

Smartphone Mobile Computing

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Overview for Today

- **Future of smartphone mobile computing**
- **Some videos**

- **Predictions of the future**

- **Group projects: questions on homework and projects**
- **Quick roundup of projects**

Future of Mobile Computing

- **What will devices look like?**
- **What will be the new capabilities that will emerge?**
- **What will be the new uses for smartphones?**
- **What challenges await?**

Topics

- **Form-factors and I/O**
- **Mobile commerce**
- **Content and push vs. pull**
- **Service providers and costs**
- **Social networking**

Tablets

- Laptops with touch screens
- Large touch screen phones
- Sizing for HD 16:9 instead of 4:3



Motorola Xoom

- Does the laptop have a future?
 - tablet + keyboard
 - tablet is the gaming console
 - Video of Motorola Atrix:
<http://www.youtube.com/watch?v=uWle8wQBqS0>

Processors

- **State of the art: 1GHz dual-core**
- **Qualcomm Snapdragon (ARM)**
- **Samsung Hummingbird (ARM)**
- **Intel Atom (x86)**
- **Nvidia Tegra (ARM)**
- **3-D graphics co-processors**
- **multiple cores**

Gestures and touch

- Full touch surface, pressure-sensing
- Interpret movement in space (accel, gyro)

- Video
 - LucidTouch – a see-through mobile device
<http://www.youtube.com/watch?v=RsNFZAEssPQ>

- Challenge
 - distinguishing all the different modes of interaction
 - separating activities

Other inputs devices/methods

■ Connecting to external sensors

- Bluetooth or over web

■ Faster input devices

- Speech, handwriting, continuous motion

■ Videos

- Swype – text input

http://www.dailymotion.com/video/xbolhe_swype-for-android-demo_tech

- Airstrip – medical sensors

<http://vimeo.com/5086611>

Pico-projectors

- **Expand screen size**
- **Combine with other sensors**

- **Videos**
 - Phone with integrated pico-projector
<http://www.youtube.com/watch?v=CgnADSuF8MA>
 - Immersive gaming – combine with phone orientation sensors
http://www.youtube.com/watch?v=i6SS_h40ISI

- **Challenge**
 - Power-consumption and brightness tradeoff

Surfaces go mobile

- Use phone with projector/sensors to create a mobile surface

- Videos

- Poker Surface: multi-player games
<http://www.youtube.com/watch?v=BgNJv8EKuD0>
- Microsoft "Surface" – interactions between phones
<http://www.youtube.com/watch?v=6VfpVYYQzHs>

- Challenge

- Consistency of interaction model across many applications

Cameras

- Interpretation of images from the real-world
- Integration with sensors

- Videos
 - PhotoCity – capture the flag while building 3-D models
<http://www.youtube.com/watch?v=tzIx4djNOhU>
 - WordLens – automatic translation
<http://www.youtube.com/watch?v=h2OfQdYrHRs>

- Challenges
 - dealing with less-structured images and free-form text

Near-field communication

- **Wallet in a phone**
- **Capture receipts, organize expenses**

- **Videos**
 - Purchasing and receipts
<http://www.youtube.com/watch?v=GD3hIb0hkg>
 - NFriendConnector – physical social networking
http://www.youtube.com/watch?v=s85EQ48G_f4

- **Challenge**
 - Security and privacy

Mobile commerce

■ NFC

- always be “ready to buy” – cash, delivery, impulse buys

■ Coupons

- the “10% off” rule to getting people to do something
- all ads will come with coupons
- Video: Groupon -
<http://www.youtube.com/watch?v=26W7-O22I7Y&feature=fvst>

■ Advertising

- location-based
- exploit “buy-local” movement

Content

- **Mobile will dominate**
- **Authoring tools for mobile content are sorely needed**
- **Flash and HTML5 for dynamism**
- **Convergence of web browsing and television**
 - “interactive TV” is coming back
- **Shallow web of special-purpose apps**

Services

- **Differentiated tiers**
- **Cloud for everything from health to recipes**
- **Further segmentation of services**
 - e.g., SMS + Facebook plans
- **Subscription models for apps**
 - Apple's new AppStore model
 - Will Android Market be able to compete?
- **Integration with home automation**
 - entertainment time-shifting and now device-shifting
 - e.g., TiVo to phone video
 - web-enabled homes mediated by server that handles security
 - LifeWare video: <http://www.youtube.com/watch?v=3JnA6m7lws>

Social networking

- **Increasing “stickiness” of social-networking sites**
- **Integration with location**
 - Facebook Places, Google Latitude, FourSquare, Gowalla
- **Reputation management**
- **Multiple personas**
- **Crowd-sourcing**
 - games with a purpose (e.g., FoldIt, PhotoCity)
 - Amazon Mechanical Turk

Predictions

- **More smartphones will be sold than PCs**
- **More people will access web from smartphone/tablet than a desktop/laptop**
- **Tablet sales will outstrip laptops**
- **Bar-coded signage replaced by direct translation**
- **End of keyboard tapping**
- **Video sharing will dominate over photos**
- **HTML5 will replace custom applications**
- **Microsoft will buy Nokia**
- **Apple app subscription model will come to dominate**
- **Ads will drive move to push architectures**
- **We all become turkers to get data – everything is a game**
- **Coupons will experience a resurgence and dominate ads**
- **Web browsing becomes a search for the right app**
- **End of unlimited data plans**
- **Wars erupt over ownership of social networking graphs and data**
- **Phones replace all remote control devices**