Assignment 4:

Stereo Matching

Computer Vision

National Taiwan University

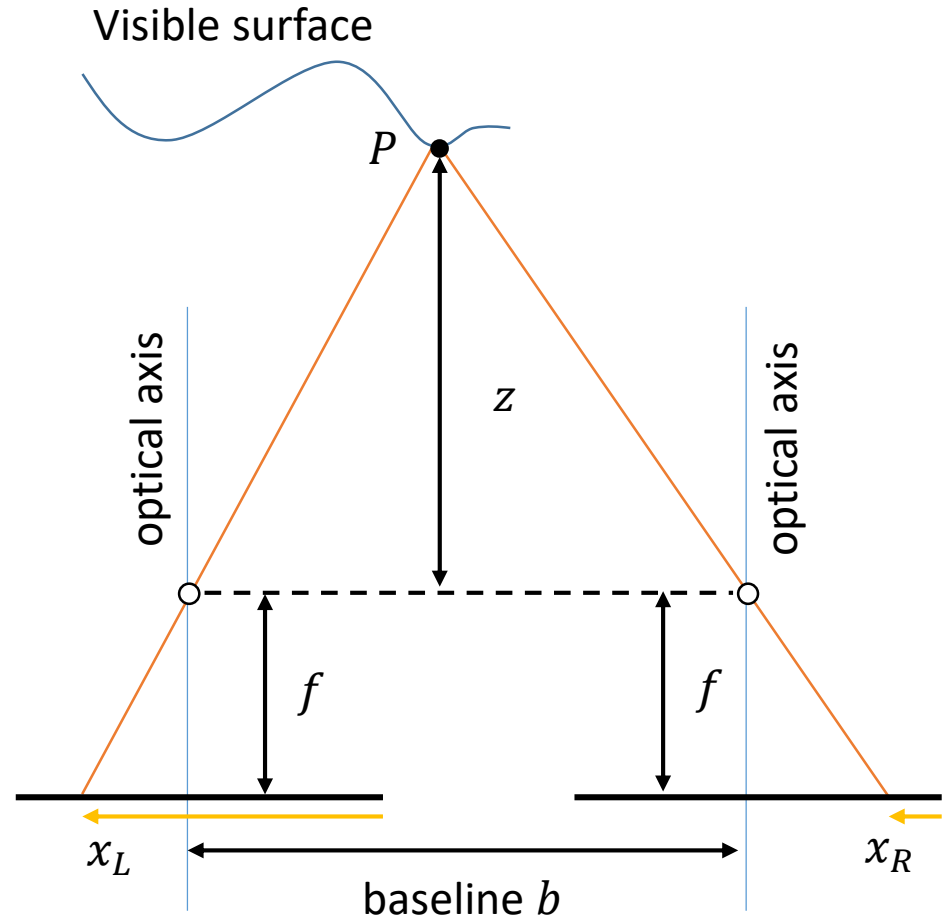Fall 2018

Part 1: Depth from Disparity

- Let $d = x_L - x_R$

- Prove
$$d = \frac{f \cdot b}{z}$$

(hint: similar triangles)

Visible surface

P

optical axis

optical axis

z

f

f

x_L

x_R

baseline b

Part 2: Disparity Estimation

- Compute disparity maps for the four standard test pairs from Middlebury v2

- Evaluation metric: bad pixel ratio (error threshold = 1)

Tsukuba

Max disp = 15
Scale factor = 16

Venus

Max disp = 20
Scale factor = 8

Teddy

Max disp = 60
Scale factor = 4

Cones

Max disp = 60
Scale factor = 4

Part 2: Regulations

- Implement your code in main.py

- Evaluate using eval_stereo.py

- Do not use deep matching costs

Grading

- Part 1: 10%
- Part2:
  - Tsukuba baseline = 8.0 (15%)
  - Venus baseline = 5.0 (15%)
  - Teddy baseline = 18.0 (15%)
  - Cones baseline = 15.0 (15%)
  - Ranking according to the avg. score among the class (20%)
  - Report (10%)

Report

- Your student ID and name
- Part 1
  - Write down your proof.
- Part 2
  - Explain your algorithm in terms of the standard 4-step pipeline. (cost computation, cost aggregation, disp. optimization, disp. refinement)
  - Show your output disparity maps in the report.
  - Show your bad pixel ratio in the report.
  - Your reference papers or websites.

Submission

- Code: main.py (Python 3.5+)

- A PDF report

- Compress all above files in a zip file named StudentID.zip
  - e.g. R07654321.zip

- Submit to CEIBA

- Deadline: 12/28 11:00 pm