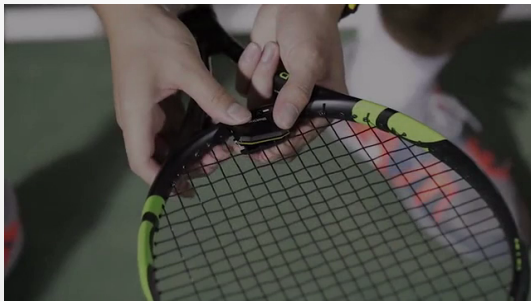# CAS 765 Fall'15
Mobile Computing and Wireless Networking

Rong Zheng

Era of Connected Devices
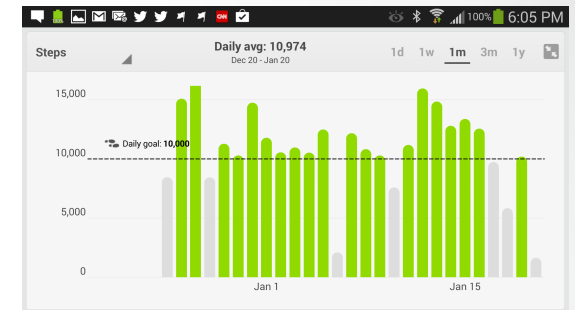
Enabling Technologies

- ## Wireless connectivity
  - o Bluetooth, Wi-Fi, cellular

- ## Rich (and cheaper) sensors
  - o EEG, EMG, camera, IMU (accelerometer, compass, gyro), optical, temperature, barometer …

- ## Processing power
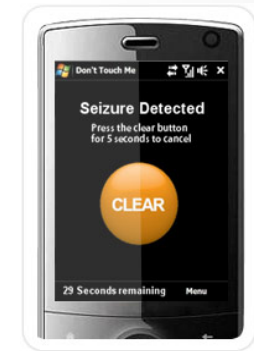 - o Octa-core processors on smartphones
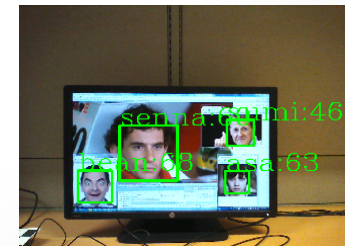 - o Cloud
  - o Cloud-let

