



IMSC
Integrated
Media Systems
Center

INTEGRATED MEDIA SYSTEMS CENTER
A National Science Foundation
Engineering Research Center at the
UNIVERSITY OF SOUTHERN CALIFORNIA

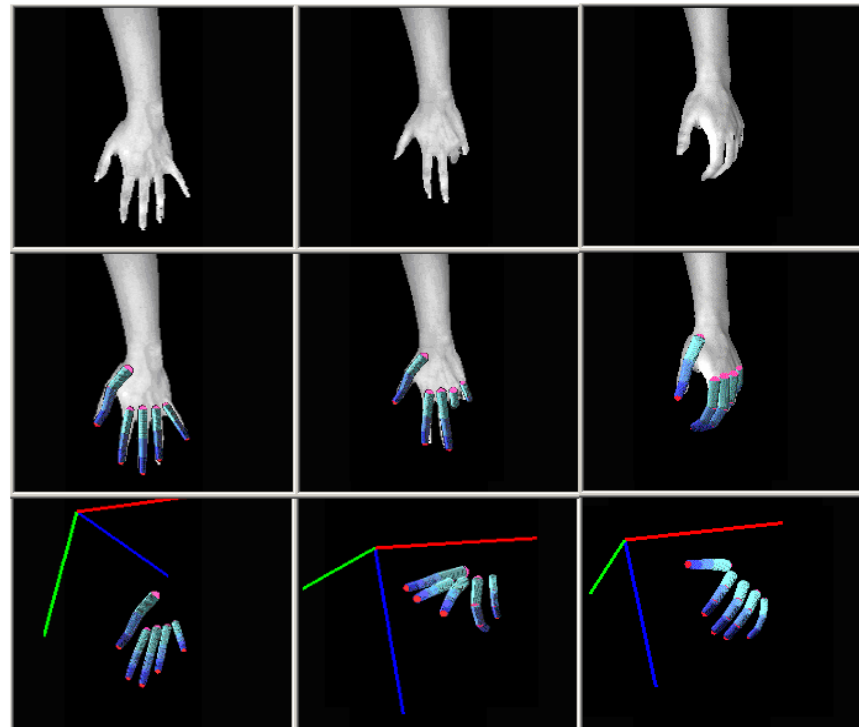
PRINCIPAL INVESTIGATOR

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USC STUDENTS (EXPECTED DEGREES):

Sung Uk Lee (Ph.D.)

3D Modeling of Hands and Fingers from Single Camera



BRIEF DESCRIPTION OF TECHNOLOGY DEMONSTRATION

Accurate hand motion tracking is important in HCI and applications requiring an understanding of user motions. Hand gestures can be used as a convenient user interface for various computer applications in which the state and the action of the users are automatically inferred from a set of video cameras. The objective is to extend the current mouse-keyboard interaction techniques in order to allow the user to behave naturally in the immersed environment, as the system perceives and responds appropriately to user actions. HCI related applications remains the most frequent however; we have focused our effort on the accurate detection and tracking of un-instrumented hands for assessing user performance in accomplishing a specific task.

UNIQUE OR DISTINGUISHING CHARACTERISTICS RELATIVE TO STATE-OF-THE-ART

- Automatic initialization
- 3D hand reconstruction from a monocular (single) image
- 3D tracking of finger joints
- 3D tracking of self occluded fingers' joints

APPLICATIONS <ul style="list-style-type: none"> • Motion Capture • Computer Aided Training • Virtual prototyping • Perceptual User Interface, Attentive User Interface 	RECENT HIGHLIGHTS, LEVEL OF DEVELOPMENT, UPCOMING MILESTONES <ul style="list-style-type: none"> • Hand modeling with adaptation of the model to the hand's proportions • Use of motion cue for accurate tracking • Future: Real-time performances, Gesture-based interaction, Manipulation of objects
UNDERLYING TECHNOLOGIES <ul style="list-style-type: none"> • A 22 degrees of freedom 3D articulated model of the hand • Automatic initialization from detected silhouettes • Geometric fitting of the model to the detected silhouette • Kalman filter for tracking fingers' joints and palm orientation 	
LIST OF PUBLICATIONS, REFERENCES, URLs <ul style="list-style-type: none"> • S.U. Lee and I. Cohen. 3D Hand Reconstruction from Monocular View, International Conference on Pattern Recognition. Cambridge, United Kingdom. August 2004. 	

For additional information, please contact the Principal Investigator listed above via email, or contact

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