



# Computers and Media: Mobile Technology

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CSCI 1200  
JAREK SZLICHTA

# Mobile Media

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# Mobile Media

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There are very few established companies in this area, it is wide open for new companies to innovate

Mobile devices are always on, the user is always connected, how can we take advantage of this?

What do people want to do with a mobile device?



# It is not a Small Computer..

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Not a simple matter of transferring desktop applications to the phone

They are very different devices, so this rarely works

Need to develop applications that fit the device, take advantage of its strong points, avoid its weaknesses

# Device Characteristics

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Small and portable

The two main constraints in mobile devices are:

- Display size
- Input, particularly text

These tend to vary significantly from one device to another



# Mobile Displays

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Display size is limited by the size of the device, a large display would make the device too large to be convenient

In theory could have desktop resolution on a small display, but it would be unreadable..

# Mobile Displays

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One of the main problems with mobile displays is their range of resolutions

Desktop applications can assume a minimum resolution that all displays can handle and is large enough for most applications

A safe minimum for mobile devices would be too small to be useful for most applications

Need to adapt to the range of display sizes

- So most applications are designed for a specific device



<http://www.concept-phones.com/cool-concepts/svision-projector-phone-concept-aims-business-people/>



# Projectors

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Suggestion to add projectors to mobile devices, can use any convenient surface as a display

Problem: everything would be public, anyone could see what you are doing, interfere with your work

This could work in an office environment or at home, but these are the places where you are likely to use a desktop computer

# Mobile Input

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Input is also a major issue with mobile devices

Many mobile devices have the standard phone keypad plus a few extra buttons

Strong trend toward completely touch screen

This is the minimum that application developers need to consider

# Mobile Input

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The problem with the phone keypad is its hard to do text, a combination of keystrokes is required for each character

The first solution was to add a limited keyboard to the phone, this has been used by RIM and Nokia

The keys are small so typing can be difficult, no touch typing

Not a full keyboard, need to use a variety of shift keys and other techniques

# Mobile Touch Screens

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The current approach is to use a touch screen

Replace the display and keypad by a larger touch screen

Display a virtual keyboard for text entry

The main advantage is the screen is reconfigurable, can add any buttons you like

The main problem is its still hard to type, can't feel the keys, easy to make mistakes

# Mobile Phones are not Small Desktops

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Can't treat a mobile device like a desktop computer

Implications for applications:

- Can't display a large amount of information
- Context switching is hard
- Can't enter large amounts of text
- Pointing not always possible, no mouse

# Mobile Device Unique Capabilities

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Mobile devices are always on, no need to wait for them to boot up

Mobile devices know where they are, can use GPS to determine position, usually within 10 feet or less

This can be used for location based services (LBS), the information presented is based on the current location, relevant to right now, where you are

# Location Based Services



iOS Yelp App: Monocle Feature

# Mobile Device Unique Capabilities

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Potential for a wider range of interactions

Can use camera to control the interaction, or motion sensitive devices

Mobile devices tend to have tighter integration of their features



# Mobile Device Use

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How do we use mobile devices?

North American usage patterns are different from the rest of the world, tend to lag

The CIP survey has some information on mobile device usage from 2007

Over 70% of Canadian households have at least one cell phone, there is an increasing trend here

CIP = Canadian Internet Project: <http://www.canadianinternetproject.ca/en/intro.htm>

2007 = Old News

# Mobile Device Usage

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In the general population 85% use a mobile device as a phone and 44% send text messages, the only other popular service is taking pictures with 36%

All other services are minor:

Download ring tones	19%
Play games	14%
Surf Web or send emails	13%
Download music	10%
Watch Videos or television	3%

[http://www.canadianinternetproject.ca/en/docs/2008/CIP07 CANADA ONLINE-REPORT-FINAL%20.pdf](http://www.canadianinternetproject.ca/en/docs/2008/CIP07_CANADA_ONLINE-REPORT-FINAL%20.pdf)

