

# **The Design and Implementation of a Distributed Photo Sharing Android Application Over Ad-Hoc Wireless**

by

HaoQi Li

Submitted to the Department of Electrical Engineering and Computer  
Science

in Partial Fulfillment of the Requirements for the Degree of  
Master of Engineering in Electrical Engineering and Computer Science

at the

Massachusetts Institute of Technology

June 2012

©2012 Massachusetts Institute of Technology

All rights reserved.

Author .....  
Department of Electrical Engineering and Computer Science  
May 21, 2012

Certified by .....  
Li-Shiuan Peh  
Associate Professor of Electrical Engineering and Computer Science  
Thesis Supervisor May 21, 2012

Accepted by .....  
Prof. Dennis M. Freeman  
Chairman, Masters of Engineering Thesis Committee



# The Design and Implementation of a Distributed Photo Sharing Android Application Over Ad-Hoc Wireless

by

HaoQi Li

Submitted to the Department of Electrical Engineering and Computer Science  
on May 21, 2012, in partial fulfillment of the  
requirements for the Degree of  
Master of Engineering in Electrical Engineering and Computer Science

## Abstract

TODO/Ask: I'm using "WiFi" to mean different things here, what should they be?  
TODO/take out word count. Word count: 136

We present a distributed photo-sharing Android application, CameraDP, that relies on ad-hoc wireless over WiFi. The app utilizes the novel DIstributed Programming Layer Over Mobile Agents (DIPLOMA) programming layer to provide a consistent shared memory over a large distributed system of android phones. The success rate and latency of photo saves and photo gets on CameraDP were compared to the numbers generated from CameraCL, a WiFi-only version of the same user interface as CameraDP. Under near-ideal WiFi conditions with only a 1.4% sacrifice in success rate, a 10-phone CameraDP system yielded a 2.6x improvement over a 10 CameraCL phones running on 4G, and the CameraDP system yielded a 16x improvement over CameraCL running on 3G. The ideas and methods of this research could be beneficial in the future if WiFi becomes more robust and smart phone WiFi ranges increase.

Thesis Supervisor: Li-Shiuan Peh

Title: Associate Professor of Electrical Engineering and Computer Science



## Acknowledgments

I would like to thank my thesis advisor Li-Shiuan Peh for her clear explanations and valuable comments, my labmate Jason Gao for his debugging skills, and my labmate Anirudh Sivaaraman for his endless patience and assistance.



# Contents

<b>1</b>	<b>Introduction and Motivation</b>	<b>9</b>
<b>2</b>	<b>Background on DIPLOMA</b>	<b>11</b>
<b>3</b>	<b>User Interface and Functionality of both Camera Apps</b>	<b>15</b>
<b>4</b>	<b>CameraDP Android Application</b>	<b>19</b>
<b>5</b>	<b>CameraCL Android Application</b>	<b>23</b>
<b>6</b>	<b>Experiments</b>	<b>27</b>
6.1	Experiment 1 . . . . .	27
6.2	Experiment 2 . . . . .	27
6.3	Experiment 3 . . . . .	27
6.4	Experiment 4 . . . . .	27
6.5	Experiment 5 . . . . .	27
6.6	Experiment 6 . . . . .	27
<b>7</b>	<b>Discussion and Conclusion</b>	<b>31</b>





# Chapter 1

## Introduction and Motivation



## Chapter 2

### Background on DIPLOMA



## Chapter 3

# User Interface and Functionality of both Camera Apps



## Chapter 4

# CameraDP Android Application





## **Chapter 5**

# **CameraCL Android Application**



# Chapter 6

## Experiments

6.1 Experiment 1

6.2 Experiment 2

6.3 Experiment 3

6.4 Experiment 4

6.5 Experiment 5

6.6 Experiment 6



## **Chapter 7**

### **Discussion and Conclusion**



# Bibliography