Seminar WS 2012/2013
Vision, Control and Human Machine Interaction in Robotic Surgery

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Organization

Term Paper
10 – 15 Pages

20 Min Presentation
10 Min Discussion

Initial Literature from Supervisor

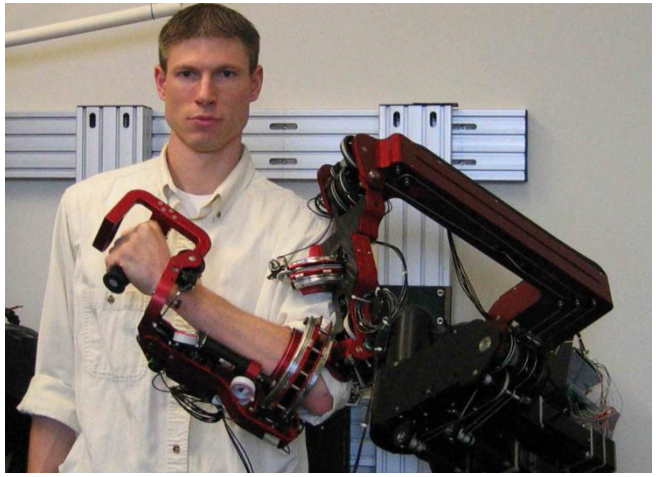
Further Literature through Independent Research

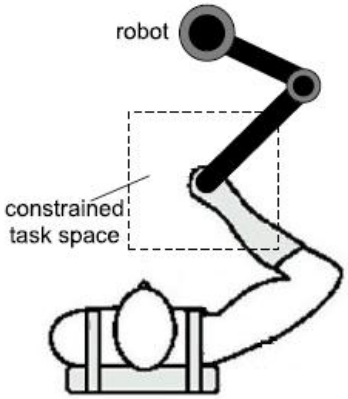
Schedule

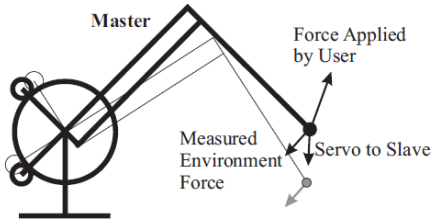
- Today
  - Topic Selection
- 3 Weeks Prior
  - Outline
- 2 Weeks Prior
  - Term Paper
- 1 Week Prior
  - Presentation Slides

