CS5520 影像繪圖 (Image-Based Rendering)

Fall 2004

Classroom: **資電館** Room 128

Time: Monday 1:10 pm – 3:00 pm, Thursday 1:10 pm – 2:00 pm.

Instructor: **張鈞法** (Chun-Fa Chang)

Office Hours: By Appointment.

Office: **資電館** Room 642

Phone: (03) 574-2962

Email: chunfa@cs.nthu.edu.tw

Scope & Goals: Image-Based Rendering has evolved into an important research domain in 3D graphics since Leonard McMillan's landmark work in 1996. It replaces the labor-intensive process of geometric modeling in traditional 3D graphics by using images as the input data. It differs from computer vision because no 3D model is explicitly reconstructed from the input images. In this course, we will study the fundamentals of image-based rendering, its classical work, and the current state of art.

Textbooks: Paper Collection**.**

References:

1. SIGGRAPH Proceedings (available online at ACM Digital Library).
2. SIGGRAPH 2001 Course Notes #46 "Surface Light Field"
3. SIGGRAPH 1999 Course Notes #39 "Image-Based Modeling and Rendering"
4. 3D Computer Graphics (3rd Edition), by Alan Watt.

Grading: Assignments: 20%, Paper Presentation: 35%, Project: 35%, Class Participation: 10%

Workload (subject to change):

1. **Programming Assignments**: There will be one or two programming assignments (for example, a 3D warping program). Experience with C or C++ programming is required. **Don't worry about its complexity**. Examples or pseudo codes will be available to make them easier and enjoyable to you.
2. **Paper Presentation**: You are expected to study a technical paper thoroughly and present its ideas to the class.
3. **Project**: The class will be divided into teams of 2-3 persons, with each team working on a different project. **At about the 8th week**, each team is expected to submit a proposal. **At about the 12th week**, each team will present the current progress. **Before the end of semester**, each team will present its results and demonstrate the finished product.

Topics and Schedule: (subject to change)

- Overview and Introduction (1 week)
- QuickTime VR and View Interpolation. (1 week)
- Plenoptic Function and 3D Warping. (1 week)
- Light Field Rendering and Lumigraph. (1 week)
- Surface Light Fields and Light Field Mapping. (2 weeks)
- Visual Hulls and Opacity Hulls. (1 week)
- 3D Scanning (1 week)
- Paper Presentations (4-5 weeks)
- Project Progress Reports and Demos (2 weeks)