Assignment 4:

Stereo Matching

Computer Vision

National Taiwan University

Fall 2018
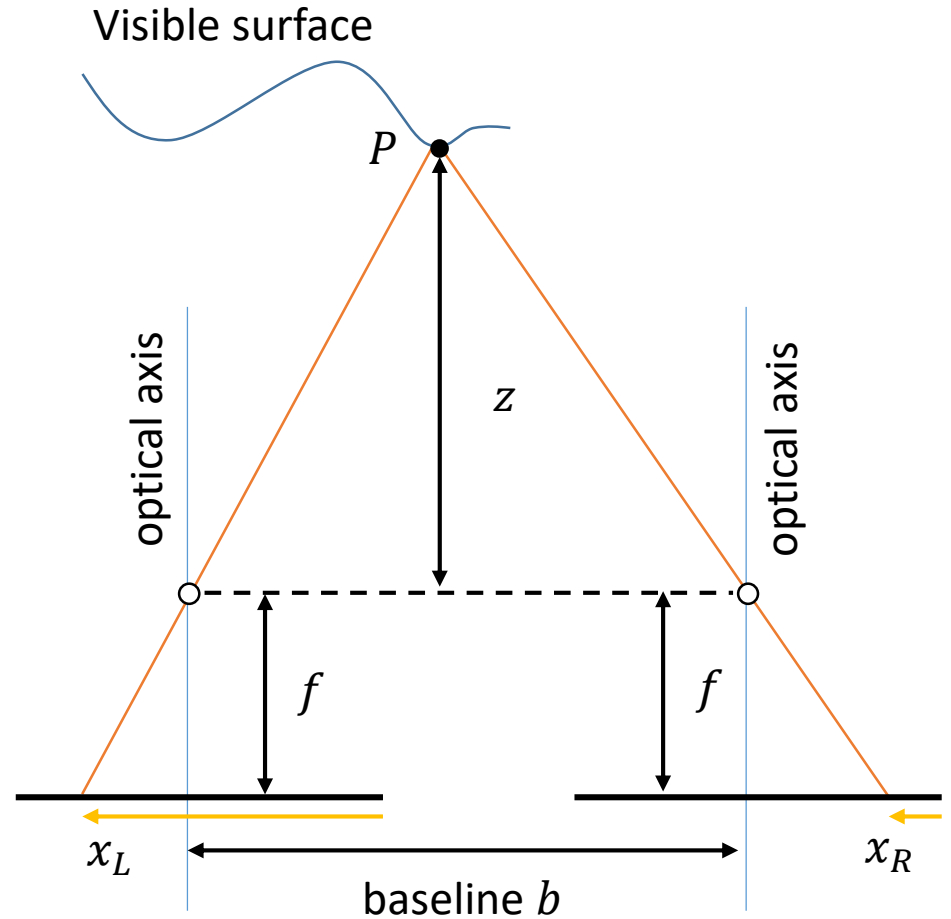
Part 1: Depth from Disparity

- Let $d = x_L - x_R$

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

  (hint: similar triangles)

Visible surface

P

optical axis

z

optical axis

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 *Venus* *Teddy* *Cones*

Max disp = 15
Scale factor = 16

Max disp = 20
Scale factor = 8

Max disp = 60
Scale factor = 4

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:

Table. Score vs. bad pixel ratio

Score	Tsukuba	Venus	Teddy	Cones
15	< 8	< 5	< 18	< 15
10	>= 8	>= 5	>= 18	>= 15
5	>= 9	>= 7	>= 24	>= 20
0	>= 10	>= 10	>= 30	>= 25

- Ranking according to your 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