### ECE 596

### HW 4 Notes

## Overview

- Final Project (<u>link</u>)
- Time: roughly 4 weeks
- Type: group work (1-3 people)
- Topic: four topics for you to choice from

   (1) content based image retrieval
   (2) object recognition
  - (3) tracking moving object
  - (4) propose your own project idea
- Eval: Oral and Written Report. (& source code)
- Points: 50 total points (+ extra credit)



(1) content based image retrieval

(2) object recognition

(3) tracking moving object

(4) propose your own project

(1) content based image retrieval

- Step 1: color clustering
- Step 2: connected component



mountain image



morphology - get rid of noise

Step 3: attributes of a region

size, color, texture, centroid, bounding box

- Step 4: region adjacency graph (RAG) inside, above adjacency, below adjacency, left adjacency, right adjacency, other
- Step 5: store step 3, step 4 results of image I

in a data structure DS(I) that you designed.

Step 6: a distance measure RELDIST(11,12) 

find best region correspondence & error

Step 7: a query system

input image I, output RELDIST(I, other Is)

as a sorted list. (UI not required)



- Develop an object recognition system that uses "parts" from interest operators to recognize classes of objects. (ref: Yi's work)
- Step 1: code for detectors and descriptors

e.g. color/texture/line detectors and SIFT descriptors.

- Step 2: EM algorithm used for clustering the parts (link) to find out which attributes correlate well with the object of interest.
- Step 3: discriminative classifier (<u>link</u>)
  <u>the WEKA package for ideas and code</u>.







- The system should be able to detect and track multiple objects in a video, even if the background also moves.
- Result should show a colored box around each tracked object with its designated identification number.
- Sample Method I
- Step 1: compute optical flow
- Step 2: cluster the flow vectors
- Step 3: find and remove the background region

### Sample Method II

- Step 1: interest operators (detectors and descriptors)
- Step 2: incorporate temporal information

(4) propose your own project

- Anything computer vision related that interests you!
- Roughly of 4-week effort
- Define project objectives in report/email.



### Timeline

### Friday

11/15/2019 Confirm Project

- 1. Sign up your group on Canvas. (<u>link</u>)
- 2. Send Linda (shapiro@cs.washington.edu) an email: group member/project choice/changes

### Timeline



#### Timeline Friday 1. Sign up your group on Canvas. 11/15/2019 2. Send Linda (shapiro@cs.washington.edu) an email: **Confirm Project** group member/project choice/changes Monday 3. Send Yun-Hsuan (yhsu83@uw.edu) an 11/25/2019 email: with progress report about **Progress Report** current project progress. (template) Tuesday 4. Send Linda (shapiro@cs.washington.edu) 12/03/2019 your power point slides by 12/02/2019. **Oral Presentation** 5. Group presentation: demo + talk (TBA mins)

#### Timeline Friday 1. Sign up your group on Canvas. 11/15/2019 2. Send Linda (shapiro@cs.washington.edu) an email: **Confirm Project** group member/project choice/changes Monday 3. Send Yun-Hsuan (yhsu83@uw.edu) an 11/25/2019 email: with progress report about **Progress Report** current project progress. (template) Tuesday 4. Send Linda (shapiro@cs.washington.edu) 12/03/2019 your power point slides by 12/02/2019. **Oral Presentation** 5. Group presentation: demo + talk (TBA mins) Saturday • 6. Submit code and final report on Canvas. 12/07/2019 template Final Report Due Late submission till 12/10/2019 (With 10% penalty per day)