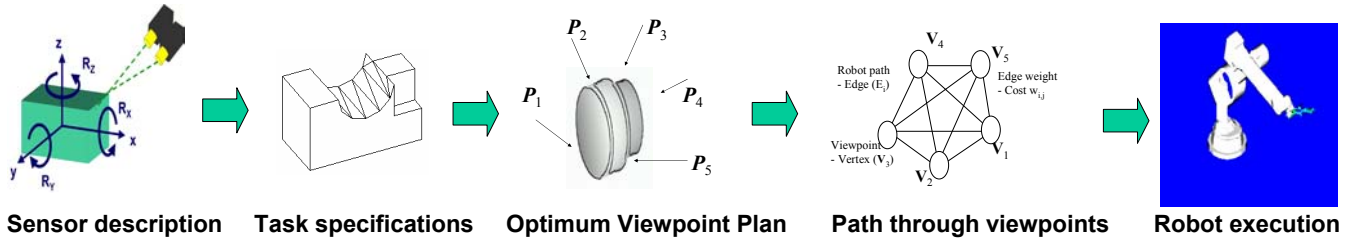


By Shengyong Chen, PhD student (supervisor Dr. Y. F. Li)

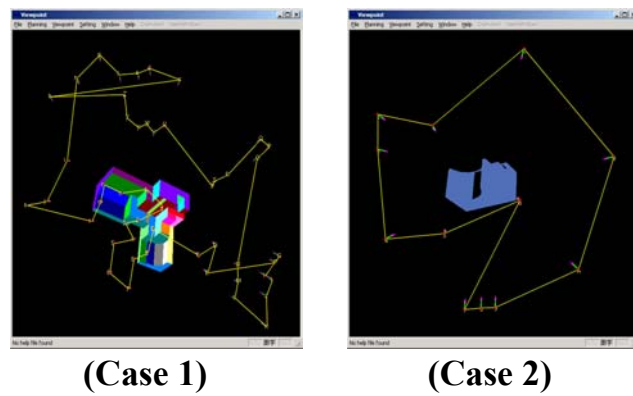
Objectives:

To develop strategies of automatic viewpoint planning for a robot in vision tasks, e.g. (1) model-based industrial inspection and (2) modeling of 3D unknown targets.

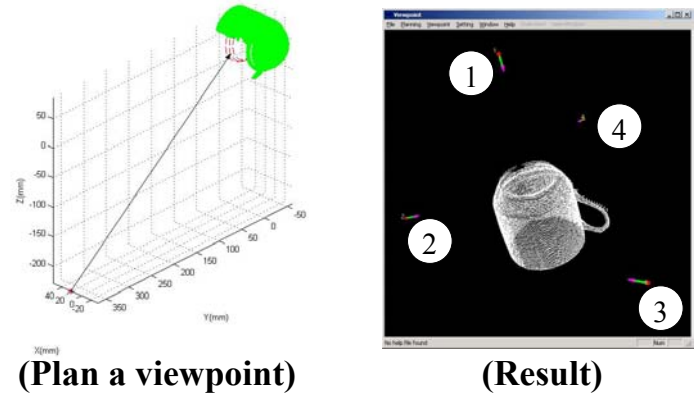
Procedure:



Example of Inspection Planning:



Example of 3D Modeling: (Viewpoint Decision)



* The perception planning for model-based robot inspection is to search an optimal sensing plan with a sequence of viewpoints. According to the sensor configuration and task specifications, it determines a least viewpoint number and best spatial distribution so that the inspection task can achieve highest efficiency. * The viewpoint decision for modeling of an unknown 3D target is to decide where to look at the target during the modeling process. This is beneficial to finish the task. * The incremental reconstruction of a complete object is a process which generates multiple viewpoints to obtain unknown area of the object. Surfaces are integrated together to form a complete model.

Example of 3D Modeling: (Incremental Reconstruction of a Complete Object)



Awards:

1. The 1st Prize in 2003 IEEE Region 10 Student Paper Contest, Oct. 2003.
2. The 3rd Prize in IEEE Hong Kong Section 2002 Postgraduate Student Paper Contest, Sep. 2002.

Representative Publications:

1. "Automatic Recalibration of an Active Structured Light Vision System", *IEEE Transactions on Robotics and Automation*, Vol. 19, No. 2, April 2003. pp. 259-268.
2. "Automatic Sensor Placement for Model-Based Robot Vision", *IEEE Transactions on Systems, Man and Cybernetics, Part B*, Vol. 33, 2003. (in press).
3. "Self-recalibration of a colour-encoded light system for automated 3-D measurements", *Measurement Science and Technology*, vol. 14, no. 1, January 2003. pp. 33-40.