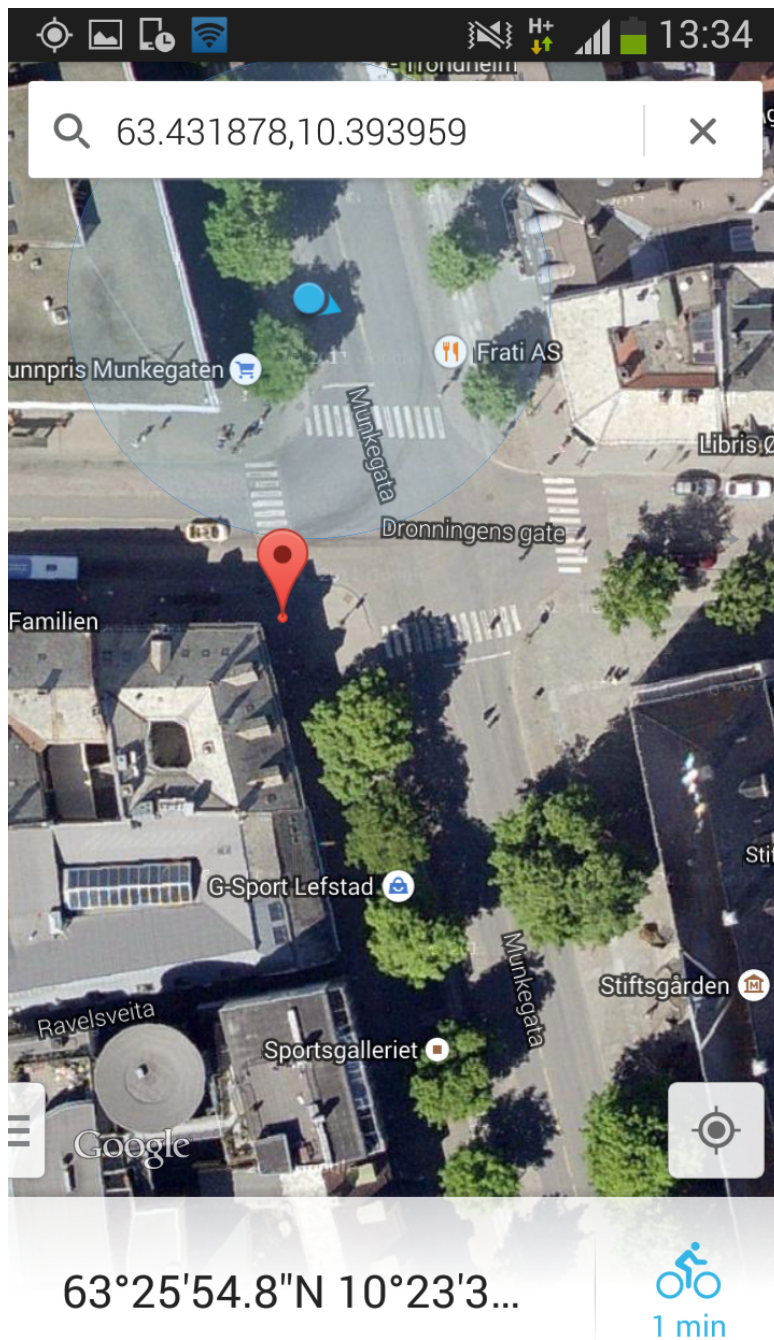
**Table 6.1: Field Test Results Triggering, Geofence Centered By Store Entrance.** The table above shows which geofence radiuses triggered the *user entered geofence event* for when the test user walked by and walked inside the store. The geofence center was placed right outside the store.

Geofence Radius	Walk By Triggered?	Walk In Triggered?
50m	no	no
40m	no	no
30m	no	no
25m	no	no
20m	no	no
15m	no	no

**Table 6.2: Field Test Results Triggering, Geofence Centered On Center of the Store.** The table above shows which geofence radiuses triggered the *user entered geofence event* for when the test user walked by and walked inside the store. The geofence center was placed on the center of the store.

such.

For the field test the author created a tool for getting the geolocation in the mobile browser. The source code can be seen in appendix E on page 101. While this tool, which in Chrome uses Google as geolocation provider, expressed a given position and an accuracy of 8 meters, the test user was in reality far from this point. One such example of instability is shown in figure 6.7 on page 48, but this was not a single incident.



**Figure 6.7: Inaccuracy of Google’s API.** The test user was in reality standing at the red marker, but according to the Google Maps app the user was located several meters further north. The test user is not actually within the zone of error (the bigger, blue, transparent, ring).

# Chapter 7

## Tracking Technologies

### 7.1 Introduction

Seeing as Google Locationing API was deemed to have to unstable accuracy an alternative method of tracking the user for the offers app is needed. A new and prominent technology for tracking devices that needs to be considered is the Ibeacon technology<sup>1</sup>, which uses Bluetooth Low Energy <sup>2</sup>. Another possible way of tracking the user is through a Wifi-positioning solution, such as indoor navigation product MazeMap<sup>3</sup> uses. A business which seemingly is on the forefront in combining indoor positioning technologies is SenionLab<sup>4</sup>, and also offers a possible solution.

### 7.2 Needs for the App

In order to find the best tracking solution we will first have to consider which criteria we want to meet for the offers app. The list of what is wanted would be the following:

1. Able to track when the user enters a store.
2. Energy efficient.
3. Cheap to implement/low costing equipment.

One could argue which of these criteria are the most important, but a simple way of summarizing the needs for the app is that we want to track when the user enters a store, using little energy, as cheaply as possible. Since the hypothesis of the whole app is that the user experience is paramount to the success of it, energy efficiency (i.e. not draining the battery) is prioritized over the cost of implementing.

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<sup>1</sup><http://en.wikipedia.org/wiki/IBeacon>, Friday 30<sup>th</sup> May, 2014.

<sup>2</sup>[http://en.wikipedia.org/wiki/Bluetooth\\_low\\_energy](http://en.wikipedia.org/wiki/Bluetooth_low_energy), Friday 30<sup>th</sup> May, 2014.

<sup>3</sup><https://mazemap.com/what-it-is>, Friday 30<sup>th</sup> May, 2014.

<sup>4</sup><http://www.senionlab.com/>, Friday 30<sup>th</sup> May, 2014.

### 7.3 Considering the Alternatives

Now knowing what we are seeking, we can evaluate the alternatives for tracking the app users. In the following subsections we will consider and discuss these different possible solutions for tracking users:

1. Ibeacon.
2. Wifi positioning.
3. SenionLab API or similar.

#### 7.3.1 Ibeacon Technology

The Ibeacon technology<sup>1</sup> is fairly new technology which uses Bluetooth Low Energy. Besides Wikipedia, a good article explaining Ibeacons can be found at <sup>5</sup> and <sup>6</sup>. In short, beacons emit a signal to let devices know their proximity to them.

Estimote, a company that sells physical beacons, indicate that you can set the power settings so that (mobile) devices notice them from 25 cm-70m range<sup>7</sup>. With a low power setting we would expect to have great accuracy, allowing us to track if the user enters a store precisely. More beacons could also be added for greater precision if needed.

#### 7.3.2 Wifi Positioning

Although Google already uses Wifi positioning in its Locationing API it might be possible to gain better accuracy using a dedicated Wifi positioning provider or system. There would be a need to do Wifi fingerprinting<sup>8</sup> in order to get more accurate positioning.

#### 7.3.3 SenionLab - Combining Technologies

SenionLab<sup>4</sup> is a company that currently has a product that uses several different technologies for tracking the user, and offers an Software Development Kit (SDK) for the developers/customers. They use Ibeacon, Wifi, and the devices own accelerometer and compass for determining the users position<sup>9</sup> <sup>10</sup>. Combining these technologies they seemingly are capable of staggering accuracy.

<sup>5</sup><http://www.ibeacon.com/what-is-ibeacon-a-guide-to-beacons/>, Friday 30<sup>th</sup> May, 2014.

<sup>6</sup><http://beekn.net/guide-to-ibeacons/>, Friday 30<sup>th</sup> May, 2014.

<sup>7</sup><http://estimote.com/>, under *Frequently Asked Questions*, Friday 30<sup>th</sup> May, 2014.

<sup>8</sup>[http://en.wikipedia.org/wiki/Wi-Fi\\_positioning\\_system](http://en.wikipedia.org/wiki/Wi-Fi_positioning_system), Friday 30<sup>th</sup> May, 2014.

<sup>9</sup><http://www.senionlab.com/solutions>, Friday 30<sup>th</sup> May, 2014.

<sup>10</sup><http://grizzlyanalytics.blogspot.no/2012/10/sensor-fusion-indoor-location-system-in.html>, Friday 30<sup>th</sup> May, 2014.

## 7.4 The Best Fit For the App

The SenionLab solution does indeed seem like the most accurate and sophisticated system for tracking users, and we undoubtedly would be able to track the user with high precision. However, since the needs of the app is simply tracking when he enters the doors of a store, this system seems to be a bit more than what is needed. Surely SenionLab would require some sort of royalties or payment for the use of their product, and their solution requires some calibration and Wifi fingerprinting<sup>11</sup>.

The need to do Wifi-fingerprinting would of course also be present with any Wifi positioning system. And even with this we might still not get precise enough tracking of the user.

The most fitting solution for the app would then seem to be an Ibeacon solution. This would give good enough precision to track when the user enters a store, while most likely being the cheapest alternative, since we don't have to pay any royalties or payments other than buying beacons.

### 7.4.1 Evaluating Needs for the App

Before concluding on Ibeacons as the best alternative for tracking the user for the offers app we have to properly review how they stack up against the needs of the app (section 7.2 on page 49).