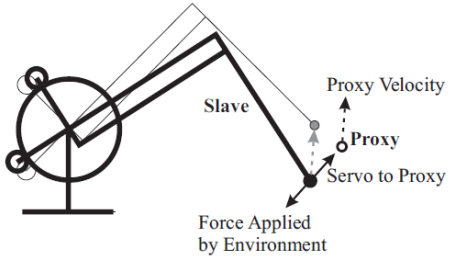
Gravity Compensation for Robot Control

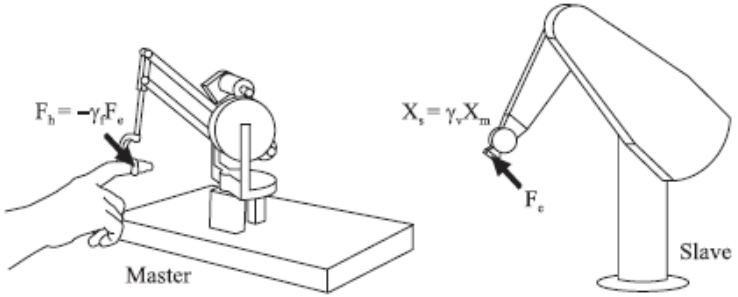
Impedance / Admittance Control



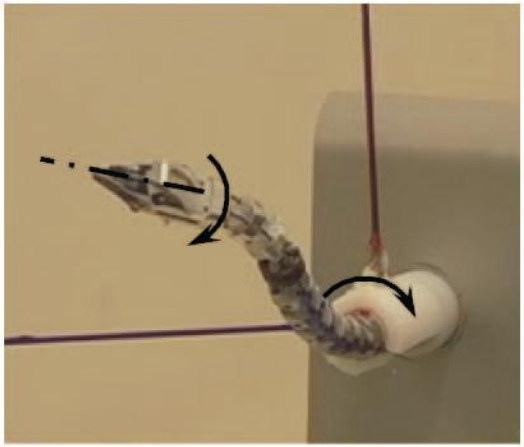


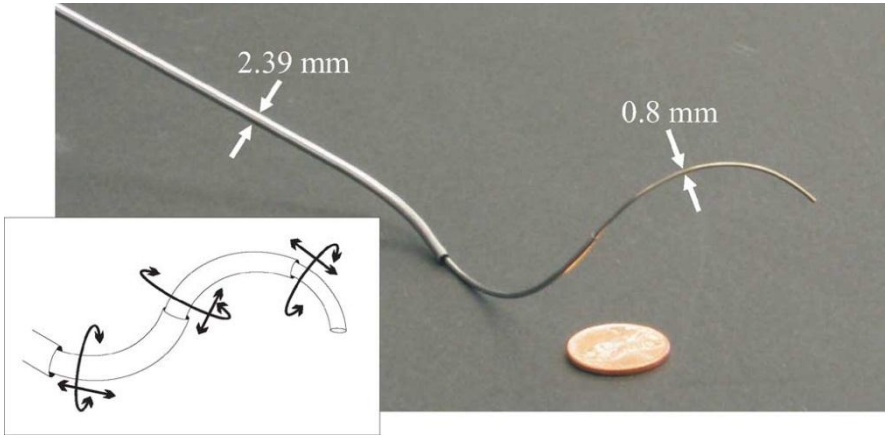




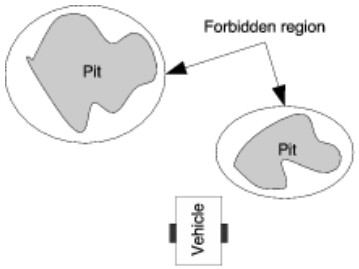


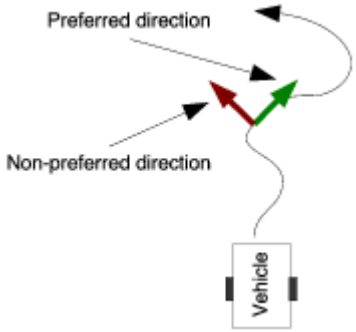
Kinematics of Bendable / Snake-like Structures

