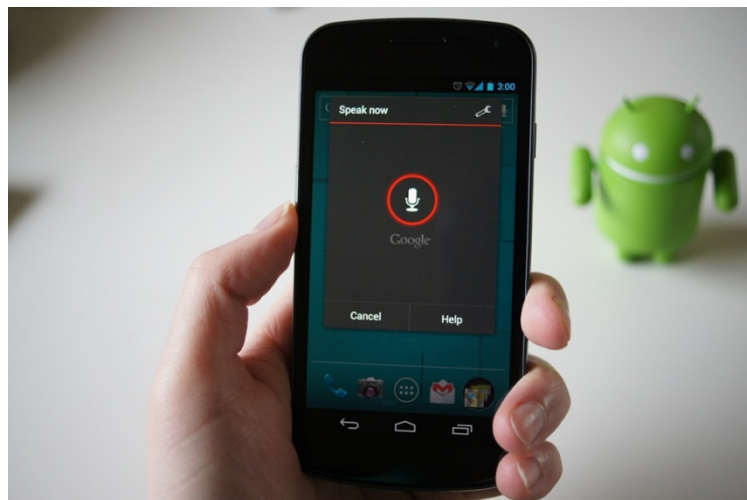# What other Android APIs may be useful for ubicomp?

Speaking to Android
Ref: Professional Android 4 Development, Meier, Ch 11, pg 437

- ## Speech recognition:
  - Accept inputs as speech (instead of typing) e.g. dragon dictate app?
  - Note: Google (remote) service Requires internet access

- ## Speech-to-text
  - Convert user's speech to text. E.g. display voicemails in text
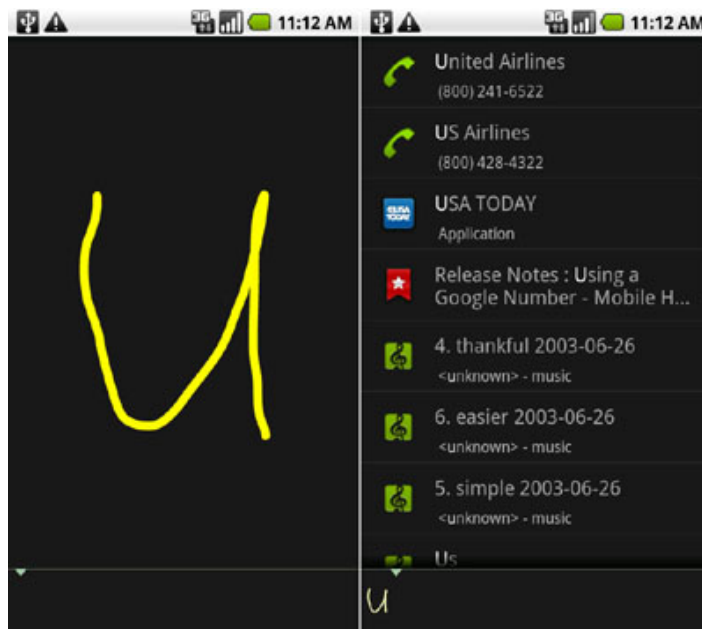
Gestures
Ref: 3 cool ways to control your phone
http://www.computerworld.com/article/2469024/web-apps/android-gestures--3-cool-ways-to-control-your-phone.html
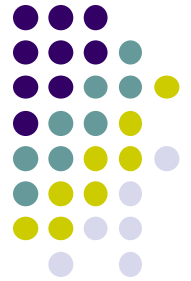
- Search your phone, contacts, etc by handwriting onto screen
- Speed dial by handwriting first letters of contact's name
- Also multi-touch, pinching

Doing More with Locations: Geocoding
Ref: Professional Android 4 Development, Meier, Ch 13, pg 513

- Maps, GPS discussed so far use longitude/latitude to pinpoint geographic addresses

- Users more likely to think in terms of street addresses

```
Latitude: 37.422005 Longitude: -122.084095

Address:
1600 Amphitheatre Pkwy
Mountain View, CA 94043
Mountain View
94043
United States
```

- **Geocoder** converts between longitude/latitude and street address
  - **Forward geocoding:** Finds latitude and longitude of an address
  - **Reverse geocoding:** Finds street address for given longitude/latitude

- Can also set proximity alerts
  - Intent delivered to your app when you are within a pre-set distance from a given location

More on Audio, Video and Camera
Ref: Professional Android 4 Development, Meier, Ch 13, pg 513

