MOBILE BIG DATA CARS, PHONES, AND SENSORS

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Cellular Data Explosion

2011 – 5 billion cell phones (source ITU)

• More than # of people w/ shoes, toilets, toothbrushes, or electricity (source IEA)

• 1 billion “mobile broadband” connections

• Incredible source of data → many new applications
  • Sensor data – positions, movement, orientation, proximity, activity

Source: http://www.maclife.com
CarTel: Sensing Roads With Phones

“Crowdsourced” collection of data from roads

CarTel is a collaboration between Profs. Madden, Balakrishnan, and their students. See http://cartel.csail.mit.edu
From Personal to Societal: Roads

**Raw Data:** Locations & Sensors (Raw Data)

**Personal Aggregates:** Traffic, Potholes, Accidents, Risky Maneuvers

**Societal Aggregates:** Road / City Safety Scores; Driver Risk / Safety Scores; Insurance Scores
From Personal to Societal: Medical Monitoring & Outpatient Care

Smartphone platform shows promise as ‘artificial pancreas’ to control diabetes

**KP discharge app is early step in future care vision**

Columbus orthopaedic center debuts smartphone app for patients, other physicians

**Mental health goes mobile**

**Teledermatology may be reliable in triaging inpatient dermatology consultations**

Derm Consult for Inpatients? There's an App for That

**Raw Data:** Images, sensor data, text

**Personal Aggregates:** Health metrics (e.g., activity level, disease severity, etc.)

**Societal Aggregates:** Expected progressions by demographics; public health and disease tracking
From Personal to Societal: Exercise

Raw Data: Heart rate, power, speed, steps, ...

Personal Aggregates: Performance (vs friends)

Societal Aggregates: Performance by demographic; wellness across groups, etc.
Privacy vs Public Good in Sensors and Smartphones

• Societal apps all have privacy concerns

• Medicine, Safe Driving, Public Health are all areas where there are (potentially) compelling benefits
  • Ex: reducing risky driver behavior
    • (McGehee et al ‘07 report 72% reduction in teen driver risky maneuvers when being monitored)
  • Ex: eliminating or reducing hospital stays
  • Ex: improving overall health of population will dramatically reduce costs

• No clear cut answer: we (society) has to decide what we are comfortable with