TagSense: A Smartphone-based Approach to Automatic Image Tagging

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Image tagging

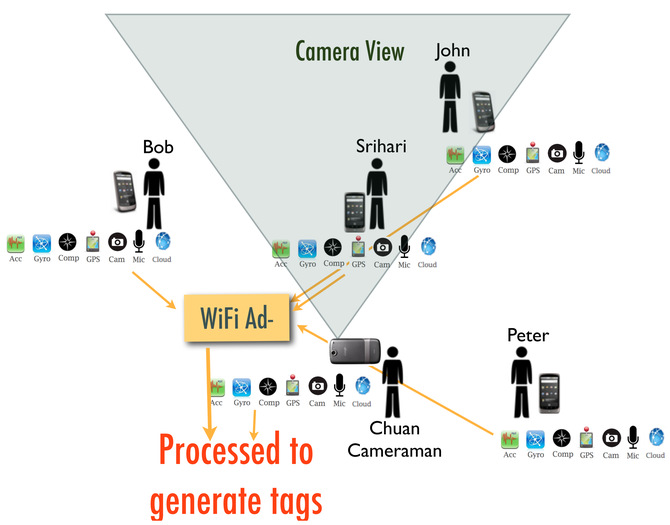
- Digital pictures are undergoing an explosion
- Image retrieval becomes crucial and they use tags
- Human tagging is accurate but cumbersome
- Image based auto-tagging still has many constraints
- How to approximate the human tagging ability?

Smartphone, the wild card

- Today's smartphones have powerful built-in sensors
- People always carry their phones

TagSense

- A system for auto-tagging, with smartphone sensors
- Leverages multiple sensing domains
- Focus of this work is mainly on tagging people



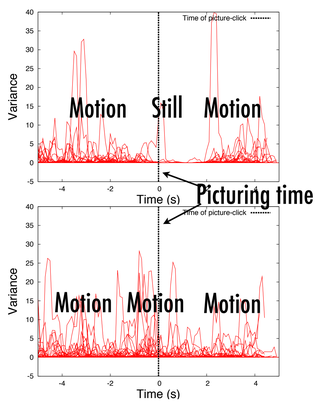
TagSense tag generation

- When? Clock + GPS + WiFi = May 4th afternoon
- Where? GPS + WiFi + Comp + Light s. = State house, outdoor
- What? Acc + Gyro + Mic + Cloud = Standing, talking, sunny
- Who? ??? = Srihari, Bob, John

1. Accelerometer based motion signatures

People often pose for pictures

Acceleration plot for 50+ pictures → People inside the picture: / People outside the picture:

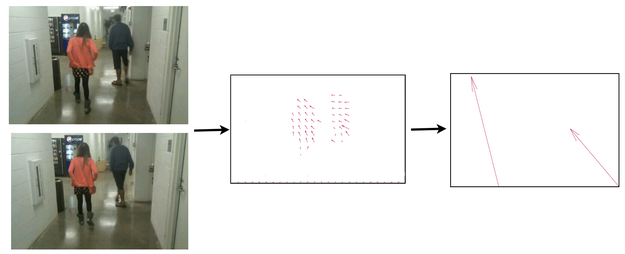


2. Complementary compass directions

- People in picture likely face camera
- Compass reading != User orientation
- Diff: Personal Compass Offset (PCO)
- Use posing picture to calibrate PCO

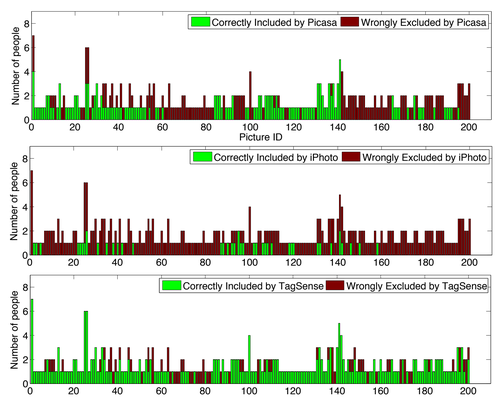
3. Correlating visual and acceleration

- Take several snapshots after shutter click
- Get Motion vectors from continuous snapshots
- Correlate with accelerometer readings to find who



TagSense evaluation

- A prototype on Android Nexus One phones
- Evaluated TagSense with 200+ pictures
- Compared tagging results with Picasa/iPhoto



Future of TagSense

- Short time scale but multiple sensing dimensions
- Extensible: Image based techniques also fit-in
  New sensors being added to smartphones
- Future: video-tagging, augmented reality, ...

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