1. It would be able to accurately detect when the user is within range, i.e. detecting entry into a store.
2. Using Bluetooth Low Energy it would be energy efficient.
3. The cost of implementing would be about the cost of code implementation plus about one beacon per storefront. Estimote<sup>7</sup> sells beacons at \$ 33 per device, and you can probably find cheaper ones too. Except for replacing batteries this is a one time cost for each storefront. If the product becomes successful we would expect to easily earn in the cost of buying the devices.

### 7.4.2 A Note on the User Experience of Ibeacons

As well as considering the needs for the app we also need to try to evaluate how Ibeacons as the tracking technology would affect the user experience.

One aspect to consider in regards to the user experience of Ibeacons for tracking the user is that the device has to have Bluetooth active to detect the beacons.

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<sup>11</sup><http://www.senionlab.com/products/android>, Friday 30<sup>th</sup> May, 2014.

Bluetooth Low Energy is very energy efficient, but it would of course drain some battery. Both Ios and Android natively support Bluetooth Low Energy<sup>2</sup>. Since this project and app is placing such a high focus on user experience we would have to consider how we tell the user that Bluetooth needs to be enabled. If the user *believes* the app or Bluetooth is draining the phone's battery, even if it isn't to any greater degree, it would result in a worse user experience. We might be able to avoid this problem simply by explaining it nicely the first time the app is started/installed.

One possible way to circumvent this problem could be by fusing the Bluetooth positioning with Google Locationing API. We could define larger geofences around storefronts wherein entering them then would activate the devices Bluetooth sensors, and exiting them would disable it, if not turned on or used by the user himself. If this is a more energy efficient solution it should be considered for implementation after the app has had some success, as it is likely not the biggest concern. This was also indicated by the questionnaire (chapter 5), not to many people worried about the affect on the battery life. This is of course under the prerequisite that people generally have Wifi and/or GPS active most of the time, if not Bluetooth. Although the author does not have any hard data at hand for this, it seems most people generally have Wifi or GPS active most of the time, at least more so than Bluetooth.



# Chapter 8

## Discussion

### 8.1 A Note On The Test Users Of The Usability Tests

The test users work at NTNU IT Orakeltjenesten as Help Desk Consultants, i.e. they help NTNU students with technical problems, and are in general very tech savvy. They have a lot more technical experience than the average users, and one would expect them to be able to understand a lot more complicated systems. This could give an incorrect measurement of how easy or hard the app was to use, maybe skewing it in the direction of easy more than it should.

With that said the authors belief and experience during the testing was that due to their long experience in helping users with a range of problems, they had a very keen eye for detecting and finding problems that would confuse a normal user. I found that their feedback was so good and extensive in the first usability testing that I preferred to use more of my coworkers for the second test, even though that wasn't the initial idea. Many of them also had experience with usability testing beforehand, which again made them very comfortable testing the app and giving (negative) feedback without hesitation.

### 8.2 Acquaintances and Friends

A big issue in regards to the usability tests, interviews and questionnaire is that I personally know and/or is acquainted or friends with most of the people who have contributed with feedback. Since most people in this category wish me well it is very reasonable to assume that some of the participants have given overly positive feedback. As a consequence the results may also be overly optimistic.

These pitfalls were however known to the author beforehand and chosen nonetheless. The main reason for this was to speed up the project, as lack of time was an issue. The author also believed that with the right wording, emphasizing on only honest

opinions, the feedback would be more or less true. Also, due to the entrepreneurial aspects of the project, which also was emphasized, *friendly* feedback wouldn't be feedback that was dishonestly positive, as this would be of negative value to me. Due to the high number of intellectuals in the author's social network, this would hopefully be understood implicitly.

The very direct, and sometimes harsh, feedback from the first usability testing assured the author that the pitfall of overly positive feedback due to friendship could be avoided. The author has the same feeling about the questionnaire submissions, which also sometimes are harsh, that people have given their honest opinions.

### 8.3 Imperfect Methods

The field test (chapter 6) is not meant as scientific method of measuring the accuracy, performance and reliability of Google's API's. The method of field testing Google's sample app was chosen to easily and pragmatically determine if the Google API would be fitting to use for the offers app or not.

### 8.4 A Prototype Without All The Functionality

Seeing as this thesis ended up focusing mostly on the user experience the focus on finishing a working prototype with all the wanted functionality was deprioritized in favor of doing the field test. The reasoning for this was that it was important to find out if the technology would be good enough for our purposes before we actually took the time it would require to implement it. Seeing as the technology was deemed to inaccurate for the offers app, and the implementation time could have been quite long, this was in retrospect considered a very fortunate prioritization by the author.

Because of this focus on user experience we at least have a user interface which has gotten quite high SUS ratings and can be deemed finished even if we don't have the fitting technology for tracking the user implemented yet. We were also able to identify which technology (Ibeacons) we want to use in the future.

### 8.5 How Accurate Tracking is Needed?

In chapter 7 we have discussed which technologies are suited for the app, as it intends to track when the user enters a store. Why only when the user enters a store, and not when the user is nearby? This has to be addressed and justified. In the early stages of the project triggering on close range to a given storefront, not just entering, was considered okay. However, due to the feedback from the interviews and questionnaire it is the author's belief that this would result in a lower user experience. Many people

noted that the app would have to "not be annoying" and not notify them when they were only strolling by the store.

It might be feasible and acceptable to give the user notifications when he is right outside the store door, even if he is just walking by, but this needs to be investigated further. In any case it seems we would need to fine tune the triggering proximity and experiment with it, something that we have found not possible with the Google Locationing API. A single beacon would allow us to experiment with the triggering range properly, and it seems beacons are the right fit for the technical solution in general.

## 8.6 Quality of Offers is of the Essence

As mentioned in the questionnaire chapter (5), the quality of the offers are paramount to the user experience of the app. If the offers aren't good enough the app would fail. Creating good offers, both good for the user and revenue gaining for businesses, could be a project of its own.

For the app to be successful we would most likely have to use a large amount of time crafting the earliest offers, in cooperation with pilot actors. Working together we should be able to find offers which work for both them and the customers.

While the earliest offers could be generic, and the same for all users, we could aim for giving users completely personalized offers in the future. This could be done by tracking where users are in the store, using more tracking, and use the information to identify which items the user has been near the longest. One could then guess that the user is interested in that item, and a discount (offer) could be given in order to get the user to buy.

One way of getting better offers for the users would be by giving businesses actors access to some of the information gathered by the app. In trade for having to give the users good offers, the actor could be given anonymous statistics, such as how many people enter the store each day, when traffic is at its highest, etc. For actors who have member cards, e.g. Coop, one possibility would be linking member cards to users in the app. Then you would be able to link positioning information with what the user actually bought.

The possibilities for creating and gathering information that can be used for creating businesses revenue are quite a few. The central question to ask regarding this is *privacy*. What level of tracking are people willing to accept? The answer to this difficult question is quite simply that if we can't get good enough offers without

gathering and selling information about users, then we will have to do just that. If, however, it turns out that we can't get good enough offers and the mass of people are not willing to be tracked, then the app will fail. Although this seems stark, we know for a fact that people are willing to use Google Maps, which gathers a large amount of information about the users location<sup>1</sup>. With this in mind the prospects of the app does indeed seem a lot brighter.

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<sup>1</sup><http://www.google.com/policies/privacy/#infocollect>, Friday 30<sup>th</sup> May, 2014.

# Chapter 9

## Conclusion

In this paper we have shortly introduced some actors who also work within location based commercials, and touched on economic prospects and gains for society as motivation for the project.

We have found that GPS and Wifi positioning as used within Google Locationing API and geofences isn't a suitable alternative for tracking users. After realising this we have looked at alternatives; Ibeacons, proprietary Wifi positioning and solutions which gather several different technologies together to track users. From this we have found that Ibeacons would be the most fitting tracking technology for the offers app, with high accuracy at close range, without too much complexity, other vendors or costs.

We can conclude that people are willing to use a service which gathers location based push messages actors into a single service from the usability testing done and questionnaire submissions. From this we see that many people are indeed willing to try the proposed offers app, while a minority of others feel rather strongly against it. Among those that feel strongly against it we see that the fear of spam being the biggest motivator.

A user interface was developed in order to demonstrate how such an app could deliver commercials to Android test users through notifications. The prototype made for the usability testing also gave test users example offers, but seeing as Google Locationing API was not deemed fit for tracking the user, the prototype is missing any tracking mechanism. Ibeacons tracking is planned to be implemented into the app in the future, after this project.