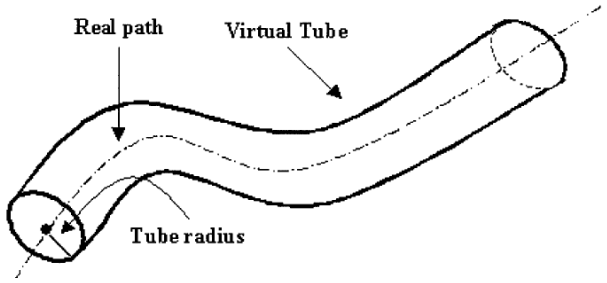


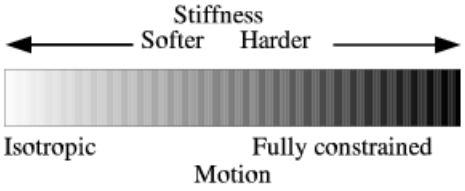


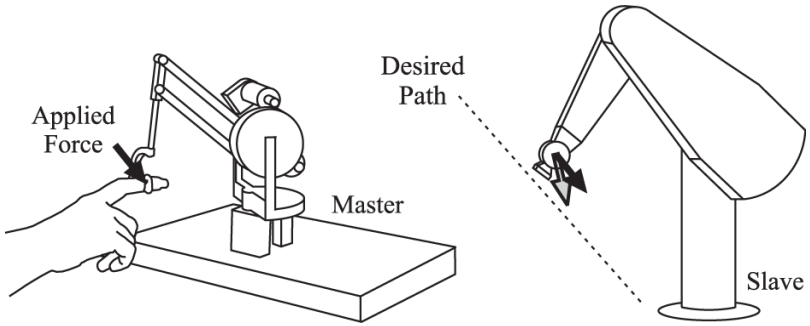
Virtual Fixtures and Force-Feedback



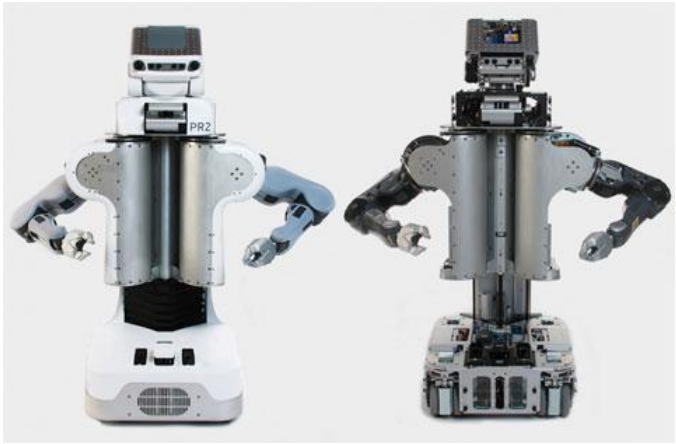


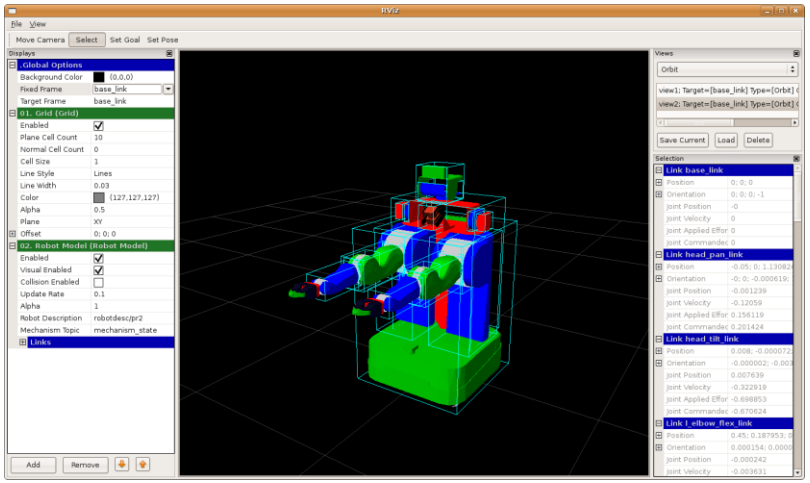


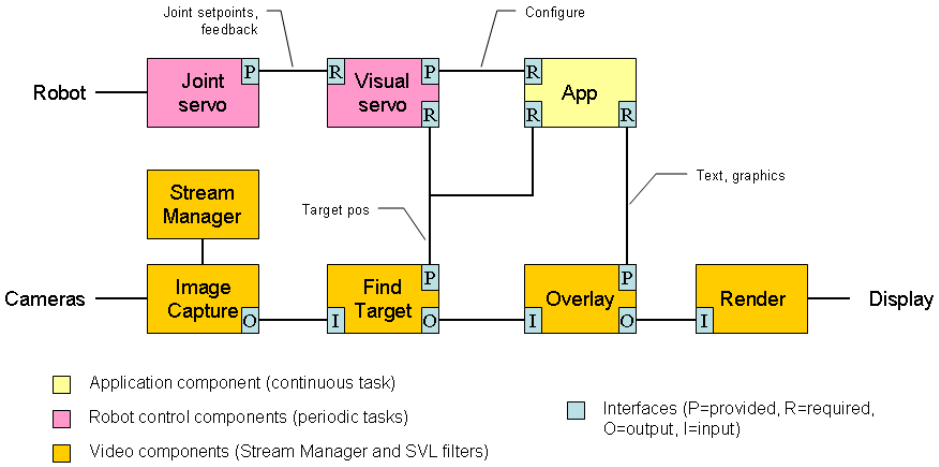


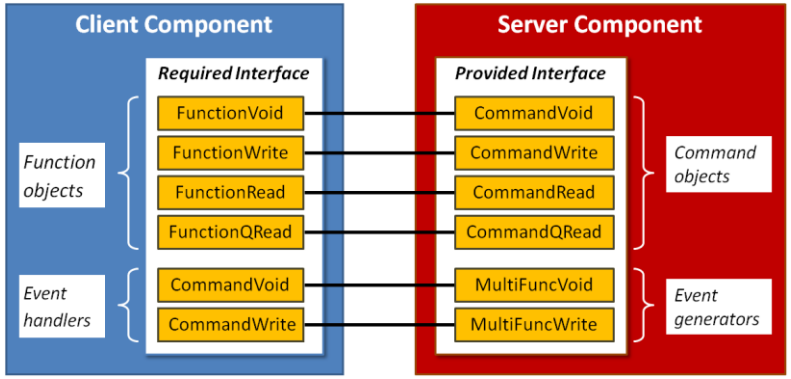


Survey of Robotics Software Platforms (ROS, CISST)

