

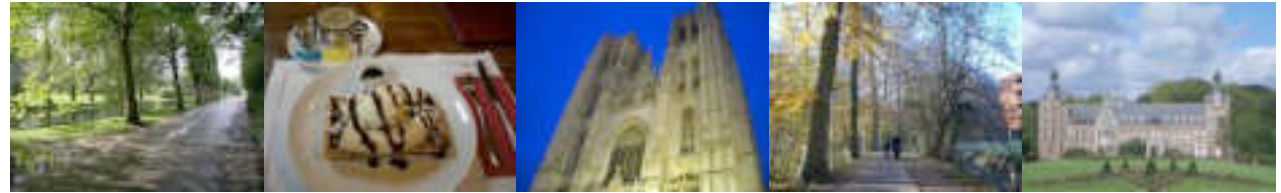
E U/Japan Pilot Project 2004-05

Katholieke Universiteit Leuven
Technical University of Denmark



Yuka Mukaibo
Keio University, Japan

Summary



KU Leuven (Belgium) Sep 2004 - Dec 2005

Research at Department of Mechanical Engineering

Division of Production Manufacturing and Automation (PMA)

Courses: Behavioural Decision Making

Introduction to Management

DTU (Denmark) Jan 2005

Course of Department of Informatics and Mathematical Modeling

Course: Human Computer Interaction



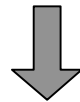
Research at KU Leuven

A Practical Implementation of Virtual Fixtures for Robotic Surgery

Background

Increase in robotic applications for surgery

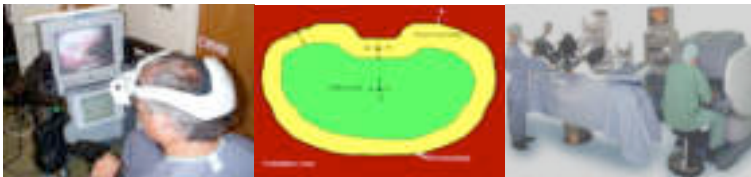
Need to reduce error, shorten operation time



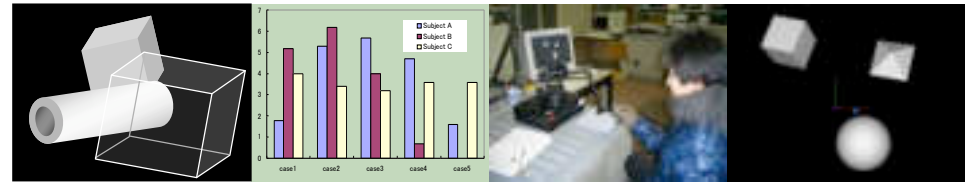
Applying Virtual Fixtures to a master-slave surgical system

Different types for different purposes
(Forbidden areas, passageways, safe areas, etc.)

Provide a practical human interface to enhance safety
applicable to soft tissue surgery



Research at KU Leuven



Sensory Evaluation to determine the properties of the virtual fixtures

Path following tasks

To determine the difference in performance when spring coefficient, damping and friction was changed

Reaching tasks

To determine the difference in performance when viscosity was changed

Experiment results analysis

Parameter	Strengths	Weakesses
High spring constant	Less stressful Less tiring	
High damping coefficient	High Stability	More tiring Less accurate
High friction	High accuracy	More tiring

Proposal of an interface with virtual fixtures

Main three types

Forbidden area: Impenetrable and set around vital organs

Tube passageways: Paths that connect workspaces for fast access

Viscous volumes: Space that require caution and stability

Student Life

Leuven

Life in a family home

Mainly research, classes twice a week

Denmark

Room in student residence / common kitchen with 24 students

Lectures in the mornings, exercises in the afternoon

Weekend excursions throughout Europe!

