TSB-funded Project 'TADD' –
Trainable vision-based anomaly detection and diagnosis
Technical Report for August 2014

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Abstract

Since the last project review meeting in 9 August 2014, I have spent most of my time in August in preparing the Siggraph presentation, attending the Siggraph conference and travelling abroad for holiday. Thus in the following, I just attach the report on Siggraph 2014.

Report on Siggraph 2014

Ran Song

I attended the renowned Siggraph conference in Vancouver, Canada from 10 August to 14 August, 2014. It is the most prestigious forum for the publication of computer graphics research. This year, 14,045 attendees including research scientists, developers, filmmakers, students and academics from 50 U.S. states and 75 countries gathered to experience cutting-edge computer graphics and interactive techniques. It was heavily covered by media and quite a lot of major IT companies demonstrated their latest techniques and/or research findings at Siggraph 2014, for example:

Microsoft: http://research.microsoft.com/en-us/about/siggraph-2014.aspx
Intel: https://software.intel.com/en-us/siggraph2014/home
NVIDIA: http://www.nvidia.com/object/siggraph2014.html

Figure 1. The exhibition hall © Siggraph 2014

I presented a technical paper titled ‘Mesh saliency via spectral processing’ at the conference and also talked with people from industry. There were quite a few 3D sensors on display in the huge 40,000 sq. ft. exhibition hall (see Figure 1). Most of them were designed for 3D motion capture (for the applications in film industry for special visual effect and video/computer games) while several of them were apparently fit for sensing small static objects with high accuracy. It seems that the stereo vision-based sensing techniques are quite popular and demonstrated to be reliable, efficient and partially noise-free.

Besides the hardware, I also found some interesting software which can be potentially used in the TADD project. Certainly most of them are not free but some are indeed open source. One is called ‘Open Standard APIs for Vision and Camera Processing’ developed by the KHRONOS Group. It includes three libraries, namely OpenKCam for Camera Processing, OpenVX for powerful efficient vision acceleration and EGL stream I/O. As shown in Figure 1, it is complementary to OpenCV, which means our TADD software based on OpenCV could be updated with the help of OpenVX for acceleration purpose.

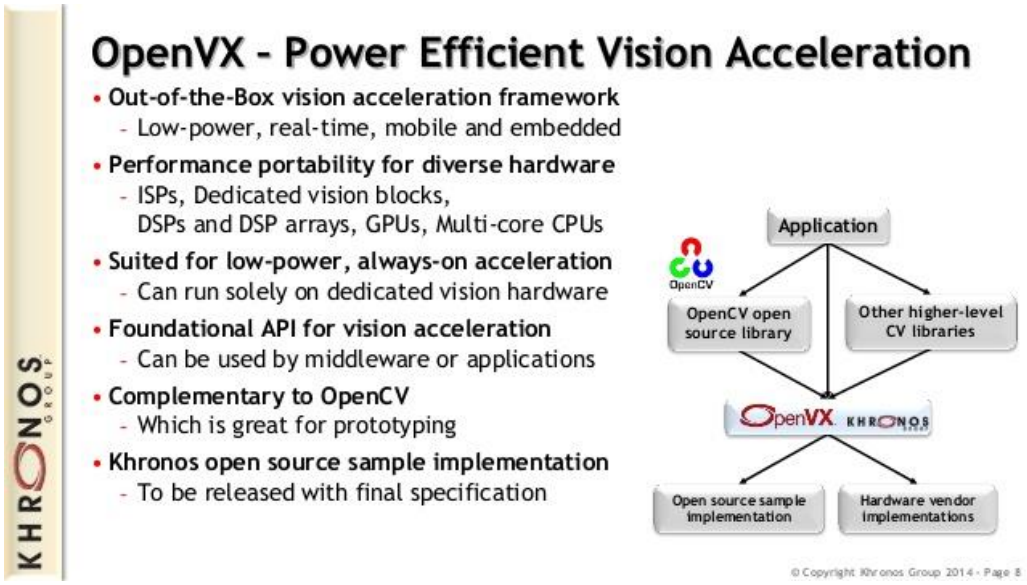

Figure 2. An overview of the the OpenVX API. © Copyright Khronos Group

Most of the software for vision applications, free or not free, support OpenCV, which demonstrates the fact that OpenCV has been the dominant industrial standard. However, for 3D graphics applications, there are three major players: OpenGL, CGAL (https://www.cgal.org/) and DirectX. Compared with OpenGL and DirectX, CGAL is not that well-known. However, their staff at the booth gave me a very impressive demonstration about what it can achieve for 3D geometry computation, rendering and visualisation. Obviously, the development of the 3D-TADD software could benefit from CGAL.

In summary, attending Siggraph 2014 is an excellent experience for me to know about the cutting-edge R&D in 3D vision and graphics around the world. More importantly, I received valuable advices about how to make the research work come out of the lab and become really useful for industry to solve real-world problems. I believe that it is particularly vital for the success of the TADD project.