# Appendix

## Source Code For Usability Testing Round One

### A.1 Source Code on Server

Since we in the end wanted to end up with a design that would preferably work and look the same in both Android and Ios, the interface was made using HyperText Markup Language version 5 (HTML5), Cascading Style Sheets version 3 (CSS3) and JavaScript. The front-end framework Bootstrap<sup>1</sup> was used to speed development up. In addition to giving fast development and prototyping, the use of these technologies and this framework means we can make designs which look good on all devices. For the authors ease these files were placed on a server, while the Android app was directed to them, which meant that we could change the files without having to recompile the Android app.

```
1 <!doctype html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/
6     bootstrap/3.1.0/css/bootstrap.min.css">
7   <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/
8     bootstrap/3.1.0/css/bootstrap-theme.min.css">
9   <script src="//code.jquery.com/jquery-1.11.0.min.js"></script>
10  <script src="//netdna.bootstrapcdn.com/bootstrap/3.1.1/js/bootstrap.
11    min.js"></script>
12  <script src="BusinessClickWidget.js"></script>
13  <script src="global.js"></script>
14  <link rel="stylesheet" href="style.css">
15  <title>Velg bedrifter</title>
16 </head>
17 <body>
18 <nav>
19   <p>Velg bedrifter du vil ha tilbud fra</p>
20 </nav>
```

<sup>1</sup><http://getbootstrap.com/>, Friday 30<sup>th</sup> May, 2014.

```

19 <div class="container-fluid">
20   <div class="row">
21     <div class="col-xs-4">
22       <a class="thumbnail" href="#">
23         
26         <button type="button" class="btn btn-default btn-lg btn-
27         block">7-Eleven</button>
28       </a>
29     </div>
30     <div class="col-xs-4">
31       <a class="thumbnail" href="#">
32         
34         <button type="button" class="btn btn-default btn-lg btn-
35         block">Rema 1000</button>
36       </a>
37     </div>
38     <div class="col-xs-4">
39       <a class="thumbnail" href="#">
40         
42         <button type="button" class="btn btn-default btn-lg btn-
43         block">Narvesen</button>
44       </a>
45     </div>
46   </div>
47 </div>
48 <div class="row">
49   <div class="col-xs-4">
50     <a class="thumbnail" href="#">
51       
53       <button type="button" class="btn btn-default btn-lg btn-
54       block">Trondheim Torg</button>
55     </a>
56   </div>
57   <div class="col-xs-4">
58     <a class="thumbnail" href="#">
59       
62       <button type="button" class="btn btn-default btn-lg btn-
63       block">Dromedar kaffebar</button>
64     </a>
65   </div>
66   <div class="col-xs-4">
67     <a class="thumbnail" href="#">
68       

```



```
57         <button type="button" class="btn btn-default btn-lg btn-  
block">Deli de Luca</button>  
59     </a>  
61     </div>  
63 </div>  
65 </body>  
67 </html>
```

**Listing A.1: user\_prototype.html.** This is the HTML file which holds the actors the users can select. It uses *BusinessClickWidget.js* and *style.css* to present the users the actors and allow him to click them.

```

1  var s,
2  BusinessClickWidget = {
3
4      settings: {
5          businesses: '.thumbnail',
6          toToggle: 'button'
7      },
8
9      init: function () {
10         s = this.settings;
11         this.bindUIActions();
12     },
13
14     bindUIActions: function() {
15         $(s.businesses).click(function() {
16             BusinessClickWidget.toggleBusiness(this);
17         });
18     },
19
20     toggleBusiness: function(business) {
21         $(business).find(s.toToggle)
22             .toggleClass('active')
23             .toggleClass('btn-default')
24             .toggleClass('btn-success');
25     }
26 };

```

**Listing A.2: BusinessClickWidget.js.** This JavaScript file toggled the button of the clicked business toggling the class of the button between 'btn-default' and 'btn-success'. The file follows the Module Pattern for JavaScript (<http://goo.gl/MZ6WzC>).

```
1 (function() {  
3     $(document).ready(function() {  
5         BusinessClickWidget.init();  
7     });  
9 })();
```

**Listing A.3:** `global.js`. This JavaScript file simply initiates the *BusinessClickWidget* class as used in the Module Pattern for JavaScript.

```
1  nav {  
2    width: 100%;  
3    height: 70px;  
4    background-color: black;  
5    margin-bottom: 70px;  
6    color: white;  
7    font-size: 36px;  
8    vertical-align: auto;  
9    text-align: center;  
10 }  
11  
12 nav p {  
13   padding-top: 5px;  
14 }  
15  
16 .row {  
17   margin-bottom: 40px;  
18 }  
19  
20 img {  
21   max-height: 264px;  
22   min-height: 264px;  
23 }  
24  
25 a:hover {  
26   text-decoration: none;  
27 }
```

**Listing A.4:** style.css. The CSS file which was important for the usability testing.

## A.2 Source Code for Mobile Apps

### A.2.1 Source Code For Viewing the Offer Application

```

1 <?xml version="1.0" encoding="utf-8"?>
2 <manifest xmlns:android="http://schemas.android.com/apk/res/android"
3     package="no.ntnu.item.locationingpushmessages"
4     android:versionCode="1"
5     android:versionName="1.0" >
6
7     <uses-sdk
8         android:minSdkVersion="16"
9         android:targetSdkVersion="18" />
10
11     <uses-permission android:name="android.permission.VIBRATE" />
12     <uses-permission android:name="android.permission.WAKE_LOCK" />
13     <uses-permission android:name="android.permission.INTERNET" />
14
15     <application
16         android:allowBackup="true"
17         android:icon="@drawable/ic_launcher"
18         android:label="@string/app_name"
19         android:theme="@style/AppTheme" >
20         <activity
21             android:theme="@android:style/Theme.NoTitleBar"
22             android:name="no.ntnu.item.locationingpushmessages.
23             MainActivity"
24             android:label="@string/app_name" >
25             <intent-filter>
26                 <action android:name="android.intent.action.MAIN" />
27
28                 <category android:name="android.intent.category.
29             LAUNCHER" />
30             </intent-filter>
31         </activity>
32         <service
33             android:name="BackgroundService"
34             android:icon="@drawable/ic_launcher"
35             android:label="@string/app_name"
36             >
37         </service>
38         <receiver android:process=":remote" android:name="Alarm" </
39         receiver>
40     </application>
41 </manifest>

```

**Listing A.5: AndroidManifest.xml - Manifest for the Android App.** The most important thing to note about the file are the permissions which are needed in order to vibrate the phone even though the phone is in deep sleep (not active). The manifest file was about the same for all versions of the app.

```

1 package no.ntnu.item.locationingpushmessages;
2
3 import android.os.Bundle;
4 import android.app.Activity;
5 import android.view.Menu;
6 import android.webkit.WebView;
7
8 public class MainActivity extends Activity {
9
10     @Override
11     protected void onCreate(Bundle savedInstanceState) {
12         super.onCreate(savedInstanceState);
13         loadWebPage();
14     }
15
16     private void loadWebPage() {
17         WebView webview = new WebView(this);
18         webview.setWebViewClient(new ProjectWebViewClient());
19         setContentView(webview);
20         webview.getSettings().setJavaScriptEnabled(true);
21         webview.getSettings().setLoadWithOverviewMode(true);
22         webview.getSettings().setUseWideViewPort(true);
23         webview.loadUrl("http://spoon.orakel.ntnu.no/master/");
24     }
25
26     @Override
27     public boolean onCreateOptionsMenu(Menu menu) {
28         // Inflate the menu; this adds items to the action bar if it is
29         // present.
30         getMenuInflater().inflate(R.menu.main, menu);
31         return true;
32     }
33 }

```

**Listing A.6: MainActivity.java.** This Android Activity class which is used when the app is launched for the first scenario of the usability testing i.e. letting the user select actors to subscribe to. The *loadWebPage()* function loads the *user\_prototype.html* file from the server and uses it as the interface for the app.

```
1 package no.ntnu.item.locationingpushmessages;
2
3 import android.webkit.WebView;
4 import android.webkit.WebViewClient;
5
6 public class ProjectWebViewClient extends WebViewClient {
7
8     @Override
9     public boolean shouldOverrideUrlLoading(WebView view, String url) {
10         view.loadUrl(url);
11         return true;
12     }
13 }
```

**Listing A.7: ProjectWebViewClient.java.** This class extends the Android `WebViewClient` and overrides the `shouldOverrideUrlLoading` function so the user can click on links without exiting the app and launching the standard web browser.

### A.2.2 Source Code for Triggering An Offer Example

```
1 package no.ntnu.item.locationingpushmessages;
2
3 import android.os.Bundle;
4 import android.app.Activity;
5 import android.view.Menu;
6
7 public class MainActivity extends Activity {
8
9     @Override
10    protected void onCreate(Bundle savedInstanceState) {
11        super.onCreate(savedInstanceState);
12        Alarm alarm = new Alarm();
13        alarm.setAlarm(this);
14    }
15
16    @Override
17    public boolean onCreateOptionsMenu(Menu menu) {
18        // Inflate the menu; this adds items to the action bar if it is
19        // present.
20        getMenuInflater().inflate(R.menu.main, menu);
21        return true;
22    }
23 }
```

**Listing A.8: MainActivity.java.** This version of the MainActivity class was used in order to trigger an example offer for the test users. It simply creates an instance of the *Alarm* class and sets the alarm up.



```

1 package no.ntnu.item.locationingpushmessages;

3 import android.app.AlarmManager;
4 import android.app.NotificationManager;
5 import android.app.PendingIntent;
6 import android.app.TaskStackBuilder;
7 import android.content.BroadcastReceiver;
8 import android.content.Context;
9 import android.content.Intent;
10 import android.net.Uri;
11 import android.os.PowerManager;
12 import android.os.Vibrator;
13 import android.support.v4.app.NotificationCompat;
14 import android.util.Log;
15 import android.widget.Toast;

17 public class Alarm extends BroadcastReceiver {

19     @Override
20     public void onReceive(Context context, Intent intent) {

21         PowerManager pm = (PowerManager) context.getSystemService(Context.
22             POWER_SERVICE);
23         PowerManager.WakeLock wl = pm.newWakeLock(PowerManager.
24             PARTIAL_WAKE_LOCK, "");
25         wl.acquire();

26         Vibrator v = (Vibrator) context.getSystemService(Context.
27             VIBRATOR_SERVICE);
28         int seconds = 1 * 1000;
29         v.vibrate(seconds);

30         NotificationCompat.Builder mBuilder = new NotificationCompat.
31             Builder(context);
32         mBuilder.setSmallIcon(R.drawable.seven_eleven);
33         mBuilder.setContentTitle("Local offer available");
34         mBuilder.setContentText("Free coffee! Click for info.");
35         Intent resultIntent = new Intent(Intent.ACTION_VIEW, Uri.parse("
36             http://spoon.orakel.ntnu.no/master/example_offer.html"));

37         TaskStackBuilder stackBuilder = TaskStackBuilder.create(context);
38         stackBuilder.addParentStack(MainActivity.class);
39         stackBuilder.addNextIntent(resultIntent);
40         PendingIntent resultPendingIntent =
41             stackBuilder.getPendingIntent(
42                 0,
43                 PendingIntent.FLAG_UPDATE_CURRENT
44             );
45         mBuilder.setContentIntent(resultPendingIntent);
46         NotificationManager mNotificationManager = (NotificationManager)
47             context.getSystemService(Context.NOTIFICATION_SERVICE);

```

```
    mNotificationManager.notify(1, mBuilder.build());
47
    wl.release();
49 }
51 public void setAlarm(Context context) {
    AlarmManager am = (AlarmManager)context.getSystemService(Context.
    ALARM_SERVICE);
53     Intent i = new Intent(context, Alarm.class);
    PendingIntent pi = PendingIntent.getBroadcast(context, 0, i, 0);
55     am.set(AlarmManager.RTC_WAKEUP, System.currentTimeMillis() + 1000
    * 10, pi); // millisec * second
    }
57 }
```

**Listing A.9: Alarm.java.** The Alarm class extends the Android *BroadcastReceiver* class in order to give the user a notification (with vibration) 10 seconds after the *setAlarm* function is called.

