OpenCL Benchmark Progress Report (2016.10.07)

1. Test different local_work_size:
   1) Cannot exceed {16, 16} including 16*16, the reason might be the private memory size limitation, because the private memory will be divided evenly by the work items in a work group to hold local variables in kernel code.
   2) When 8*8 get the optimal result, save nearly 9ms (90ms vs 81ms) per filter comparing to default local_work_size.

2. Found a way to measure the different events execution time in the queue, clGetEventProfilingInfo(); After the test, it can be sure that, the data from host to device will only be transferred once(after check the read data event startTime several times, it all the same), which means we don't need to consider the situation that the data has been copied multiple times.

3. There are 2 unknown problem:

   1) The output picture from buffer method has higher quality than the one from image method:

(1) Output from image method

(2) Output from buffer method

The reason for this might be the function clEnqueueReadImage() losing some data when transfer to host, because when I use the same function on my laptop Nivdia GPU, it raise an error said the host pointer(host output) has been accessed out of range.

2) When I test the kernel running time for Image method, there is a huge wired difference for one filter, between the two measurement clGetEventProfilingInfo() and time_stamp(), however it doesn't happen in buffer method.

```
// execute kernel
for (int l_i = 0; l_i < filterNum ; l_i++)
{
    perf_start = time_stamp();
    clStatus = clEnqueueNDRangeKernel(command_queue, kernel, 2, offset, global_work_size, local_work_size, 0, NULL, &kernelRun);
    //SAMPLE_CHECK_ERRORS(clStatus);
    clStatus = clFinish(command_queue);
    perf_stop = time_stamp();
}

printf("       NDRange perf. counter time (%d Filter Calls) %f ms.\n", 1, (perf_stop - perf_start) * 1000);
```

Source code

```
Global_work_items, width = 1920, height = 1120
Image Read Time = 8.103000 ms
       NDRange perf. counter time (1 Filter Calls) 925.632000 ms.
Image kernel Time = 145.910000 ms
Image write to host Time = 21.941000 ms
```

Output for image method

```
Global_work_items, width = 1920, height = 1120
Buffer Read Time = 7.889000 ms
       NDRange perf. counter time (1 Filter Calls) 82.702000 ms.
Buffer kernel Time = 81.171000 ms
Buffer write to host Time = 21.235000 ms
```

Output for buffer method