

The Needle Detection and Reconstruction Based on OCT image with GPU Platform Acceleration

The needle detection and reconstruction is the key challenge to realize the automatic operation of surgery. In the eye surgery, surgeons use a needle with diameter below 0.3 mm to inject into the eye and deliver some drug into vessel on the retina.

Currently, OCT image technology is only available approach to obtain 3D image of needle with ideal resolution. We have already developed the needle detection and reconstruction method for OCT 3D image (Fig.1). However, the large amount of computation leads to more than 40s computation time for one frame. Here, GPU acceleration approach is adopted for the real-time application. Nvidia GTX 660 Ti and 980 Ti are available for our application (Fig.2).

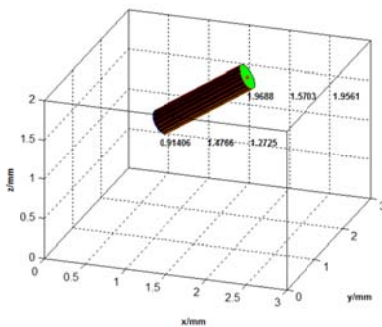


Fig. 1. Need 3D reconstruction



Fig. 2. Nvidia GPU card

The project will include following phases:

1. Learn the Cuda package for Nvidia GPU programming.
2. Learn the image algorithm we have developed for needle modeling.
3. Implement and test the algorithm on GPU with Cuda.
4. Write and conclude the results.

We require the candidate having basic knowledge of image processing and good math background.

If you have interest please contact us for further information:

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