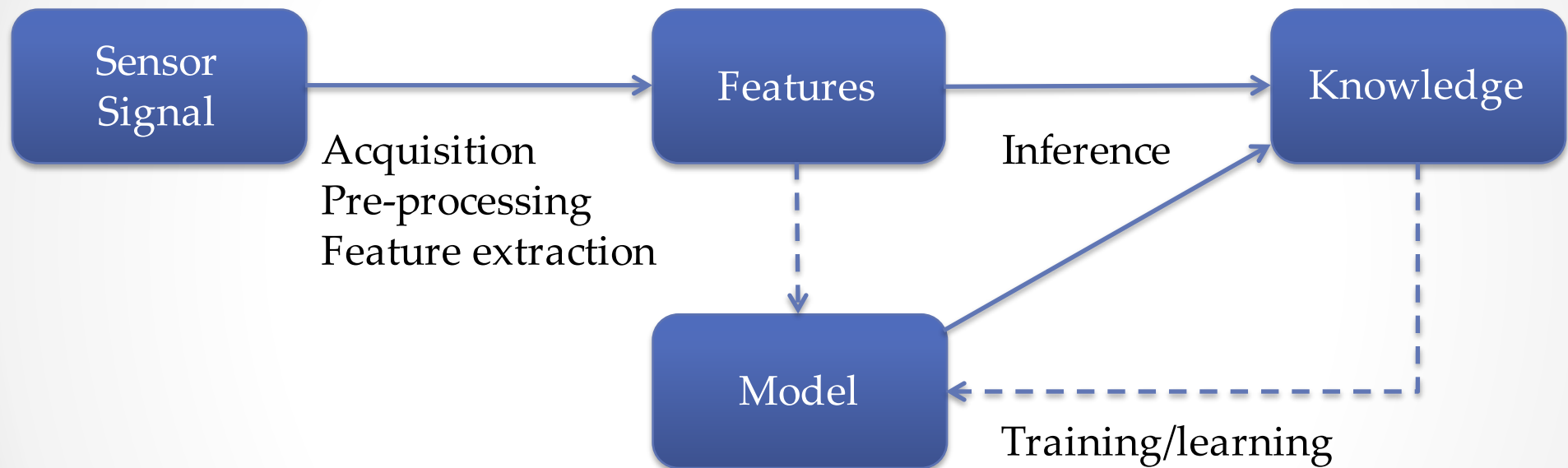# From Devices to Knowledge

Sport & fitness analytics

Disease management

Situation awareness

From Devices to Knowledge – A Breakdown

| Sensor Signal | → | Features | → | Knowledge |

Acquisition
Pre-processing
Feature extraction

Inference

Model

Training/learning

- Further questions
  - o Model representation
  - o Where and when are training and inference done: computation, storage, power consumption
  - o Privacy?

Scope
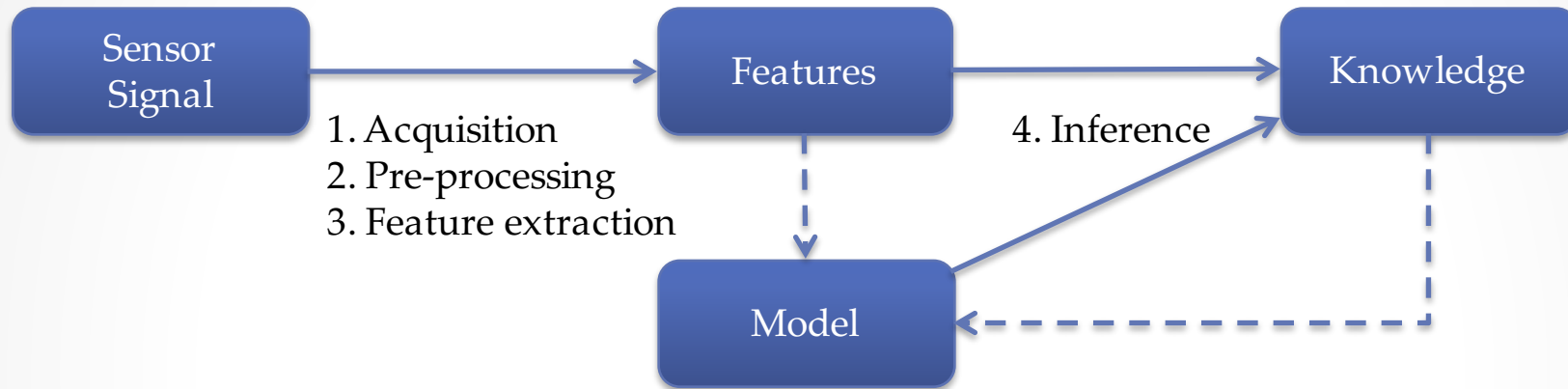
- Lectures:
  - Sensors and sensor data processing (2 lectures)
  - Data acquisition in Android (1 lecture)
  - Bayesian filters and SLAM (1 lecture)
  - Machine learning basics (1 lecture)
  - Feature extraction (1 lecture)

Organization

- Advanced topics (student presentation)
  - Power profiling and accounting
  - Incentive mechanisms and gamification
  - Social implication of wearable technology (touching upon privacy)
- 4 homeworks done individually
  - Matlab or Octave
- Final project in groups
  - Suggested topics on course website
  - Project pre-proposal (1-page), proposal (presentation) and final presentation (presentation + report)
- No midterm or final
- Grading: presentation 10%, homework 40%, pre-proposal 5%, proposal 10%, final project 35%
- SVN

Pre-requisite

- Matlab (a must)
- Android programming (or Java programming) experiences
- Probability
- *Preferable owns an Android device*
- My research lab can provide the following devices:
  - o One pair of Recon Jet glasses
  - o A limited number of Android phones
  - o Monsoon power monitor

  Students are responsible for any damage of loaned devices