# Appendix **B**

## Source Code For Usability Testing Round Two

Only the files mentioned below were changed since the first round of usability testing.

```
1 <!doctype html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta name="viewport" content="width=device-width, user-scalable=no"
6     >
7   <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/
8     bootstrap/3.1.0/css/bootstrap.min.css">
9   <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/
10     bootstrap/3.1.0/css/bootstrap-theme.min.css">
11   <link href="//netdna.bootstrapcdn.com/font-awesome/4.0.3/css/font-
12     awesome.css" rel="stylesheet">
13   <script src="//code.jquery.com/jquery-1.11.0.min.js"></script>
14   <script src="//netdna.bootstrapcdn.com/bootstrap/3.1.1/js/bootstrap.
15     min.js"></script>
16   <script src="BusinessClickWidget.js"></script>
17   <script src="global.js"></script>
18   <link rel="stylesheet" href="style.css">
19   <link rel="icon" type="image/png" href="favicon.png">
20   <title>Velg bedrifter</title>
21 </head>
22 <body>
23   <nav>
24     <p>Velg bedrifter du vil ha tilbud fra</p>
25   </nav>
26
27   <div id="alerts" class="alert alert-success"></div>
28
29   <div class="container-fluid">
30
31     <div class="row">
32       <div class="col-xs-4">
33         <a class="thumbnail" href="#">
34           
32     <i class="fa fa-square-o"></i>
33     </a>
34     <div class="name">7-Eleven</div>
35 </div>
36 <div class="col-xs-4">
37     <a class="thumbnail" href="#">
38         
39         <i class="fa fa-square-o"></i>
40         </a>
41         <div class="name">Rema 1000</div>
42     </div>
43 <div class="col-xs-4">
44     <a class="thumbnail" href="#">
45         
46         <i class="fa fa-square-o"></i>
47         </a>
48         <div class="name">Narvesen</div>
49     </div>
50 </div>
51 <div class="row">
52     <div class="col-xs-4">
53         <a class="thumbnail" href="#">
54             
55             <i class="fa fa-square-o"></i>
56             </a>
57             <div class="name">Trondheim Torg</div>
58         </div>
59     <div class="col-xs-4">
60         <a class="thumbnail" href="#">
61             
62             <i class="fa fa-square-o"></i>
63             </a>
64             <div class="name">Dromedar kaffebar</div>
65         </div>
66     <div class="col-xs-4">
67         <a class="thumbnail" href="#">
68             
69             <i class="fa fa-square-o"></i>
70             </a>
71             <div class="name">Deli de Luca</div>
72         </div>
73     </div>
74 </div>

```

```
</body>  
77 </html>
```

**Listing B.1: user\_\_prototype.html.** The file is much the same as listing A.1 but some minor cosmetic changes were done.

```

1  var s,
2  BusinessClickWidget = {
3
4  settings: {
5      businesses: '.col-xs-4',
6      toToggle: 'i',
7      subscribe_message_box: "#alerts",
8      subscribe_message_time: 1100,
9      subscribe_message_time_fadeout: 0,
10     subscribe_message: " lagret.",
11     unsubscribe_message: " deaktivert.",
12     business_id: 'div.name'
13 },
14
15 init: function () {
16     s = this.settings;
17     this.bindUIActions();
18     $(s.subscribe_message_box).hide();
19 },
20
21 bindUIActions: function() {
22     $(s.businesses).click(function() {
23         BusinessClickWidget.toggleBusiness(this);
24     });
25 },
26
27 toggleBusiness: function(business) {
28
29     $(business).find(s.toToggle)
30         .toggleClass('fa-square-o')
31         .toggleClass('fa-check-square-o');
32
33     var active = $(business).find('i').first().attr('class').indexOf('
34     fa-check-square-o') != -1;
35     var business_name = $(business).first().find(s.business_id).first
36     ().text();
37
38     if (active) {
39         $(s.subscribe_message_box)
40             .html(business_name + s.subscribe_message)
41             .removeClass("alert-info")
42             .addClass("alert-success");
43     }
44     else {
45         $(s.subscribe_message_box)
46             .html(business_name + s.unsubscribe_message)
47             .addClass("alert-info")
48             .removeClass("alert-success");
49     }
50
51     if (typeof timeout !== 'undefined') {

```

```
51     clearTimeout(timeout);  
52   }  
53   $(s.subscribe_message_box)  
54     .show();  
55  
56   timeout = setTimeout(function() {  
57     $(s.subscribe_message_box)  
58       .fadeOut(s.subscribe_message_time_fadeout);  
59   }, s.subscribe_message_time);  
60 }  
61 };
```

**Listing B.2: BusinessClickWidget.js** The BusinessClickWidget was largely rewritten in order for the webpage to display appropriate notifications when the user clicked actors. Some consideration had to go into the technical aspect of timing the notifications for them to show properly.

```
nav {  
2  width: 100%;  
3  height: 40px;  
4  background-color: #2e2e2e;  
5  margin-bottom: 40px;  
6  color: white;  
7  font-size: 22px;  
8  vertical-align: auto;  
9  text-align: center;  
10 }  
  
12 nav p {  
13   padding-top: 5px;  
14 }  
  
16 .alert {  
17   z-index: 1;  
18   position: fixed;  
19   width: 100%;  
20   top: 4%;  
21   font-size: 18px;  
22 }  
  
24 .row {  
25   margin-bottom: 40px;  
26 }  
  
28 div {  
29   font-size: 10px;  
30 }  
  
32 img {  
33   width: auto;  
34   max-height: 30px;  
35 }  
  
36 .thumbnail {  
37   margin-bottom: 3px;  
38 }  
  
40 span {  
41   font-size: 10px;  
42   vertical-align: middle;  
43 }  
  
44 a: hover {  
45   text-decoration: none;  
46 }  
48 }
```

**Listing B.3: style.css.** Some work went into changing the CSS-file so the actors page would give an even better user experience.



```

1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="utf-8">
5   <meta http-equiv="X-UA-Compatible" content="IE=edge">
6   <meta name="viewport" content="width=device-width, initial-scale=1">
7   <link rel="icon" type="image/png" href="http://upload.wikimedia.org/
8     wikipedia/en/thumb/d/d4/7-eleven-brand.svg/272px-7-eleven-brand.svg
9     .png">
10  <title>Gratis kaffe!</title>
11  <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/
12    bootstrap/3.1.0/css/bootstrap.min.css">
13  <link href="cover.css" rel="stylesheet">
14 </head>
15 <body>
16   <div class="site-wrapper">
17     <div class="site-wrapper-inner">
18       <div class="cover-container">
19         <div class="inner cover">
20           <h1 class="cover-heading">Ta en gratis kaffe Rosso</h1>
21           
23           <p class="lead">Ta deg en kopp kaffe og vis frem QR-koden i
24             kassa for &#229; f&#229; deg en helt gratis kaffe.</p>
25           
28           <p class="lead">
29             <a href="http://www.7-eleven.no/kaffekontrollor.aspx"
30               class="btn btn-lg btn-default">Mer info</a>
31           </p>
32         </div>
33       </div>
34     </div>
35   </div>
36 </body>
37 </html>

```

**Listing B.4: example\_offer.html.** The code for the new example offer created in order to better demonstrate how an offer would look like.