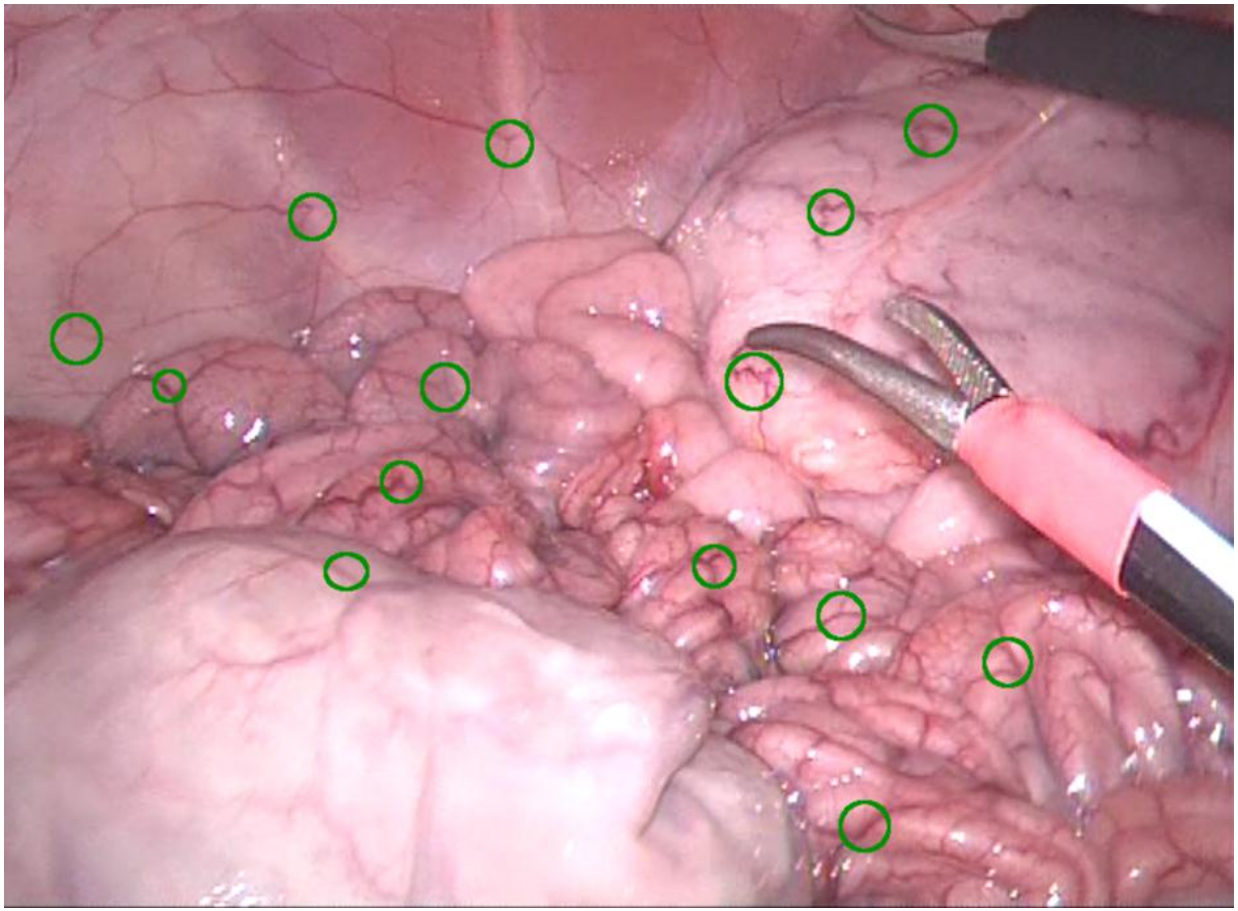






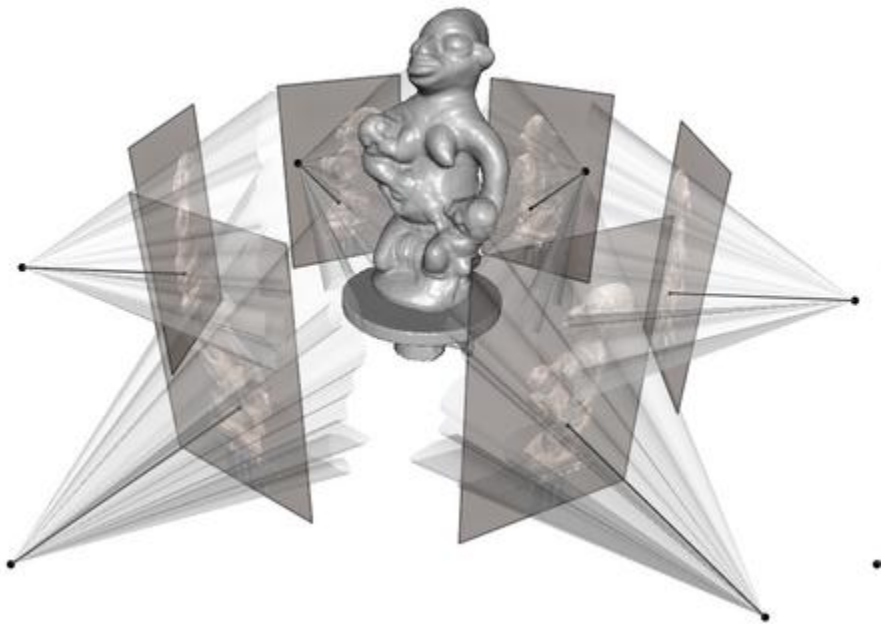


Survey of Feature Points Detectors and Descriptors

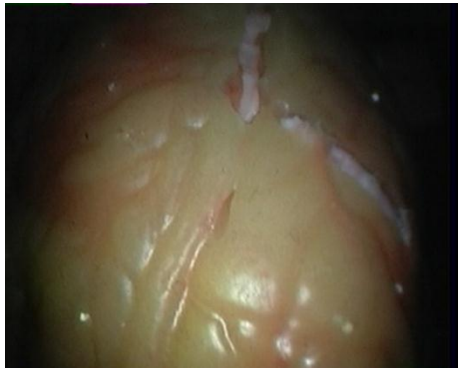


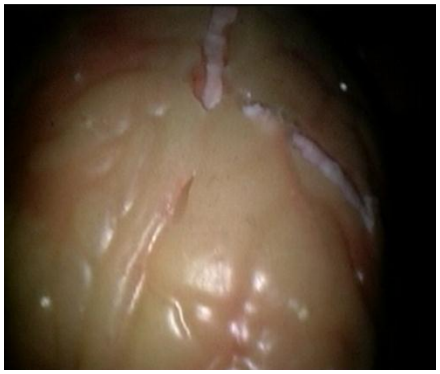
Visual SLAM Approaches

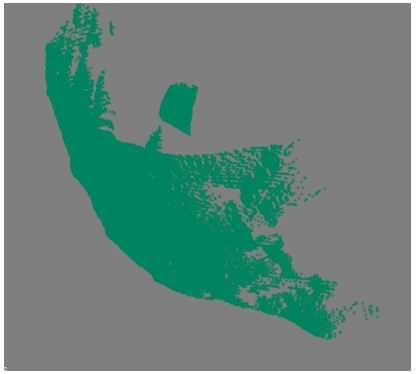
Stereo Reconstruction Fundamentals



