

3DMM 2014
Assignment #3: OpenCL

Environment Setting

- Intel

- <https://software.intel.com/en-us/vcsourc/tools/opencl-sdk>

1. Install Intel OpenCL CPU runtime (32 bit or 64 bit)

2. Install Intel SDK for OpenCL

- NVIDIA

- <https://developer.nvidia.com/opencl>

- AMD

- <http://developer.amd.com/resources/heterogeneous-computing/opencl-zone/>

Problem – Image Abstraction



Input image

Problem – Image Abstraction



Bilateral filtering result

Problem – Image Abstraction



Edge map

Problem – Image Abstraction



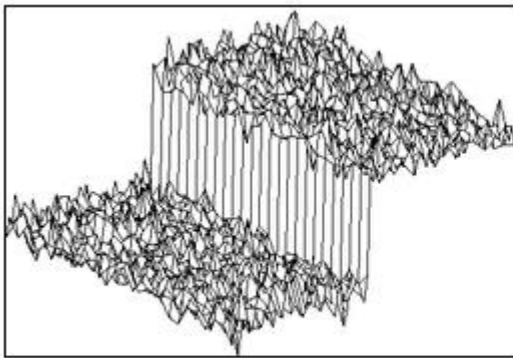
Combined image = Image abstraction

Bilateral Filtering

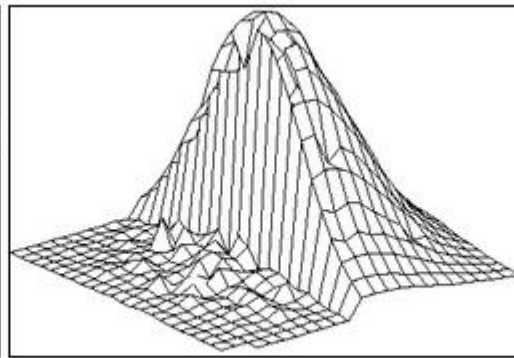
- http://homepages.inf.ed.ac.uk/rbf/CVonline/LOCAL_COPIES/MANDUCHI1/Bilateral_Filtering.html
- http://en.wikipedia.org/wiki/Bilateral_filter

$$I^{\text{filtered}}(x) = \frac{1}{W_p} \sum_{x_i \in \Omega} I(x_i) f_r(\|I(x_i) - I(x)\|) g_s(\|x_i - x\|),$$

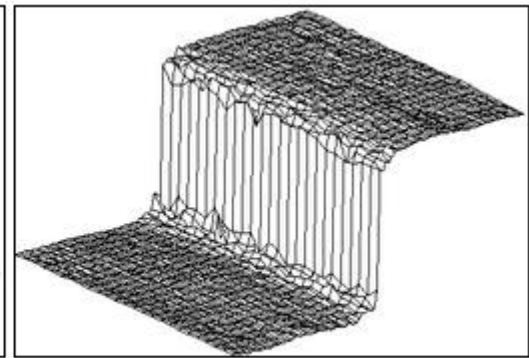
$$W_p = \sum_{x_i \in \Omega} f_r(\|I(x_i) - I(x)\|) g_s(\|x_i - x\|)$$



(a)



(b)



(c)

Report

- Explain your OpenCL code. For example:
 - How many kernels do you use? Why?
 - How do you manage the memory (buffers)? Why?
- What kind of platform do you use? How many cores(threads) do you have?
- What is your final speedup ratio? Is it possible to achieve the speedup ratio as the number of cores in your device? Why?

Scoring

- Program functionality
 - 60%
- Report
 - 20%
- Performance
 - 20%

Submission

- **Deadline: 2014/5/12 11:59 pm**
- Compress all required files as a single ZIP or RAR file.
 - **Naming rule:**
 - 3DMM_HW3_R02943001.zip
 - 3DMM_HW3_R02943001_v2.zip
- FTP:
 - **140.112.174.82**
 - Port: **2021**
 - Account: The same as the one used in the course website.
- Required files
 - Report, in **PDF** format
 - **Only source code** (ImageAbstraction_ocl.cpp/ImageAbstraction.cl)
- Any further question, please contact TA
 - 塗偉志 wctu@media.ee.ntu.edu.tw