- Android MediaPlayer previously used to play audio

- Media Player can also:
  - Play videos (e.g. MPEG 4)
  - Record audio and video
  - Preview video
  - Manipulate raw audio from microphone/audio hardware, PCM buffers
    - E.g. if you want to do audio signal processing, speaker recognition, etc
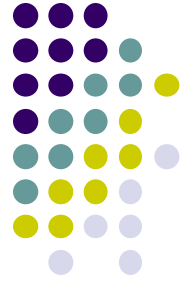
More on Audio, Video and Camera
Ref: Professional Android 4 Development, Meier, Ch 13, pg 513

- Can control Camera parameter settings
  - Flash mode, scene mode, white balance
- Camera can also do face detection and feature recognition
  - Detects face up to a max number of faces + accuracy

RenderScript

- High level language for GPGPU

- Use Phone's GPU for computational tasks

- Very few lines of code = run GPU code

Wireless Communication
Ref: Professional Android 4 Development, Meier, Ch 16, pg 665

- Bluetooth
  - Discover nearby bluetooth devices
  - Control your smartphone's (device's) discoverability
  - Communicating over bluetooth

- WiFi
  - Scan for WiFi hotspots
  - Monitor WiFi connectivity, Signal Strength (RSSI)
  - Do peer-to-peer (mobile device to mobile device) data transfers

Wireless Communication
Ref: Professional Android 4 Development, Meier, Ch 16, pg 665

- NFC:
  - Contactless technology
  - Transfer small amounts of data over short distances
  - **Applications:** Share spotify playlists, Google wallet
  - **Google wallet?**
    - Store debit, credit card on phone
    - Pay by tapping terminal
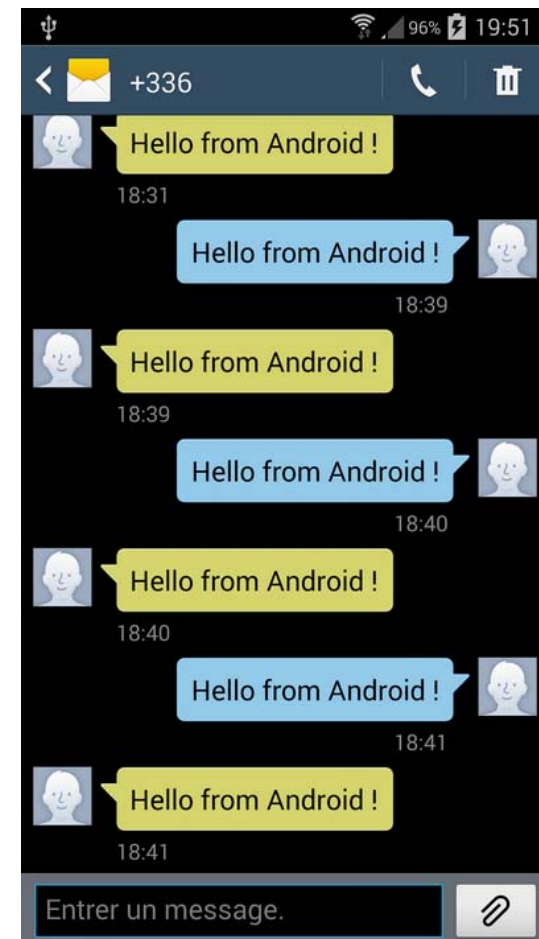   - Fly through checkout?

Telephony and SMS
Ref: Professional Android 4 Development, Meier, Ch 17, pg 701

- **Telephony:**
  - Initiate phone calls from within app
  - Access dialer, etc

- **SMS:**
  - Send/Receive SMS/MMS from app
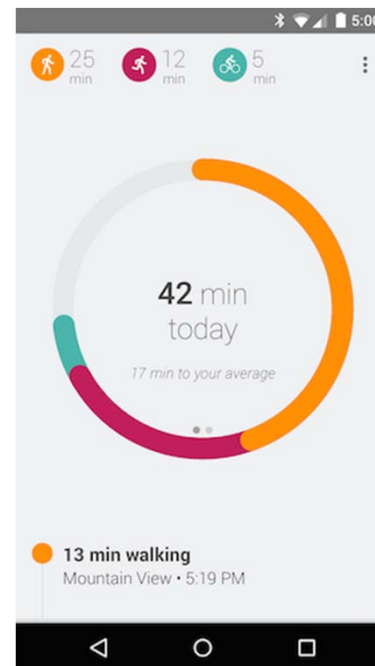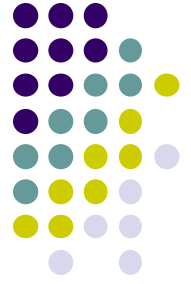 - Handle incoming SMS/MMS in app