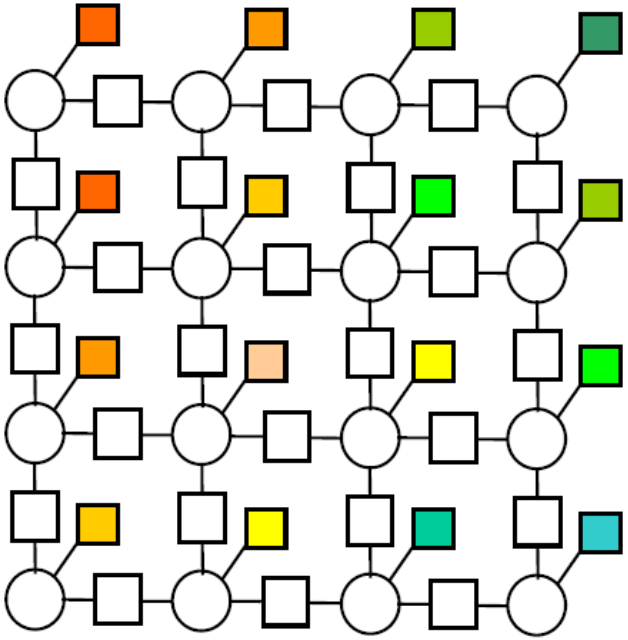
- Geometrical Considerations & Depth Map Generation
- Correspondence Problem
- Dense Reconstruction
- Local / Global Methods
- Space Time Stereo





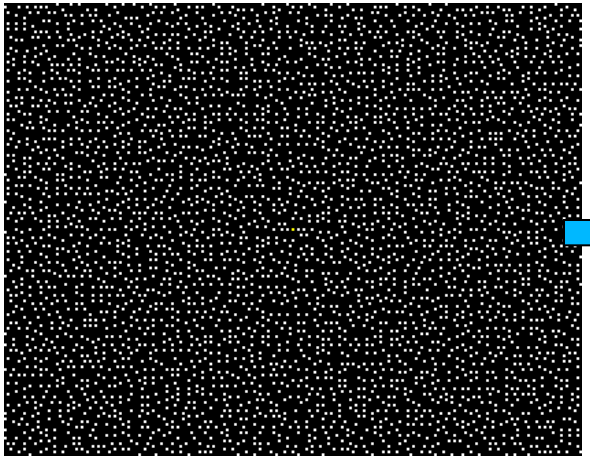


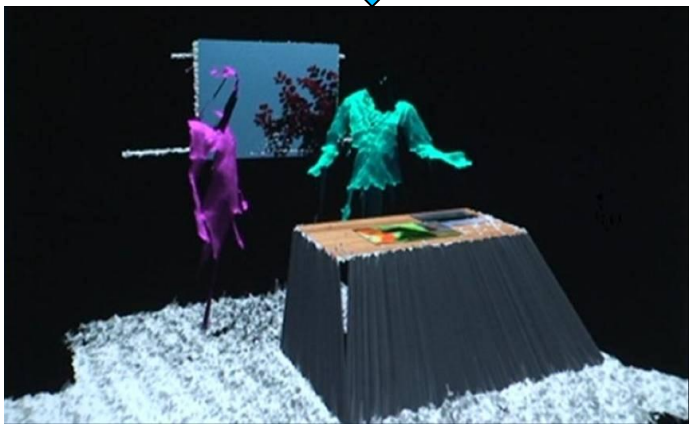
Stereo with Markov Random Fields



- Markov Random Field Formulation for Stereo
- Data Costs + Smoothness Costs
- Inference Calculation
  - Graph Cuts
  - Message Parsing
  - …

Pattern Design & Reconstruction





- Related to structured-light methods
- Design of projection patterns
  - Uniqueness
  - Recover pattern
- Decision Trees

Hardware Efficient Stereo