Schedule for Today’s Mixer

- 3:00pm: Active research topics
  - EE368/CS232 project mentors
  - 1-2 minute overviews

- 3:25pm: Project ideas
  - EE368/CS232 students
  - 1-2 minute pitches
Active Research Topics

- Roland Angst: 3D Reconstructions
- Jean-Baptiste Boin: Plane Rectification
- Matt Yu: Illumination-Invariant Matching
- Sam Tsai: Text and Image Features
- David Chen: Compact Image Databases
- Huizhong Chen: Name-Face Correlations
- Peter Vajda: Personalized News Videos
- Andre Araujo: Image-to-Video Search
3D Reconstructions
Roland Angst (rangst@stanford.edu)

- Image-based 3D reconstructions
  - SfM usually point based
  - What about line segments or planar patches?

- Lifting line segments from multiple images?
- Implementation of a robust appearance based line descriptor?
3D Reconstructions on Mobile Devices
Roland Angst (rangst@stanford.edu)

- Camera calibration app for Android or IPhone
  - Estimation of intrinsic parameters of camera
  - Without special calibration pattern

- Absolute scale estimation
  - IMU provide data with metric units
  - Correlate 3D reconstruction in similarity frame with measurements from IMU
  - Sequential filtering for absolute scale estimation
Plane Rectification in Real Time
Jean-Baptiste Boin (jbboin@stanford.edu)

- Goal: rectify a view of a plane that is distorted because of perspective
- Way of solving the problem: find the vanishing point corresponding to the horizontal lines, which is enough for full rectification
Plane Rectification in Real Time
Jean-Baptiste Boin (jbboin@stanford.edu)

- **1st step**: “augment” our camera measurements by also using the sensor data of the mobile device.
- **Gravity direction** gives us the elevation angle, which constrains our problem to a 1-dimensional problem.
- **2nd step**: run an edge detection on the image, find the dominant lines, and find the most likely intersection.
Plane Rectification in Real Time
Jean-Baptiste Boin (jbboin@stanford.edu)

- Some real life results
Illumination-Invariant Matching
Matt Yu (mattcyu@stanford.edu)

- **Problem Setup**
  - Same scene but different lighting (e.g., time of day)
  - Can we build a more robust:
    - Keypoint Detector
    - Feature Descriptor
Text and Image Features
Sam Tsai (sst sai@stanford.edu)
Compact Image Databases
David Chen (dmchen@stanford.edu)

Mobile Augmented Reality App
- Android Implementation
- Database of 100k Images
- 50MB RAM Usage
- Recognition in < 1 sec
Exploring Name-Face Correlations

Huizhong Chen (hchen2@stanford.edu)

• Surprisingly accurate at guessing the first name of a never-seen face.

• State-of-the-art gender and age classifiers without manual labels.

Ranked Names
Stephanie
Ann
Kate

Gender & Age Predictions
Ethan
Heather
Personalized News Videos

Peter Vajda (pvajda@stanford.edu)
Personalized News Videos
Peter Vajda (pvajda@stanford.edu)

News video summarization

Sentence segmentation

Augmented reality
Image-to-Video Search
Andre Araujo (afaraujo@stanford.edu)

INTERACTIVE DEMO
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EE368 Project Ideas – Jeff Stone

- Project Type: Fun to develop! Fun to Use!
- Interests: Interactive image Proc. / Graphics, Games, AI.
- Best Mobile Entry, 2nd Overall – Winter 2014 CS248 Game Design Contest for “Lost Flock”
- Part-Time MSEE Graduating June 15, 2014
- In Real Life: Principal Circuit Design Engineer, HEV Automotive Power, Texas Instruments
- “Nuts & Bolts” HW/SW Engineer – C++/Java/Android/iOS/Python/Ruby/Etc.
Unwrapping Panoramic Images

Single shot 360 Panorama

Looking for teammates!

Speak to Mark Stauber → stauber@stanford.edu
Masood Shaikh [masood@stanford.edu]

- Image Colorization
- Vehicle Logo Recognition
- Pedestrian Detection