# Mobile Device Usage

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At first this looks fairly dismal, many of the advanced features aren't used

The survey also breaks down the data by age group, and this is where the interesting trends occur

Text messaging is popular amongst younger users, with those under 18 texting more than they talk on their mobile devices

# Mobile Device Usage

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It is the 45 and up groups where texting falls off, these groups also make very limited use of the other services

Returning to our previous table we have the following of the under 18 group:

<b>Service</b>	<b>18+</b>	<b>Under 18</b>
Download ring tones	19%	48%
Play games	14%	48%
Surf Web or send emails	13%	27%
Download music	10%	28%
Watch Videos or television	3%	7%

# Mobile Device Usage

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This is a significantly different usage pattern, and is similar to what we see in other countries

Young people get old, does this mean that older groups will start using a wider range of services?

This is highly likely, so we should expect the development of new services in Canada and world wide

# Pew 2013 Cell Internet Use

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Take 10 minutes, in groups, and review the Pew Internet 2013 Cell phone report:

<http://www.pewinternet.org/2013/09/16/cell-internet-use-2013/>

# Services

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What are the current opportunities?

What are the barriers to new services?

The opportunities most often mentioned are:

- Games
- Music
- Video
- Health Care
- Financial Services



# Games

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Has long been predicted to be a major winner, only happening in a real way in last 5 years

There are several good possibilities here:

- Causal games – good for spending short periods of time, easy to pickup and doesn't make heavy demands on the device
- Networked games – good money earner for the carriers, social networking and location based games
- Spinoffs – additions to existing desktop and console games, good example is FIFA Soccer

# Games

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Why were games slow to take off?

One reason is mobile devices didn't have good enough graphics and processing power until recently

A related reason is the wide range of hardware configurations, games that work well on one device don't work well on others, controls and screen sizes

# Game Distribution

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Another reason is distribution channels

Until recently could only purchase mobile games from the carriers (e.g. Rogers/Bell), could only download from carrier site

If the carrier wasn't interested in games, there was nothing you could do

Many carriers didn't view games as a good source of income, so didn't bother with them

# Game Distribution Changes

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Handset/OS manufacturers are now the main channel for distribution

- Apple App store
- Android Marketplace
- Blackberry App World

This gave game developers a more centralized distribution channel

EA is also exploring direct sales for mobile devices

# Music and Video

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Mobile devices now have a considerable amount of storage, can store many songs and full length videos

Currently most downloads occur through PCs or Wifi, they don't use the phone network

This is a loss of revenue for the *carriers*, they could be getting a piece of the action, both in terms of bandwidth and their own stores

# Music and Video

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Music obviously fits the mobile experience, phone can take the place of music players

But what about video?

Most people won't want to watch a full length movie on a phone:

- Screen size is too small
- Rarely have long period of uninterrupted time with the phone, would need to break viewing into several chunks

# Music and Video

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What types of video content fit mobile devices?

# Video Content

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Aim at video content that is around 5 minutes in length, this is what people will watch

News and sports casts follow this format, but would people be willing to pay for this?

A subscription model would work well here

This could also be a bundled service, sold as part of a phone plan

- E.g. movie previews from Cineplex app not counted toward bandwidth



# Mobile Video

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Another possibility is short episodes of popular TV programs

Could tie this to the TV program, provide additional content / non-linear narratives:

- Background for the TV show
- Alternative endings

This is an area where there are lots of possibilities, someone just needs to find the right format

# Health Care

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Most developed countries have an aging population, many of these people want to stay independent, live in their own homes

This raises a number of health issues, how can they be monitored to detect health problems?

