Programming assignment for 2812ICT

Alan Liew

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Important matters

- Major Programming assignment for 2812ICT
  - 20% of final mark
    - Mark distribution: proposal (not graded), final report (12%), presentation (8%)
  - Compulsory
  - Individual project
  - Due on 30 September 2018

- Submission (by 30 September 2018)
  - A paper (properly written and formatted, see template) describing your project
  - A 5-minute powerpoint presentation of your work in class (need to be submitted before the presentation date in week 12)
  - Your code (you will need to demo it during the presentation)

Project proposal

- Maximum of 2 pages
- Submit by end of week 8 as a PDF document
- Include the following:
  - Title and author
  - Introduction: Problem you want to solve and why
  - Technical Approach: How do you propose to solve it?
  - Milestones (dates and sub-goals)
  - References

Project report

- Submitted at the end of week 11 (30 September 2018)
- Use the template provided
- Page length: maximum of 10 pages
- Include the following:
  - Title and author
  - Abstract
  - Introduction
  - Previous work
  - Technical Approach
  - Experiments
  - Conclusions
  - References

Powerpoint presentation

- Short presentation (5 mins) with time for a brief Q&A
- Include the following:
  - Problem Motivation/Description
  - Technical Approach
  - Results
  - Demo

Project Advice

- Make sure the project scope fits the course
- Constrain your problem so that it is achievable
- Think about the datasets you need
- You may need to learn stuffs outside of the course
- You can use functions from OpenCV in your code

At the end, you demonstrate understanding through the report and the presentation. You will need to be able to answer questions during the presentation!

Project Scope

- It must be related to computer vision, and to some concepts covered in the course
- Suggestions for project direction
  - Replicate an interesting paper
  - Compare different methods
  - Use a new approach to an existing problem
  - Implement an interesting system
  - Original research

Datasets

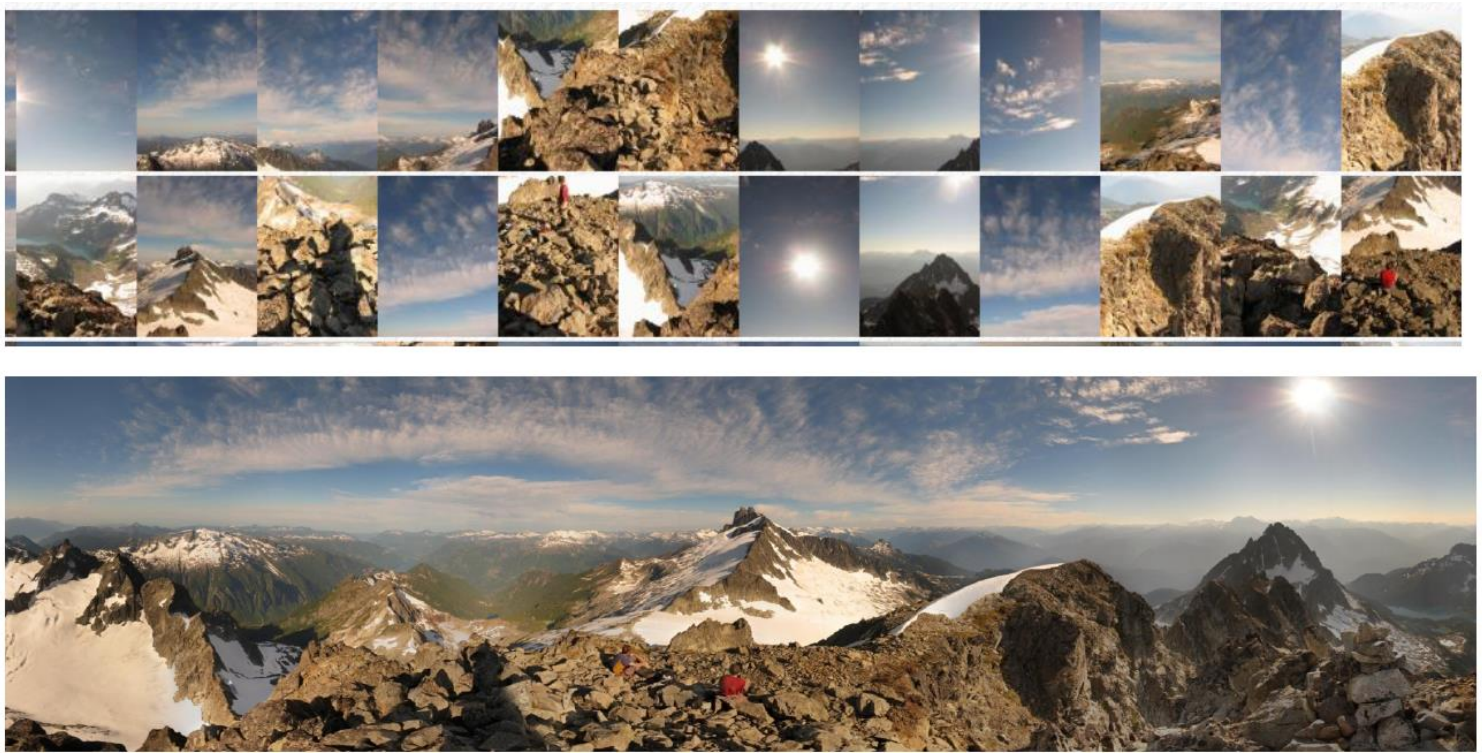
- some popular computer vision datasets:
  - Meta Pointer: A large collection organized by CV Datasets.
  - Yet another Meta pointer
  - ImageNet: a large-scale image dataset for visual recognition organized by WordNet hierarchy
  - SUN Database: a benchmark for scene recognition and object detection with annotated scene categories and segmented objects
  - Places Database: a scene-centric database with 205 scene categories and 2.5 millions of labelled images
  - NYU Depth Dataset v2: a RGB-D dataset of segmented indoor scenes
  - Microsoft COCO: a new benchmark for image recognition, segmentation and captioning
  - Flickr100M: 100 million creative commons Flickr images
  - Labeled Faces in the Wild: a dataset of 13,000 labeled face photographs
  - Human Pose Dataset: a benchmark for articulated human pose estimation
  - YouTube Faces DB: a face video dataset for unconstrained face recognition in videos
  - UCF101: an action recognition data set of realistic action videos with 101 action categories
  - HMDB-51: a large human motion dataset of 51 action classes
  - ActivityNet: A large-scale video dataset for human activity understanding
  - Moments in Time: A dataset of one million 3-second videos

