COMP3800 Image Processing

Final Project

Requirements

- Team: 2~3 students (find a leader)
- Use MATLAB, add GUI to your program, google drive to share image and code.
- Real-world problems can be listed on your resume, extra bonus for the problems from Co-op.
- Image source: your own pictures (preferred, webcam on your laptop/phones, pick the quality and angle of images) or existing online image database (not preferred)
- Algorithms: permit use existing algorithms from publications
- Talk to me with ideas ASAP

Deliverables

- Proposal presentation (15%)
- MATLAB project (20%)
- Group presentation (45%)
- Poster (20%)
- Peer evaluations (up to 50% of the final project grade could be altered)

Group Final Presentation (1)

- Whole team!
- Everyone need do presentation. 10 mins/team
- Sections

1. Motivation (problem solved)
2. Relevant background
3. Design: flow charts, screenshots, etc
4. Image dataset description and algorithms (list the algorithms you learned through this course)
5. **Intermediate results**
6. Challenge (story, failed methods, what you learned through the project, any changes with proposal).
7. Demo! Questions!

Group Final Presentation (2)

- Evaluation (i.e. grading) factors…
  - Motivations (interesting, challenge, real-world problem)
  - Length, clarity, professionalism (practice!)
  - Member participate
  - Demo quality (subjective)
  - Results (same or better than existing methods)
- Audience participation: ask great/insightful/awesome questions!

1-6-6 Rule

- One idea per slice
- Six bullet points per slice
- Six words per bullet point
- Highlight the bullet you are talking
- Use more pictures rather than text
- 'Questions' for the last slice

Final presentation evaluation form

Group	Interest	Group work	Clarity	Professionalism	Demo	Total
1	/20	/10	/20	/10	/40	/100
2	/20	/10	/20	/10	/40	/100
3	/20	/10	/20	/10	/40	/100
4	/20	/10	/20	/10	/40	/100
5	/20	/10	/20	/10	/40	/100
6	/20	/10	/20	/10	/40	/100
7	/20	/10	/20	/10	/40	/100
8	/20	/10	/20	/10	/40	/100

Note: Presentation time: no more than 12 minutes (including demo)

Project code

- Upload to Blackboard (or shared drive if you have a huge number of images), file/folder name is section # + group # (e.g., Section12_Group1)
- Including detailed user manual. You should ask someone else to run your code following the user manual
- Including several test images. Make sure your code works for those test images
- Including the result images. Please also upload result images for the test images with your code

Poster

- Clear and better demonstration
- Key components:

1. Title (clear and get attention)
2. course name (**COMP3800 Image Processing**), Section, Group, and authors' name
3. Background (or Introduction/Motivation)
4. Methods (including data source, algorithm, flowchart, etc.)
5. Results (accuracy, compare with other existing methods, picture of results
6. Conclusions (what you learned through this project, possible future improvement, possible application through your project)

Poster

- People usually only spend several minutes for each poster, use more pictures to attract people
- Use PowerPoint to create poster draft, font should not be too small
- Recommended Size: 48” x 36” (Width x Height), color print (photo-quality $0.91/square foot at WIT)
- We will have a poster tour. Your group will introduce the poster during the tour.
- Also upload .ppt/.pdf version to Blackboard (file name is group#)
- Sample posters: https://web.stanford.edu/class/ee368/Project_Spring_1314/index.html

Face Swapping

Motivation

Goal: To develop a method for replacing faces in an image with stock faces

There is a growing concern of online privacy with today's large collections of high-resolution images. Many public photos contain people who have not consented to be photographed, much less for commercial purposes. While the current practice of obfuscating face regions uses blurring or pixelation, it can often decrease the visual appeal of the image. One solution to this problem is to replace every face in the image with stock faces.