Google Fit API

- Google Fit API: Single cloud storage record for all user's fitness apps (myfitnesspal), gadgets (fitbit), etc

- Complimentary Google Fit app supports fitness tracking, view progress

- You can program app to access, read, write Google Fit record

Google Fit API
http://en.wikipedia.org/wiki/Google_Fit

- Google Fit API also has API for step counting
- i.e. Low end phones without step counter can use Google Fit's step counting API
  - Implemented as a Google service
- Also **DetectedActivity** API to detect smartphone user's current activity
- Currently detects 6 states:
  - In vehicle
  - On Bicycle
  - On Foot
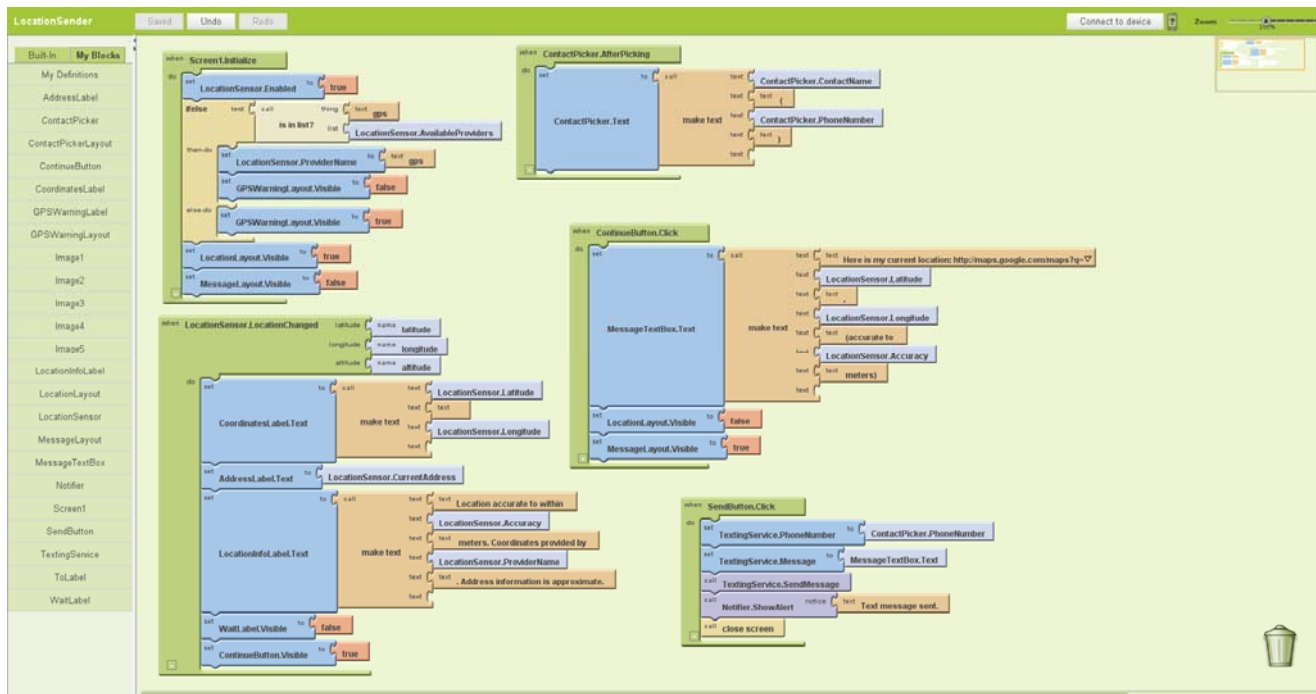 - Still
  - Tilting
  - Unknown

Alternate Implementation Options

AppInventor (http://appinventor.mit.edu/)

- MIT project, previously Google

- Use lego blocks to build app, easy to learn

- **Pro:** Quick UI development

- **Con:** sensor access, use third party modules restricted

PhoneGap

- Develop Apps using HTML, CSS, javascript
- **Pro:** Access to most native APIs, sensors, UI
- **Con:** Need to know HTML, CSS javascript

HTML5   JavaScript

App development
usign HTML5 and
JavaScript

PhoneGap

Access to native
APIs with
phoneGap

Hassle-free
Deploy the app
on any device

References

- Busy Coder's guide to Android version 4.4
- CS 65/165 slides, Dartmouth College, Spring 2014
- CS 371M slides, U of Texas Austin, Spring 2014