# Appendix C

## Source Code For Finalized Prototype

```
1 <!doctype html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta name="viewport" content="width=device-width, user-scalable=no"
6     >
7   <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/
8     bootstrap/3.1.0/css/bootstrap.min.css">
9   <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/
10     bootstrap/3.1.0/css/bootstrap-theme.min.css">
11   <link href="//netdna.bootstrapcdn.com/font-awesome/4.0.3/css/font-
12     awesome.css" rel="stylesheet">
13   <script src="//code.jquery.com/jquery-1.11.0.min.js"></script>
14   <script src="//netdna.bootstrapcdn.com/bootstrap/3.1.1/js/bootstrap.
15     min.js"></script>
16   <script src="jquery.cookie.js"></script>
17   <script src="BusinessClickWidget.js"></script>
18   <script src="global.js"></script>
19   <link rel="stylesheet" href="style.css">
20   <link rel="icon" type="image/png" href="favicon.png">
21   <link href='http://fonts.googleapis.com/css?family=Sigmar+One' rel='
22     stylesheet' type='text/css'>
23   <link href='http://fonts.googleapis.com/css?family=Prosto+One' rel='
24     stylesheet' type='text/css'>
25   <title>Locoffers</title>
26 </head>
27 <body>
28
29   <nav class="navbar navbar-default navbar-static-top" role="
30     navigation">
31     <div class="container-fluid">
32       <!-- Brand and toggle get grouped for better mobile display -->
33       <div class="navbar-header">
34         <a href="menu.html" class="black-link">
35           <button type="button" class="navbar-toggle">
36             <span class="glyphicon glyphicon-home"></span>
37           </button>
38         </a>
```

```

30         <span class="navbar-text pull-left">Velg akt&#248;rer du vil
32     ha tilbud fra</span>
34 </div>
36 </div>
38 </nav>
40 <div class="container-fluid">
42 <div class="row">
44 <div class="col-xs-4">
46 <a class="thumbnail" href="#">
48 
52 <i class="fa fa-square-o"></i>
54 </a>
56 <div class="name">7-Eleven</div>
58 </div>
60 <div class="col-xs-4">
62 <a class="thumbnail" href="#">
64 
66 <i class="fa fa-square-o"></i>
68 </a>
70 <div class="name">Rema 1000</div>
72 </div>
74 <div class="col-xs-4">
76 <a class="thumbnail" href="#">
78 
82 <i class="fa fa-square-o"></i>
84 </a>
86 <div class="name">Narvesen</div>
88 </div>
90 </div>
92 <div class="row">
94 <div class="col-xs-4">
96 <a class="thumbnail" href="#">
98 
102 <i class="fa fa-square-o"></i>
104 </a>
106 <div class="name">Trondheim Torg</div>
108 </div>
110 <div class="col-xs-4">
112 <a class="thumbnail" href="#">
114 
116 <i class="fa fa-square-o"></i>
118 </a>

```

```

76     <div class="name">Dromedar kaffebar</div>
77 </div>
78 <div class="col-xs-4">
79   <a class="thumbnail" href="#">
80     
81     <i class="fa fa-square-o"></i>
82   </a>
83   <div class="name">Deli de Luca</div>
84 </div>
85 <div class="col-xs-12 bottom-button">
86   <a href="info.html" type="button" class="btn btn-primary btn-
lg btn-block">Lagre akt&#248;rer</a>
87 </div>
88 </div>
89 <div class="row">
90 <div class="col-xs-4">
91   <a class="thumbnail" href="#">
92     
93     <i class="fa fa-square-o"></i>
94   </a>
95   <div class="name">G-Sport</div>
96 </div>
97 <div class="col-xs-4">
98   <a class="thumbnail" href="#">
99     
100     <i class="fa fa-square-o"></i>
101   </a>
102   <div class="name">XXL</div>
103 </div>
104 <div class="col-xs-4">
105   <a class="thumbnail" href="#">
106     
107     <i class="fa fa-square-o"></i>
108   </a>
109   <div class="name">Clas Ohlson</div>
110 </div>
111 <div class="col-xs-12 bottom-button">
112   <a href="info.html" type="button" class="btn btn-primary btn-
lg btn-block">Lagre akt&#248;rer</a>
113 </div>
114 </div>
115 </div>
116 </div>
117 </body>
118 </html>
120

```

---

**Listing C.1: user\_\_prototype.html.** For the finalized design there was added a new row of actors.

```

var s,
2 BusinessClickWidget = {
4   settings: {
      businesses: '.col-xs-4',
6     toToggle: 'i',
      business_id: 'div.name'
8   },
10  init: function () {
      s = this.settings;
12    this.bindUIActions();
      this.checkBusinessesAccordingToCookies();
14  },
16  bindUIActions: function () {
      $(s.businesses).click(function () {
18        BusinessClickWidget.toggleBusiness(this);
      });
20  },
22  toggleBusiness: function(business) {
      this.toggleBusinessClass(business);
24    var active = $(business).find('i').first().attr('class').indexOf('
fa-check-square-o') != -1;
    var businessName = $(business).first().find(s.business_id).first
      ().text();
26
    $.cookie(businessName, active);
28  },
30  toggleBusinessClass: function(business) {
      $(business).find(s.toToggle)
32    .toggleClass('fa-square-o')
      .toggleClass('fa-check-square-o');
34  },
36  checkBusinessesAccordingToCookies: function () {
      var allBussinesses = $(s.businesses);
38    for (var i = 0; i < allBussinesses.length; i++) {
        var business = allBussinesses[i];
40        var businessName = $(business).first().find(s.business_id).
          first().text();
42
        if ($.cookie(businessName) == 'true') {
44          this.toggleBusinessClass(business);
        }
46    }
48  };

```

**Listing C.2: BusinessClickWidget.js.** The final version was again rewritten to save clicked actors to a cookie which was again read from when first opening the web page.



```
html,
2 body {
3     height: 100%;
4     width: 100%;
5 }
6
7 img {
8     max-height: 60px;
9 }
10
11 .navbar-toggle {
12     display: block;
13 }
14
15 .navbar-text {
16     font-size: 18px;
17     margin-left: 10px;
18 }
19
20 .black-link {
21     color: black;
22 }
23
24 .row {
25     margin-bottom: 10px;
26 }
27
28 .thumbnail {
29     margin-bottom: 3px;
30 }
31
32 a:hover {
33     text-decoration: none;
34 }
35
36 .bottom-button {
37     position: fixed;
38     bottom: 10px;
39 }
```

**Listing C.3:** style.css. The final version of the CSS-file.

```
1 <!doctype html>
2 <html lang="en">
3 <head>
4   <meta http-equiv="refresh" content="0; url=menu.html" />
5 </head>
6 </html>
```

**Listing C.4: index.html.** The index.html file which simply forwarded the web browser to the *menu.html* file.

```

1 <!doctype html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta name="viewport" content="width=device-width, user-scalable=no"
6     >
7   <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/
8     bootstrap/3.1.0/css/bootstrap.min.css">
9   <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/
10    bootstrap/3.1.0/css/bootstrap-theme.min.css">
11   <link href="//netdna.bootstrapcdn.com/font-awesome/4.0.3/css/font-
12    awesome.css" rel="stylesheet">
13   <script src="//code.jquery.com/jquery-1.11.0.min.js"></script>
14   <script src="//netdna.bootstrapcdn.com/bootstrap/3.1.1/js/bootstrap.
15    min.js"></script>
16   <link rel="stylesheet" href="style.css">
17   <link rel="icon" type="image/png" href="favicon.png">
18   <link href='http://fonts.googleapis.com/css?family=Sigmar+One' rel='
19     stylesheet' type='text/css'>
20   <link href='http://fonts.googleapis.com/css?family=Prosto+One' rel='
21     stylesheet' type='text/css'>
22   <title>Locoffers</title>
23 </head>
24 <body>
25   <nav class="navbar navbar-default navbar-static-top" role="
26     navigation">
27     <div class="container-fluid">
28       <!-- Brand and toggle get grouped for better mobile display -->
29       <div class="navbar-header">
30         <a href="menu.html" class="black-link">
31           <button type="button" class="navbar-toggle btn active">
32             <span class="glyphicon glyphicon-home"></span>
33           </button>
34         </a>
35         <span class="navbar-text pull-left">Locoffers - lokale tilbud<
36         /span>
37       </div>
38     </div>
39   </nav>
40
41   <div class="container-fluid">
42     <div class="well">
43       <p class="lead">Med denne appen f&#229;r du tilbud i butikkene
44       du faktisk er innom og vil ha tilbud fra!</p>
45     </div>
46     <div class="row">
47       <div class="col-xs-12">
48         <a href="user_prototype.html" type="button" class="btn btn-
49         primary btn-lg btn-block">Velg akt&#248;rene du vil ha tilbud fra</
50         a>
51       </div>

```

```
40     </div>
42 </div>
44 </body>
</html>
```

**Listing C.5: menu.html.** The source code for the landing page when you open the app. The main content is an explanation of the app.

```

1 <!doctype html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta name="viewport" content="width=device-width, user-scalable=no"
6     >
7   <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/
8     bootstrap/3.1.0/css/bootstrap.min.css">
9   <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/
10     bootstrap/3.1.0/css/bootstrap-theme.min.css">
11   <link href="//netdna.bootstrapcdn.com/font-awesome/4.0.3/css/font-
12     awesome.css" rel="stylesheet">
13   <script src="//code.jquery.com/jquery-1.11.0.min.js"></script>
14   <script src="//netdna.bootstrapcdn.com/bootstrap/3.1.1/js/bootstrap.
15     min.js"></script>
16   <link rel="stylesheet" href="style.css">
17   <link rel="icon" type="image/png" href="favicon.png">
18   <link href='http://fonts.googleapis.com/css?family=Sigmar+One' rel='
19     stylesheet' type='text/css'>
20   <link href='http://fonts.googleapis.com/css?family=Prosto+One' rel='
21     stylesheet' type='text/css'>
22   <title>Locoffers</title>
23 </head>
24 <body>
25
26   <nav class="navbar navbar-default navbar-static-top" role="
27     navigation">
28     <div class="container-fluid">
29       <!-- Brand and toggle get grouped for better mobile display -->
30       <div class="navbar-header">
31         <a href="menu.html" class="black-link">
32           <button type="button" class="navbar-toggle">
33             <span class="glyphicon glyphicon-home"></span>
34           </button>
35         </a>
36         <span class="navbar-text pull-left">Du er n&#229; klar for
37           &#229; f&#229; tilbud</span>
38       </div>
39     </div>
40   </nav>
41
42   <div class="container-fluid">
43     <div class="alert alert-success">
44       <p class="lead">Du har n&#229; valgt bedrifter og neste gang du
45         bes&#248;ker en av deres butikker eller er rett i n&#230;rheten vil
46         du f&#229; tilbud fra de.</p>
47       <br>
48       <p class="lead">Alt du trenger &#229; gj&#248;re er &#229; bes
49         &#248;ke stedene du uansett bes&#248;ker!</p>
50     </div>
51   </div class="row">

```

```
41     <div class="col-xs-12">
42         <a href="menu.html" type="button" class="btn btn-primary btn-
43         lg btn-block">Ok</a>
44     </div>
45 </div>
47 </body>
</html>
```

**Listing C.6: info.html.** This is the source for the page you landed on when you finished selecting actors shortly explaining what to do next.

