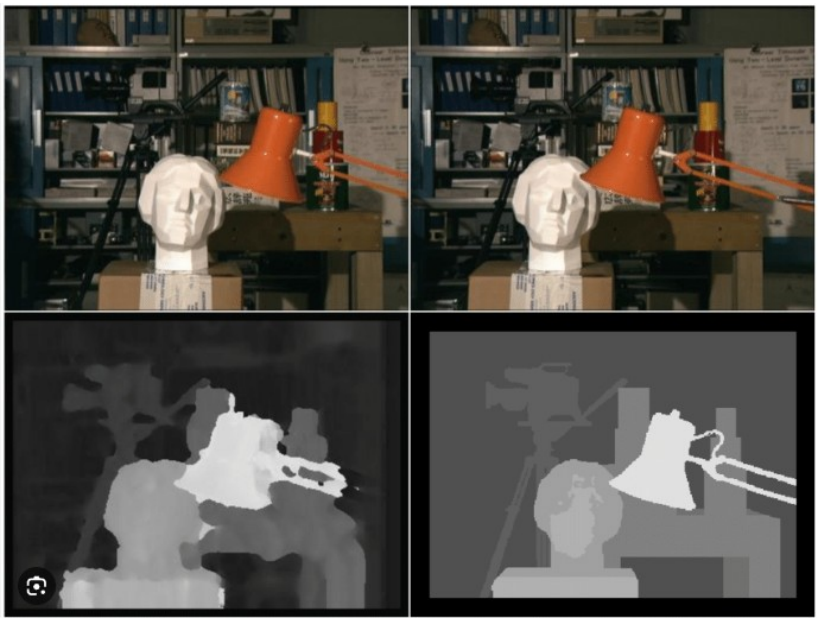
SWE 507 PARALLEL PROGRAMMING PROJECT STUDY 4 (for midterm) (2024)

Due date: 24 May 2024, class time.

In this project, you are expected to create a solution for stereo image processing with sequential programming model using C language. Expected outcome of your application is a dept image of objects in gray color which is called disparity. Stereo image pairs for testing your application can be obtained (will be provided as well) from KITTI benchmark suite. Figure 1 shows an example input pair and output of similar work in literature [1]. The first row depicts image pairs (left and right images), and the second row left image shows the output of the system which is a depth map of objects with gray level. Second row, right image is the rectified image of the depth map (left). Please use the references given below to complete the task properly [2, 3, 4, 5].



- In this project you are supposed to implement a sequential solution to the problem.
- Measure the performance of your implementation.
- Profile the execution, find possible improvement points.
- Do possible improvements and measure the performance again.

References:

[1] https://www.researchgate.net/publication/220595132_Stereo_Image_Quality_Assessment _Using_Visual_Attention_and_Distortion_Predictors/figures?lo=1
[2] Stereo Vision: Depth Estimation between object and camera https://medium.com/analytics-vidhya/distance-estimation-cf2f2fd709d8
[3] Depth Map from Stereo Images. https://docs.opencv.org/4.x/dd/d53/tutorial_py_depthmap.html
[4] Depth-Map Generation using Pixel Matching in Stereoscopic Pair of Images. https://arxiv.org/pdf/1902.03471
[5] Kitti benchmark dataset. https://www.cvlibs.net/datasets/kitti/

Grading:

No	Task	Grade
1	Program works correctly	75
2	Present the profile output and show possible performance improvements	5
3	How execution time varies based on problem size (image size)?	20

PS: In class presentation is required.