If someone is living alone they may not be able to summon help in a medical emergency, no one may know that they are in trouble

# Health Care

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Elderly people should have their health monitored more regularly, but they have more difficulty getting to doctors than other people

Idea: use technology to monitor their health

Continuous monitoring of vital signs, can save the data and transmit to doctor, detect irregularities and call for assistance

All of this could be coordinated through a cell phone

# Mobile Health Monitoring

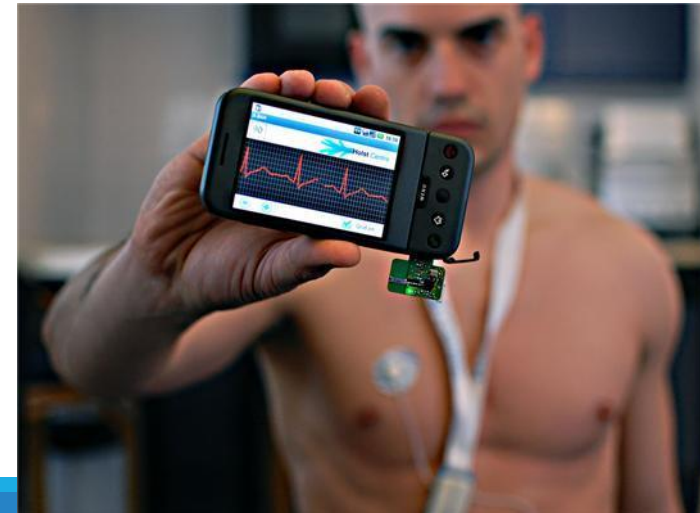
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Monitor heart rate & view electrocardiogram on Android phone

Gather motion and other sensor data from device for social sharing, health monitoring, gaming (Fletcher Lu @ UOIT!)

<http://www.sciencedaily.com/releases/2010/10/101005085500.htm>

<http://www.freepatentsonline.com/20110195780.pdf>



# Health Care

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Phones are easy to carry so can have 24 hour/day monitoring

Phones also know where they are, can be used to track people who tend to wander away (as long as they take their phone with them)

While this is a good idea, it hasn't occurred yet, one of the main issues is privacy, the other is to get all the equipment manufacturers to agree to one standard

# Financial Services

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Can access your bank account online, why not do this on your phone as well?

Could carry this a step further, store your money on your phone, not in your wallet

Have your phone act like a debit card, just need to present your phone to the cashier when making a purchase

Touch your phone to a vending machine when making a purchase instead of using coins

# Financial Services

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What happens if someone steals your phone, is all your money gone as well?

Makes it easier to steal your financial information

Need standards and a large number of companies need to cooperate

Hasn't been viewed as something consumers really want, but maybe retailers might want it, easier to separate customer from their money

# Mobile Web

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A large portion of web use is now mobile

Many sites have a mobile and a desktop version for different screen sizes



**Mobile Website**

VS



**Standard Website**





# Canadian Situation

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Mobile has been slow to develop in Canada, several reasons:

- High data rates
- Small customer base
- Incompatible carriers

Data has been viewed mainly as a business service and not a personal service

Rates have been high because business have been willing to pay the high rates, the alternatives were more expensive

# Canadian Situation

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Rates are just coming down now, thanks to iPhone and similar devices

Small customer base means that Canadian developers must think globally, can't rely on the local market to make a profit

# Canadian Situation

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This could be a win for us, if we play our cards right

GTA is one of the most ethnically diverse places in the world

Have local developers that speak many languages and understand many cultures

Should be able to produce applications for the world, internationalized to many different countries

This is an opportunity that is currently being missed

# Canadian Situation

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Carriers use different technology, their systems are incompatible

Further fragments our local market

Services either aren't available or work differently

Forces developers to do more work, must produce slightly different application for each carrier

This is beginning to go away, but is still a major barrier

# ”How to live before you die”

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Talk by Steve Jobs at Stanford University

[http://www.ted.com/talks/steve\\_jobs\\_how\\_to\\_live\\_before\\_you\\_die](http://www.ted.com/talks/steve_jobs_how_to_live_before_you_die)

# Summary

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Younger generation views mobile devices as more than a phone, use a wide range of services

An area that is still under development, not clear how things will develop, good opportunities for new companies

Many false starts, need to think differently about how these devices will be used