Appendix **D**  
**All Answers From The  
Questionnaire**

Tidsmerke	Ville du samsvilg/vis lasst ned/grvd er slik app?	Kryss av for de pstandene du fcler deg enig i, og la de du er uenige i s!n utvnlking.	Hvor positive/engstive fclere f!r du for en slik app?	Hva syns du om et slikt produkt?	Hvorfor ville du ikke ha lasst ned en slik app?	Hva ville gjort en slik app s! bra at du ville brukt den?	Kjenn	Alder	Hvilken type telefon har du?	Kommentarer/innspill
26.03.2014 Kl. 13.31.01	Ja	Tor det vil v!re nyttig/eg liker tanken. Jeg liker at jeg kan velge akt!rer. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg f!r.	6	Fcler det bli/til som problemt svar p! reklamene som kommer i posen?	Ikke interessert i mer reklame		Kvinne	18-24	Android	
26.03.2014 Kl. 13.33.45	Ja	Om jeg lasst ned appen er veldig avhengig av hvilke tilbud jeg f!r. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg f!r.	4	Fcler det bli/til som problemt svar p! reklamene som kommer i posen? Spennende ide, men kanskje ikke revolusjonerende. Usikker p! om det er noe man bare g!rder en uke, eller om man holder det g!rende.	Ikke interessert i mer reklame		Kvinne	25-34	iPhone	
26.03.2014 Kl. 13.34.16	Ja	Tor det vil v!re nyttig/eg liker tanken. Jeg liker at jeg kan velge akt!rer. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg f!r.	6		Ikke interessert i mer reklame. Betyrninger rundt personvern		Mann	25-34	Android	
26.03.2014 Kl. 13.37.09	Nei	Jeg liker at jeg kan velge akt!rer. Jeg fcler appen er meningsl!s. Jeg er skeptisk til appen.	2	Jeg hater reklame			Mann	18-24	iPhone	
26.03.2014 Kl. 13.37.59	Ja	Tor det vil v!re nyttig/eg liker tanken. Jeg liker at jeg kan velge akt!rer. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg f!r.	6	Fint om jeg f!r rabatt p! ting jeg faktisk har lyst p! ansett.			Mann	25-34	Android	
26.03.2014 Kl. 13.39.12	Ja	Jeg liker at jeg kan velge akt!rer. Om jeg lasst ned appen er veldig avhengig av hvilke tilbud jeg f!r. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg f!r.	6				Kvinne	25-34	Android	
26.03.2014 Kl. 13.39.38	Ja	Tor det vil v!re nyttig/eg liker tanken. Jeg liker at jeg kan velge akt!rer. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg f!r.	7		Ikke interessert i mer reklame		Mann	18-24	iPhone	
26.03.2014 Kl. 13.40.46	Ja	Tor det vil v!re nyttig/eg liker tanken. Jeg liker at jeg kan velge akt!rer. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg f!r.	2	Er absolutt positiv! Kommer s!rlig/gedig an p! utvalget av f!rklarer som kommer inn p! min f!rklarer. Ser ut til at jeg liker dem. Men digger f! eks nettstedet, s! p!ns p! )			Kvinne	18-24	iPhone	
26.03.2014 Kl. 13.41.44	Nei	Jeg fcler appen er meningsl!s	7				Kvinne	18-24	Android	Narvesen har noe liknende, hvor du f!r notifikasjon n!r de har nye tilbud, og mange ganger er det faktisk ganske airtelle tilbud. Usikker p! om dette er en mulighet allerede, men enten ! kunne s!ke opp f! eks "sko"/et produkt ! se hvilke bukker som har tilbud innentor det tema. Eller kanskje "salier" og kunne f! treff p! hvem som har p! nat osv. B!re fors!g latt ut ifra hvordan flere bruker narvesen- appen.)
26.03.2014 Kl. 13.43.19	Ja	Tor det vil v!re nyttig/eg liker tanken. Jeg liker at jeg kan velge akt!rer. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg f!r.	7	Ideen er god, og det kan potensielt v!re noe man buker ofte.			Kvinne	25-34	Android	
26.03.2014 Kl. 13.43.38	Ja	Tor det vil v!re nyttig/eg liker tanken. Jeg liker at jeg kan velge akt!rer. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg f!r.	7	Som utlending s! kan jeg si f!lgende: utlendinger digger slike ting. N!r det er sagt, !en om drama f!r tak i en s!nn app, for da m! jeg til heivare bli plagd med ! bli dratt inn i butikkene for ! benytte oss av tilbudene...			Mann	25-34	Android	
26.03.2014 Kl. 13.43.36	Nei	Tor det vil v!re nyttig/eg liker tanken. Jeg liker at jeg kan velge akt!rer.	5		Ikke interessert i mer reklame		Mann	25-34	Android	
26.03.2014 Kl. 13.45.22	Ja	Jeg liker at jeg kan velge akt!rer. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg f!r. Jeg er skeptisk til appen.	7	S! berge den holder seg innenfor s! og n!r man s!r de der informasjonen, vil det slikt et andre akt!rer sender meg m!rrettel.			Mann	18-24	iPhone	
26.03.2014 Kl. 13.45.53	Ja	Tor det vil v!re nyttig/eg liker tanken. Jeg liker at jeg kan velge akt!rer. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg f!r.	7				Kvinne	25-34	iPhone	
26.03.2014 Kl. 13.46.46	Ja	Tor det vil v!re nyttig/eg liker tanken. Jeg liker at jeg kan velge akt!rer.	7				Mann	25-34	iPhone	



Tidsmerke	Ville du samsvilgvis læst ned/prøvd en slik app?	Kryss av for de påstandene du føler deg enig i, og la de du er uenige i stå uten avkryssing.	Hvor positive/engstive følelser får du for en slik app?	Hva syns du om et slikt produkt? Det er en app jeg tror har potensial. Men dette er veldig avhengig av hyppigheten på reklamer, og hva jeg får tilbud fra reklamen. Det må være tilbud som gjør det 'verd' å trykke hverdagen' med en notification.	Hvorfor ville du ikke ha læst ned en slik app?	Hva ville gjort en slik app så bra at du ville brukt den?	Kjønn	Alder	Hvilken type telefon har du?	Kommentarer/innspill
26.03.2014 kl. 13.47.16	Ja	Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får. Jeg er skeptisk til appen. Jeg har læst ned appen og prøvd den, men jeg bruker den veldig sjelden.	8				Mann	18-24	iPhone	
26.03.2014 kl. 13.51.10	Nei	Jeg har læst ned appen og prøvd den, men jeg bruker den veldig sjelden.	5				Mann	25-34	iPhone	
26.03.2014 kl. 13.51.18	Nei	Jeg har læst ned appen og prøvd den, men jeg bruker den veldig sjelden.	3				Mann	18-24	Android	
26.03.2014 kl. 13.51.52	Nei	Jeg følger appen er meningsløs. Jeg er skeptisk til appen.	2				Mann	18-24	Android	
26.03.2014 kl. 13.53.03	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	6	Arlig hvis det fungerer og gir meg nyttige tilbud			Kvinne	18-24	Android	
26.03.2014 kl. 13.55.08	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får.	8	Vilker som en god ide! Liker tanken så lenge mobile ikke blir for fullt med altfor mange pushvarsler			Mann	18-24	iPhone	
26.03.2014 kl. 13.58.53	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	8	God ide, gir deg jo tilbud som faktisk er aktuelle for deg i og med at du er i den butikken.			Kvinne	25-34	iPhone	
26.03.2014 kl. 13.59.28	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får.	7	Absolutt en god ide!			Mann	18-24	iPhone	
26.03.2014 kl. 14.00.33	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får.	8				Kvinne	18-24	iPhone	
26.03.2014 kl. 14.00.45	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får.	5	Vilker som en god ide			Mann	18-24	Android	
26.03.2014 kl. 14.06.28	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får.	8	Høres bra ut hvis det fungerer/blir brukt av butikkene. Må være litt eksklusivt for jeg. Man bør kanskje få tilbud som notifications? Særlig hvis man kan velge hvilke kategorier man ønsker å få notifications om!			Kvinne	25-34	Windows	
26.03.2014 kl. 14.08.26	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får.	6				Mann	25-34	iPhone	
26.03.2014 kl. 14.13.37	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får.	8	Spenningdel!			Kvinne	25-34	iPhone	
26.03.2014 kl. 14.15.24	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får. Jeg er skeptisk til appen.	8	Ulikker på hvordan mulstilling er på iPhone for iuten men appen på iPhone. Bekreftelsen og følelsen jeg opplever på den ikke støttet på iPhone da den ikke støttet 8 sikkerhets mulstilling.			Mann	25-34	Android	
26.03.2014 kl. 14.19.07	Ja	Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	7				Mann	25-34	Android	