Future Work

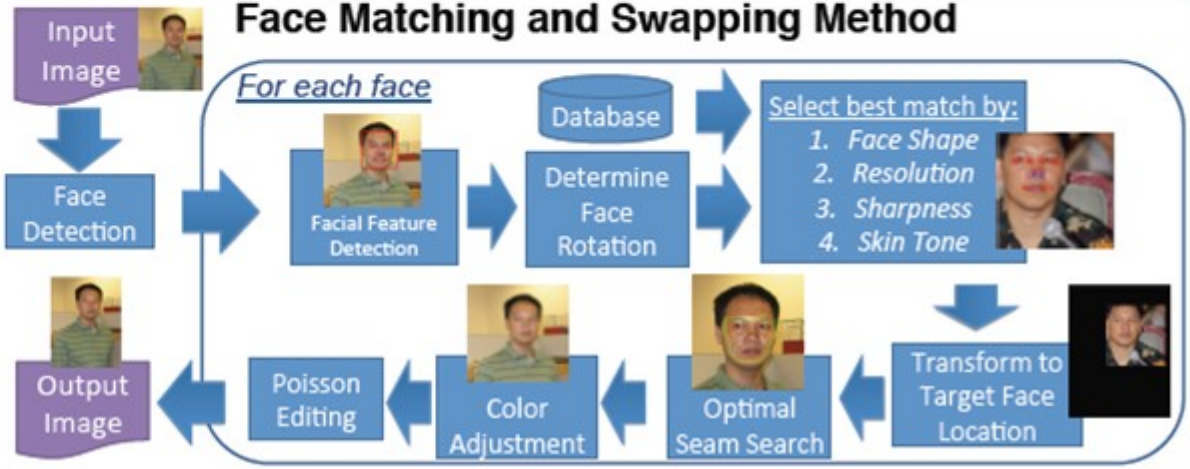
1. Pose Estimation

2. Illumination direction correction

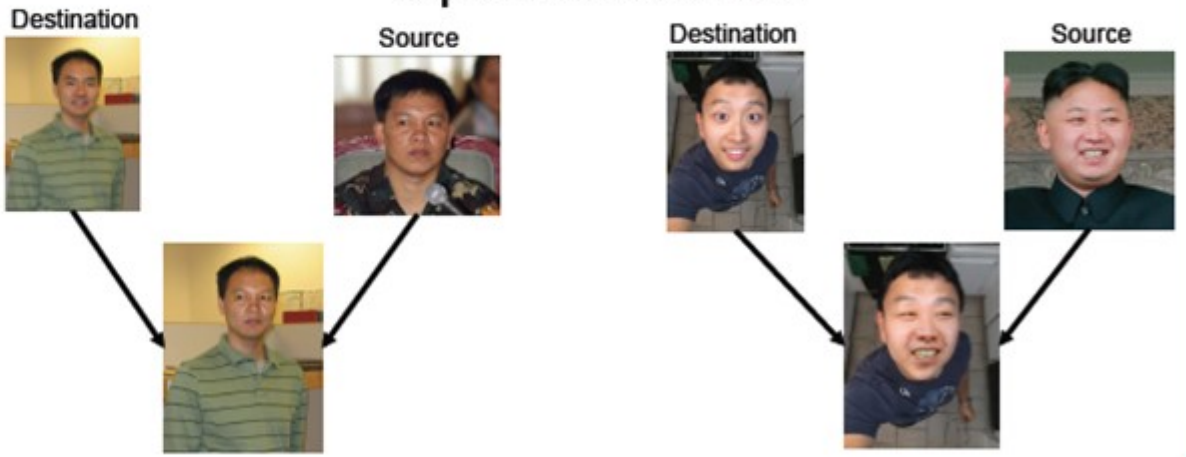
Related Work

[1] Bitouk, Dmitri, et al. "Face swapping: automatically replacing faces in photographs." ACM Transactions on Graphics (TOG). Vol. 27. No. 3. ACM, 2008.
[2] Avidan, Shai, and Ariel Shamir. "Seam carving for content-aware image resizing." ACM Transactions on graphics (TOG). Vol. 26. No. 3. ACM, 2007.
[3] Pérez, Patrick, Michel Gangnet, and Andrew Blake. "Poisson image editing." ACM Transactions on Graphics (TOG). Vol. 22. No. 3. ACM, 2003.

Face Matching and Swapping Method



Experimental Results



STOP SIGN RECOGNITION

[redacted]
Image Processing COMP-3800-14

Motivation

Objective: To develop a MatLab program that will detect if a stop exists in a given image

- To apply image recognition concepts to a real-world problem
- The growing autonomous vehicle industry
  - o Self-driving cars
  - o Autonomous railways
- Increase need for computer vision on the roads

Future Work

360 Degree Object Detection:

- Detect different objects on the road from all angles

Moving Stop Sign Recognition:

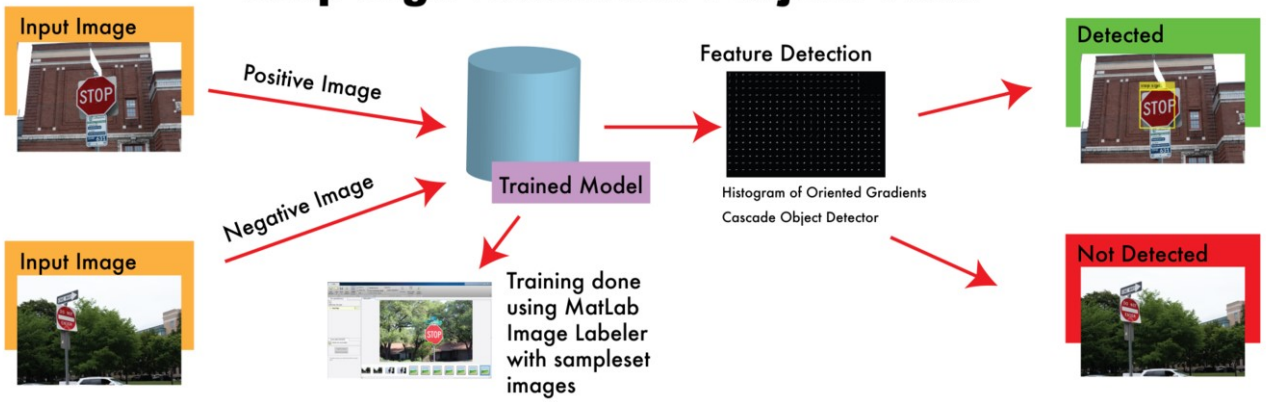
- Trains the model by using video instead of image
- Simulates real time detection

Algorithms

Histogram of Oriented Gradients:

Coscade Object Detecor: MatLab Function

Stop Sign Detection Project Flow



Experiment Results

Input Image

Stop Sign Detected

Input Image

No Stop Sign Detected