Hand Gesture Interface based on TSL Adaptive Skin Detection and Fourier Descriptor

顧　磊　池永研　修士課程2年

■ Background

■HMD (Head-mounted display) is showing growing importance and enlarging potential.

■ Hand gesture interface is one of critical technologies for practical application of HMD.

Develop A Robust and Realtime Hand Gesture Interface for HMD

■ Problems of Existing Methods

➢Accuracy

・Detection skin color mode should be adaptive to different people in different light situation

➢Complexity

・Computation complexity should be controlled to meet the need of real-time.

■ Purpose

Improve the existing methods to obtain more accuracy and speed.

Proposal

Hand Area Detection

- HSV Color Space Threshold Filter
- Gaussian Filter
- TSL Color Space Conversion
- TS Space Filter
- Contour Detection

Finger Detection

- Contour Signature Generation
- Peak Point Detection
- Fingertips Labelling

Gesture Recognition

- Fourier Descriptor Transform
- Low Pass Filter
- Magnitude Features
- SVM Classification

■ Proposal 1 : TSL self-adaptive hand skin color detection

■TSL color space make high difference between non-skin color and skin color value.

■Adaptive to different people in different light situation automatically.

■ Proposal 2 : Fourier descriptors based hand gesture detection

■Invariant to shape transformation

■Fourier descriptors to delineate the hand contour.

■Decrease the computation for SVM classification.

Result