Tidsmerke	Ville du samsvilg/vis lasjet ned/brøvd en slik app?	Kryss av for påstandene du føler deg enig i, og la de du er uenige i stå uten avkrytning.	Hvor positive/negative følelser får du for en slik app?	Hva synes du om et slikt produkt?	Hvorfor ville du ikke ha lasjet ned du ville brukt den?	Hva ville gjort en slik app så bra at du ville brukt den?	Kjønn	Alder	Hvilken type telefon har du?	Kommentarer/Innsjill
26.03.2014 Kl. 14.19.04	Nei	Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får. Jeg er skeptisk til appen	5	Kommer sikkert til å gå innom de butikkene som er med på appen oftere (veger heller i stedet ennforvaresen) så som jeg får det kaffen) jeg skal klippe til halv 8 pris!	Ikke interessert i mer reklame. Bekymringer rundt personvern. Nedsett ystelse på telefonen	Code tilbud, altså noe man kan spare noen hundrelapper på (ikke å korer avslag på is bare for å lokke deg inn i butikken)	Mann	25-34	Android	
26.03.2014 Kl. 14.20.27	Ja	Tror det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får	8	Viker veldig kjekt. Tilbud er som regel bra, men kun hvis man faktisk kan komme til å bruke (når man f. eks. går inn i butikken med tilbudet). Kjøtt å få masse tilbud om ting du ikke byr deg om eller kommer til å bruke, så et slikt produkt høres bra ut.			Kvime	25-34	Android	
26.03.2014 Kl. 14.20.57	Ja	Tror det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får	7				Mann	25-34	Android	
26.03.2014 Kl. 14.30.43	Ja	Tror det vil være nyttig/eg liker tanken	8	Nyttig så lenge man mottar tilbud som faktisk er gode og relevante (10% avslag på en bestemt vare f. eks.). Ikke hvis tilbudene oppfattes som unyttig spam (Tjapp 14 budgg og det på facebook, så får du nr 19 i julekalenr. Alltid kult å vite hva som er på tilbud selv om det mest samsvilg vil være mulig å finne denne informasjonen et annet sted i butikken.			Mann	18-24	iPhone	
26.03.2014 Kl. 14.34.55	Ja	Tror det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får	7				Mann	18-24	iPhone	Lykke til med masteroppgaven! =)
26.03.2014 Kl. 14.36.39	Ja	Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får	6	Skeptisk på vegne av personvernet og "overvåking"/lagning av geolokasjonsdata og forbrukerpreferanser, samt grenser for rediasing for mindreårige med mobil (reklame rettet for barn) men kult. Fremtidsint. (: er nok et bra potensial der.			Kvime	25-34	Android	
26.03.2014 Kl. 14.39.17	Ja	Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Jeg er skeptisk til appen	6				Kvime	25-34	Android	
26.03.2014 Kl. 14.42.26	Ja	Tror det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får	9	Studenten elsker/burde ønske tilbud			Kvime	18-24	iPhone	
26.03.2014 Kl. 14.46.16	Ja	Tror det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får	6	Må være enkelt å stå av, ellers ført Multiopret til å filtrere tilbudene ? (gratis, rabatt etc.)			Kvime	18-24	iPhone	
26.03.2014 Kl. 14.54.03	Ja	Tror det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får. Jeg er skeptisk til appen	5				Kvime	18-24	iPhone	

Tidsmerke	Ville du samsvilgvis lasset ned/brøvd en slik app?	Kryss av for de påstandene du føler deg enig i, og de du er uenige i så uten avkrytning.	Hvor positive/egsattive følelser får du for en slik app?	Hva synes du om et slikt produkt?	Hvorfor ville du ikke ha lasset ned en slik app?	Hva ville gjort en slik app så bra at du ville brukt den?	Kjønn	Alder	Hvilken type telefon har du?	Kommentarer/Innspill
26.03.2014 kl. 14.54.44	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	5	Kralbla, et aboskullt supplement til eksisterende apper som jeg tror vil bli godt mottatt - så lenge tilbudene 9 man får er bra.)	Kke interessert i Ber rekname Bekymringer rundt pers. data/for Nedsatt ytelise på telefonen		Kvinne	25-34	iPhone	
26.03.2014 kl. 15.01.27	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	9				Kvinne	18-24	Windows	
26.03.2014 kl. 15.02.50	Nei	Jeg følger appen er meningsløs Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	1				Mann	25-34	Android	
26.03.2014 kl. 15.08.34	Ja	Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får	8	Innovativt og spennende.			Mann	25-34	iPhone	Hvis designet har noe å si: Kanskje du bør endre bakgrunnsfargen til de valgte merkekelede - da blir det lettere se!
26.03.2014 kl. 15.08.49	Ja	Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får	6				Mann	18-24	iPhone	
26.03.2014 kl. 15.12.38	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får	8	Viktig at jeg kan styre hvor mye appen "forstyrrer" meg.			Mann	25-34	Android	
26.03.2014 kl. 15.14.02	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	6	God ide. Hvordan tilbudene blir presentert. F. eks fra Rema 1000, da det ofte er veldig mange tilbud samtidig. Får 7 man alt, eller bare noe?			Kvinne	25-34	iPhone	
26.03.2014 kl. 15.15.32	Ja	Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får	10				Mann	25-34	Android	
26.03.2014 kl. 15.39.24	Ja	Jeg liker at jeg kan velge aktører. Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	10	Har potensiale, men aktiv bruk foruserer gode tilbud. Jeg hadde hvert fall avnsliert appen med 7 mye spsm om nyttige tilbud..			Kvinne	18-24	Android	
26.03.2014 kl. 15.42.39	Ja	Jeg liker at jeg kan velge aktører. Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får.	9				Mann	25-34	iPhone	
26.03.2014 kl. 15.44.43	Nei	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	7	Fin tanke, men er generelt sett ikke så glad i apper. Virker fornuftig, men varslingen bør være i passelig stor avstand fra 7 butikken.	Nedsatt ytelise på telefonen. Oker kke apper		Kvinne	18-24	Android	
26.03.2014 kl. 15.46.20	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	7	Har tidligere hatt apper som f. eks. er kun for 711 (ja, trossakkisk det var en 7/11 app), der fikk man da tilbud med jevne mellomrom, men selvfølgelig kun fra den aktuelle sjåppen.. Liker derfor at man kan velge seg aktører, og man får et forslag til hva man kan gjøre den dagen jeg trykker 711 igjen er ønsket da jeg gjerne å slukke den, samt at det 8 ble aldri pusset noe fra den)			Mann	25-34	iPhone	Bar være mulig å velge radius fra butikken/kiosken.
26.03.2014 kl. 15.48.20	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører.	8				Mann	18-24	iPhone	Gann på J!

Tidsmerke	Ville du samsvilgvis laslet ned/brøvd en slik app?	Kryss av for de påstandene du føler deg enig i, og la de du er uenige i stå uten avkrytning.	Hvor positive/engstive følelser får du for en slik app?	Hva syns du om et slikt produkt?	Hvorfor ville du ikke ha laslet ned en slik app?	Hva ville gjort en slik app så bra at du ville brukt den?	Kjenn	Alder	Hvilken type telefon har du?	Kommentarer/Innspill
26.03.2014 kl. 15.53.45	Nei	Jeg er skeptisk til appen. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	3	Tor det blir mye strøm. Ellers spennende tjeneste.	Kke interessert i mer reklame. Bekymringer rundt personvern.	Det eneste jeg kan tenke at kanskje ville ha overbevist meg om å bruke en slik app, hadde vært hvis de tilgjengelige tilbudene var tilnærmet uinteressante. For eks. ved utvask eller prisreduksjon eller andre buddeier.	Mann	25-34	Android	
26.03.2014 kl. 15.58.38	Ja	Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	8	Tor det blir mye strøm. Ellers spennende tjeneste.	Kke interessert i mer reklame. Bekymringer rundt personvern.	Det eneste jeg kan tenke at kanskje ville ha overbevist meg om å bruke en slik app, hadde vært hvis de tilgjengelige tilbudene var tilnærmet uinteressante. For eks. ved utvask eller prisreduksjon eller andre buddeier.	Mann	25-34	iPhone	
26.03.2014 kl. 16.03.38	Ja	Tor det vil være nyttig/jeg liker tanken	5	Bra			Mann	35-44	Android	
26.03.2014 kl. 16.03.69	Ja	Tor det vil være nyttig/jeg liker tanken	5	Bra			Mann	35-44	Android	
26.03.2014 kl. 16.10.35	Ja	Tor det vil være nyttig/jeg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	8				Mann	18-24	iPhone	
26.03.2014 kl. 16.15.35	Ja	Tor det vil være nyttig/jeg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	6	Grel måte å få oversikt over tilbud i nærheten.			Mann	25-34	iPhone	
26.03.2014 kl. 16.23.38	Ja	Tor det vil være nyttig/jeg liker tanken. Jeg liker at jeg kan velge aktører	7				Mann	18-24	Android	
26.03.2014 kl. 16.55.33	Ja	Jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	8	Høres spennende ut. Tilbudene må være gode for at jeg skal bruke appen aktivt.			Kvinne	18-24	Android	
26.03.2014 kl. 17.53.34	Ja	Tor det vil være nyttig/jeg liker tanken. Jeg liker at jeg kan velge aktører	4				Kvinne	25-34	Android	Jeg er uinteressert i tilbud og reklame, og vil derfor ikke oppsøke reklame selv. Har ikke smrtfon og er ikke interessert i å kaste bort tid som er penger på å spore noen flere her og der. Håkene for hvorfor man evt. ikke ville brukt appen var også svært relevante, å ha på geokalibrering og detaljrikke til enhver tid for å få nettet reklame er mye strømforbruk og smelter de parandis delene av sjela.
26.03.2014 kl. 17.28.39	Nei	Jeg er skeptisk til appen	2		Kke interessert i mer reklame. Bekymringer rundt personvern. Nedsett yelse på telefonen		Mann	25-34	Kke smarttelefon	
26.03.2014 kl. 17.57.34	Ja	Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	7				Mann	18-24	Android	Liker å holde mobilen som reklamefri some...
26.03.2014 kl. 18.02.56	Nei	Tor det vil være nyttig/jeg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får.	1		Kke interessert i mer reklame		Mann	35-44	Symbian	
26.03.2014 kl. 18.06.39	Ja	Tor det vil være nyttig/jeg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	7				Kvinne	25-34	iPhone	
26.03.2014 kl. 18.22.57	Ja	Tor det vil være nyttig/jeg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	9				Mann	25-34	iPhone	