Idea?

- Find an interesting vision paper and replicate it
  - CVPR: IEEE Conference on Computer Vision and Pattern Recognition
  - ICCV: International Conference on Computer Vision
  - ECCV: European Conference on Computer Vision
  - Beware: this could be very challenging!
- It can be in one of these:
  - Geometry
  - Matching & modeling
  - Mid level processing
  - Recognition
- Example list of topics done in CV course at University of Illinois here

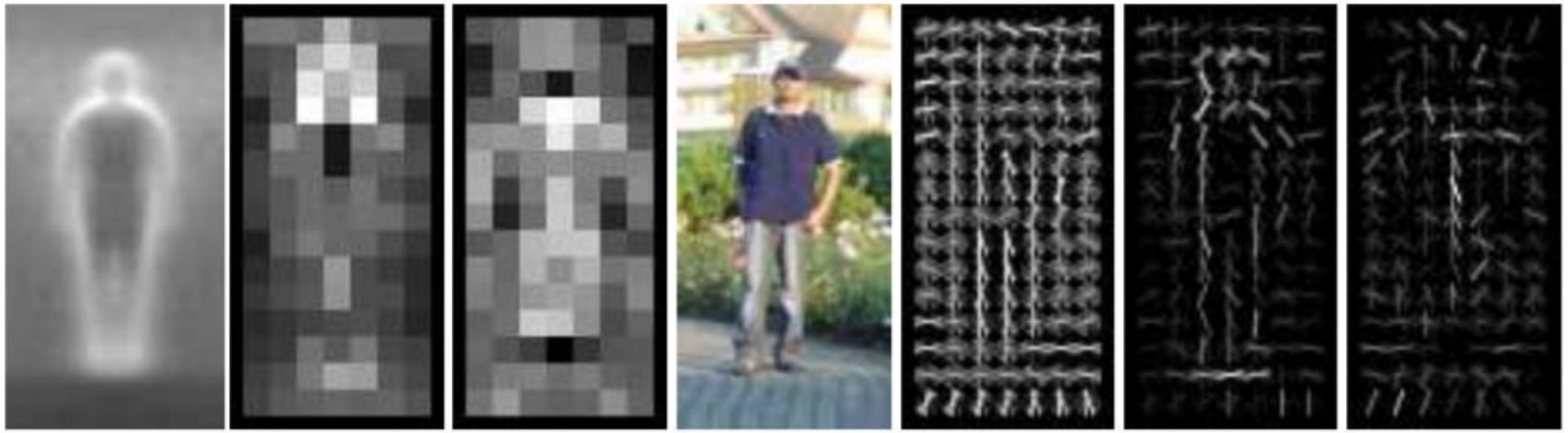
Examples

- Panorama Stitching
  - M. Brown and D. G. Lowe, Recognizing Panoramas, ICCV 2003



Examples

- Histograms of Oriented Gradients for Human Detection
  - N. Dalal, B. Triggs, “Histograms of Oriented Gradients for Human Detection”, CVPR2005
  - https://lear.inrialpes.fr/people/triggs/pubs/Dalal-cvpr05.pdf



