



Faculty of Science and Technology  
Department of Electrical Engineering and Computer Science

# **Android app for cost-effective rich multimedia notifications for social media applications**

Bachelor's Thesis in Computer Science  
by

Andreas Østhus Saltveit

Internal Supervisors

Vinay Jayarama Setty

External Supervisors

External Supervisor 1

External Supervisor 2

Reviewers

Reviewer1

Reviewer2

March 18, 2018





*“Is Norway safe to visit? Not if you are Swedish. As soon as you cross the border the Norwegians will start to harass you. “Do you wanna fight? We are in NATO and you are not”. “Want to go skiing? We will give you an eight hour head start while we sleep and after we have passed you we will wait for you at the finish line.” Except they never do. Not to mention when you go into a restaurant or a store. They immediately suss you out as a Swede (probably because you are blonde and not wearing a “lusekofte”. ) If you are in a store you will be escorted out by store security “We only accept real kroner, not that worthless krona, Besides you can’t afford anything in here. Go to the homeless shelter”. In a restaurant they will assume you are the new dishwasher, push you into the kitchen and introduce you to your new boss, the old dishwasher - the mentally challenged Ola. And you’ll take the job because the salary is ridiculously high. And the harassment doesn’t stop when you get back to Sweden either. Small Norwegian children on vacation will throw oil and whale parts at you from their parents Ferrari. Old Norwegian women will hit random Swedes on the head with their 18K cane and ask why service is so slow. There are a few things that will drive them away though. It is their equivalent of garlic and sunlight. Just whisper in their ear “electric cars are rapidly becoming economically and practically viable products” or “solar powered heating is eventually going to take the place of oil”. Then they will scamper away and hide inside their mountains filled with gold and in their fjords filled with fish. By the way Finns and Danes never get harassed, mainly because unlike Swedes they will head butt anyone they don’t like.”*

Anders Tilly [1]



## *Abstract*



# *Acknowledgements*



# Contents

<b>Abstract</b>	<b>vi</b>
<b>Acknowledgements</b>	<b>viii</b>
<b>Abbreviations</b>	<b>xi</b>
<b>Symbols</b>	<b>xiv</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Motivation . . . . .	1
1.2 Problem Definition . . . . .	1
1.3 Usecases/Examples . . . . .	2
1.4 Challenges . . . . .	2
1.5 Contributions . . . . .	2
1.6 Outline . . . . .	2
<b>2 Related Work</b>	<b>3</b>
2.1 Richnote . . . . .	3
2.1.1 the problem . . . . .	4
<b>3 Solution Approach</b>	<b>5</b>
3.1 Introduction . . . . .	5
3.2 Existing Approaches/Baselines . . . . .	5
3.3 Analysis . . . . .	5
3.4 Proposed Solution . . . . .	5
<b>4 Experimental Evaluation</b>	<b>7</b>
4.1 Experimental Setup and Data Set . . . . .	7
4.2 Experimental Results . . . . .	7
<b>5 Discussion</b>	<b>9</b>
<b>6 Conclusion and Future Directions</b>	<b>11</b>

List of Figures	11
List of Tables	15
Bibliography	17

# Abbreviations

Acronym	What (it) Stands For
LAH	List Abbreviations Here



aesthetics



# Symbols

symbol	name	unit
$a$	distance	m
$P$	power	W ( $\text{Js}^{-1}$ )
$\omega$	angular frequency	$\text{rads}^{-1}$





# Chapter 1

## Introduction

### 1.1 Motivation

### 1.2 Problem Definition

The goal of this thesis is to develop an android app to track the smartphone status such as battery, bandwidth availability and mobile data quota etc. The measurements are then sent to a backend service which intelligently adapts the quality of multimedia notifications according to the device status.

The app will be designed as a client for notifications from Spotify as well as social networks such as Facebook. The app authenticates users with the help of APIs from these services and receives notifications. From the device side it collects and sends the device status to the backend and receives and displays the notifications.

The backend service acts as a forwarding agent for notifications from the original services such as Spotify and Facebook. The backend intercepts the notifications for the users using the authentication tokens obtained via user credentials. The backend service according to the device status transforms the notifications (for e.g, lower resolution images in Facebook) and forwards it to the client app. The forwarding of notifications is done using Google notification service.

### **1.3 Usecases/Examples**

### **1.4 Challenges**

### **1.5 Contributions**

### **1.6 Outline**

## Chapter 2

# Related Work

### 2.1 Richnote

As described in the introduction, richnote[2] is a algorithm suggested to best solve the problem of delivering content rich multimedia notifications scaled down based on constraints on the device they are to be displayed on.

I'd like to expand on the problem.

An example of the problem would be if you are using Spotify, and your close friend starts listening to a new song. You could get a notification about this song including a full 30 second preview of the song. Now your device has to download this notification, this uses battery on your device. If your device has full battery, downloading and playing is not a problem. However, if the device is very low on battery, you might loose precious last battery power and end with a dead device a long way from a charger. You might not be able to show your ticket on the bus home(where you can charge). So to address this, one would have to manage the notification.

Another part of the problem is available bandwidth. You don't want to use the final bandwidth of the month on a 30 second preview of a song on Spotify, when you rely on it to purchase a digital ticket for the bus home. Then you would have to buy additional data or end up with a long walk.

attention, use of time, irritating amount of notifications

solution suggested in richnote document

breakdown of algorithm, problem to execute on device.

server (site other students thesis) -> client implementation(this thesis)

### **2.1.1 the problem**

## **Chapter 3**

# **Solution Approach**

### **3.1 Introduction**

### **3.2 Existing Approaches/Baselines**

Reading [\[3\]](#)

### **3.3 Analysis**

### **3.4 Proposed Solution**



## **Chapter 4**

# **Experimental Evaluation**

### **4.1 Experimental Setup and Data Set**

### **4.2 Experimental Results**





## **Chapter 5**

### **Discussion**



## **Chapter 6**

# **Conclusion and Future Directions**



## List of Figures



## List of Tables





# Bibliography

- [1] Umeå University (1996) Anders Tilly, B.S. Political Science & National Economies. Is norway safe to visit?, May 2017. URL <https://www.quora.com/Is-Norway-safe-to-visit>.
- [2] M. Y. S. Uddin, V. Setty, Y. Zhao, R. Vitenberg, and N. Venkatasubramanian. Richnote: Adaptive selection and delivery of rich media notifications to mobile users. In *2016 IEEE 36th International Conference on Distributed Computing Systems (ICDCS)*, pages 159–168, June 2016. doi: 10.1109/ICDCS.2016.107.
- [3] Roger S. Pressman. *Software Engineering: A Practitioner's Approach*. McGraw-Hill Higher Education, seventh international edition, 2010. ISBN 0071267824, 9780071267823.