Tidsmerke	Ville du samsvilgvis lastet ned/prøvd en slik app?	Kryss av for de påstandene du føler deg enig i, og la de du er uenige i stå uten avkrytning.	Hvor positive/negative følelser får du for en slik app?	Hva synes du om et slikt produkt?	Hvorfor ville du ikke ha lastet ned en slik app?	Hva ville gjort en slik app så bra at du ville brukt den?	Kjønn	Alder	Hvilken type telefon har du?	Kommentarer/Innspill
26.03.2014 kl. 18.23.03	Nei	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Jeg er skeptisk til appen. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	6	Hva synes du om et slikt produkt? Push notifications hadde vært superirriterende, da hadde det plinglet som en gal bane jeg tuslet bortover en butikkgate. Hadde det derimot vært slik at den viste meg tilbud dersom jeg selv gikk inn på appen for å sjekke hvilke tilbud som fantes i butikken jeg gikk inn i, hadde det vært kult, men det er vel som i matlud-appen tenker jeg kanskje. Og markeringen som de i tillegg er en annen sak. Ikke bra å ha på app, det får ikke profitt. Lykke til med oppgaven!	Benytt meg alle de andre appene som har push notifications	Ogps allerede svart på denne	Kvinne	18-24	iPhone	
26.03.2014 kl. 18.33.53	Ja	Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	4	Når kunden først er inne i lokalet kan man jo se alt av markedsføring inne i butikken, også markedsføring avhengig av hvilket utvalg hver enkelt butikk i en kjede har. Du vil jo ikke at folk kan begynne å fikle med telefonen og ikke se på alt butikken har å tilby?	Ikke interessert i mer reklame. Tor ikke det ville fungert i praksis	Ingen ting da en slik app ikke er levedyktig... hvorfor vil en bedrift betale for å reklamere for produkter på telefonen til personer som er fysisk tilstede i butikken???	Kvinne	25-34	Android	
26.03.2014 kl. 18.45.26	Nei	Jeg følger appen er meningsløs. Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	2				Mann	25-34	Android	Lykke til med oppgaven!
26.03.2014 kl. 21.21.32	Ja	Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	7	Nyttig			Mann	25-34	iPhone	
26.03.2014 kl. 20.50.54	Nei	Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	4	Sikkert fint, men har enda ikke lastet ned min første app på telefonen	Neidatt. Vise på telefonen	Betydelig reduksjon av markedsføring i løpet av en måned. Et eneste butikkens jeg ikke har prøvd. Hadde ønsket å kunne legge inn andre butikker også, som jeg kunne dra til hvis kundesert var tilstede...	Kvinne	25-34	Android	Lykke til med masteren:-)

Tidsmerke	Ville du samsvilgvis lastet ned/brøvd en slik app?	Kryss av for påstandene du føler deg enig i, og la de du er uenige i stå uten avkrytning.	Hvor positive/negative følelser får du for en slik app?	Hva synes du om et slikt produkt?	Hvorfor ville du ikke ha lastet ned en slik app?	Hva ville gjort en slik app så bra at du ville brukt den?	Kjenn	Alder	Hvilken type telefon har du?	Kommentarer/Innsjill
26.03.2014 Kl. 21.00.40	Nei	Jeg er skeptisk til appen	2	Jeg frykter at jeg ville fått melding en gang i minuttet nær jeg går nedover Kan Jøtans gate, eller tar bussen opp til Nydalen.	Ikke interessert i mer reklame. Nedsatt yelse på telefonen. Tor ikke det ville tungert i praksis. Benytter meg allerede av noe lignende	Sjekk ut Liquid Barcodes om du ikke har gjort det (seff har du det).	Mann	25-34	iPhone	Har det er greit at jeg var dønn enig. Lykke til med masteroppgaven, kjøtteri!
26.03.2014 Kl. 21.41.58	Ja	Jeg liker at jeg kan velge aktører. Om jeg laster med appen er veldig avhengig av hvilke tilbud jeg får.	7				Mann	25-34	Android	
26.03.2014 Kl. 21.52.08	Nei	Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får. Jeg er skeptisk til appen.	4	Skeptisk	Ikke interessert i mer reklame. Bekymringer rundt personvern. Ikke interessert i mer reklame. Nedsatt yelse på telefonen	Sjanselt gode tilbud, dvs over 30% rabatt e.l.	Mann	55-64	iPhone	Lykke til
26.03.2014 Kl. 22.26.11	Nei	Jeg liker at jeg kan velge aktører. Om jeg laster med appen er veldig avhengig av hvilke tilbud jeg får. Jeg er skeptisk til appen.	3	Lurer på om jeg heller ønsker å velge aktører jeg ønsker tilbud fra, og få de uten å være i nærheten av selve butikken. Da får jeg bedre oversikt over tilbud jeg ønsker å benytte meg av, og kan i større grad planlegge kjøpene. Ønsker ikke at det skal poppe opp reklame på til, slik at det oppleves som spam. Men heller at det er en grei å bli oversikt inne på appen.			Mann	35-44	Windows	
26.03.2014 Kl. 22.58.48	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører	6				Kvinne	25-34	iPhone	
27.03.2014 Kl. 06.05.32	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører	7				Kvinne	25-34	iPhone	
27.03.2014 Kl. 08.43.08	Ja	Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får	6				Mann	25-34	Android	
27.03.2014 Kl. 08.25.23	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får	7				Mann	25-34	iPhone	

Tidsmerke	Ville du samsvilgvis lastet ned/brøvd en slik app?	Kryss av for påstandene du føler deg enig i, og la de du er uenige i stå uten avhukning.	Hvor positive/negative følelser får du for en slik app?	Hva synes du om et slikt produkt?	Hvorfor ville du ikke ha lastet ned en slik app?	Hva ville gjort en slik app så bra at du ville brukt den?	Kjønn	Alder	Hvilken type telefon har du?	Kommentarer/innspill
27.03.2014 kl. 09.38.06	Ja	Jeg liker at jeg kan velge aktører. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får. Jeg er skeptisk til appen.	5	sa det blir som en slags dynamisk tilbuds-katalog der du selv kan filtrere veik aktører men du må være en viss avstand fra en fysisk butik for å kunne se tilbudene? vent er ikke det akkurat slik samme vanligge tilbud fungerer som ikke blir rekamert for? typ nar det står på et skilt utenfor butikken eller i butikken der det er å gå inn og se i skap av puser lenge jeg er glad av puser notifications.			Mann	18-24	Android	vil appen kunne la meg se hvor mine venner betlmer seg og kan jeg sosialisere og web 4.0 og etc samme ting fordi nei takk, og sa vil jeg nok ikke bruke appen hvis den krever at jeg autentiserer med facebook eller noe slikt, man det er bare meg, folk alders vil sikkert ikke fordi jeg og det vil jo være en glimne folk der kan logge hvilke butikker folk går inn i og hva slags tilbud de får da i tillegg og hva de selger og selge deisge og alt det innover og selge deisge daten til andre, tenk på det.
27.03.2014 kl. 15.27.15	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får.	9	Veldig god ide.			Mann	18-24	Android	
27.03.2014 kl. 17.20.37	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får.	8	Bra så lenge det ikke blir føles som spam.			Mann	35-44	Android	
27.03.2014 kl. 19.31.32	Ja	Tor det vil være nyttig/eg liker tanken. Jeg liker at jeg kan velge aktører. Om jeg laster ned appen er veldig avhengig av hvilke tilbud jeg får. Om jeg aktivt bruker appen er veldig avhengig av hvilke tilbud jeg får. Jeg er skeptisk til appen.	4				Kvinne	25-34	Android	





# Appendix E

## Source Code For Geolocation Page

```
1 <!doctype html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <title>Geo Position</title>
6   <script src="//code.jquery.com/jquery-1.11.0.min.js"></script>
7   <script>
8     var options = {
9       enableHighAccuracy: true ,
10      timeout: 20000,
11      maximumAge: 5000
12    };
13
14    function success(pos) {
15      var crd = pos.coords;
16
17      $('#lat').html('Latitude : ' + crd.latitude);
18      $('#lon').html('Longitude: ' + crd.longitude);
19      $('#acc').html('Accuracy ' + crd.accuracy + ' meters. ');
20      $('#err').html('');
21    };
22
23    function error(err) {
24      $('#err').html('ERROR(' + err.code + '): ' + err.message);
25      var options = {
26        enableHighAccuracy: true ,
27        timeout: 20000,
28        maximumAge: 5000
29      };
30      navigator.geolocation.getCurrentPosition(success , error , options);
31    };
32
33    navigator.geolocation.getCurrentPosition(success , error , options);
34  </script>
35  <style>
36  body {
37    font-family: helvetica;
38  }
```

```
    </style>
40 </head>
    <body>
42   <h1>Your current position is:</h1>
      <h1 id="lat"></h1>
44   <h1 id="lon"></h1>
      <h1 id="acc"></h1>
46   <h1 id="err"></h1>
    </body>
48 </html>
```

**Listing E.1: pos.html.** This was a webpage created in order to read out the geolocation of the client.