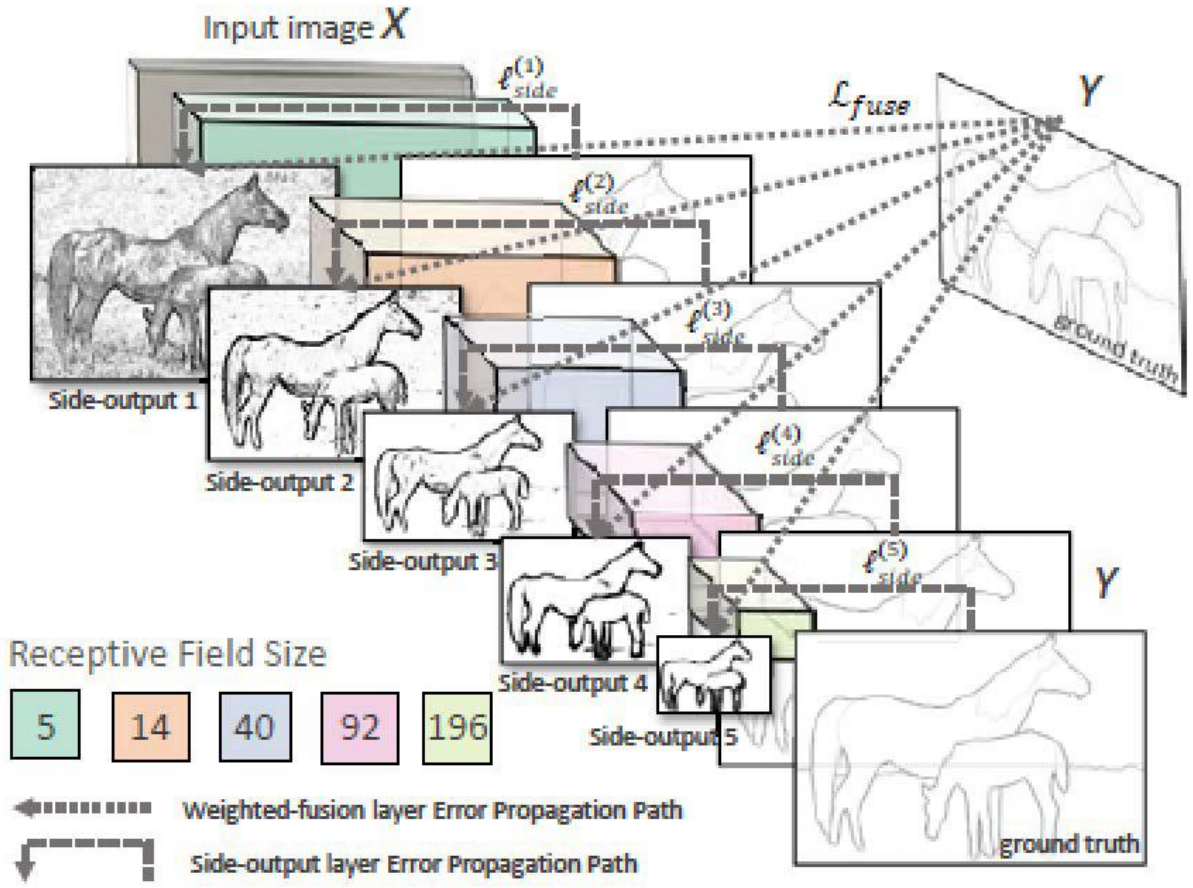
Examples

- Spatial Pyramid Matching for Recognizing Natural Scene Categories
  - S. Lazebnik, C. Schmid, J. Ponce, “Beyond Bags of Features: Spatial Pyramid Matching for Recognizing Natural Scene Categories”, CVPR2006 (https://ieeexplore.ieee.org/document/1641019/)
  - http://slazebni.cs.illinois.edu/slides/ima_poster.pdf

gure 4. Retrieval from the scene category database. The query images are on the left, and the eight images giving the highest values of e spatial pyramid kernel (for $L = 2, M = 200$) are on the right. The actual class of incorrectly retrieved images is listed below them.

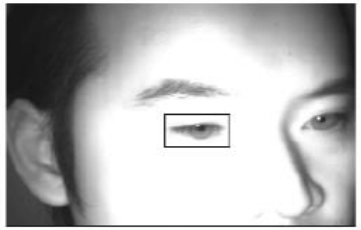
Examples

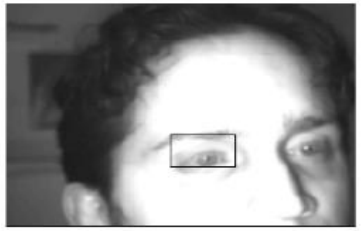
- Edge detection using deep learning
  - S. Xie, Z. Tu, “Holistically-Nested Edge Detection”, ICCV 2015
  - http://openaccess.thecvf.com/content_iccv_2015/papers/Xie_Holistically-Nested_Edge_Detection_ICCV_2015_paper.pdf

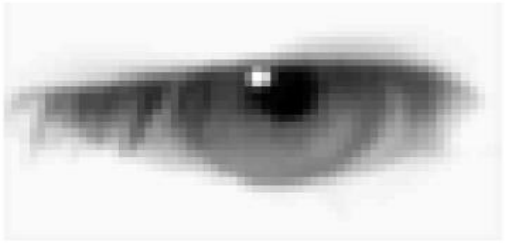


Examples

Human Gaze Tracking







Examples

- Your ideas….