

# Compte rendu 05-09-2011 Visit at Intelligent Systems Research Center (ISRC) at SKKU, Suwon, Korea

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## 1 3D reconstitution from projected patterns and one camera

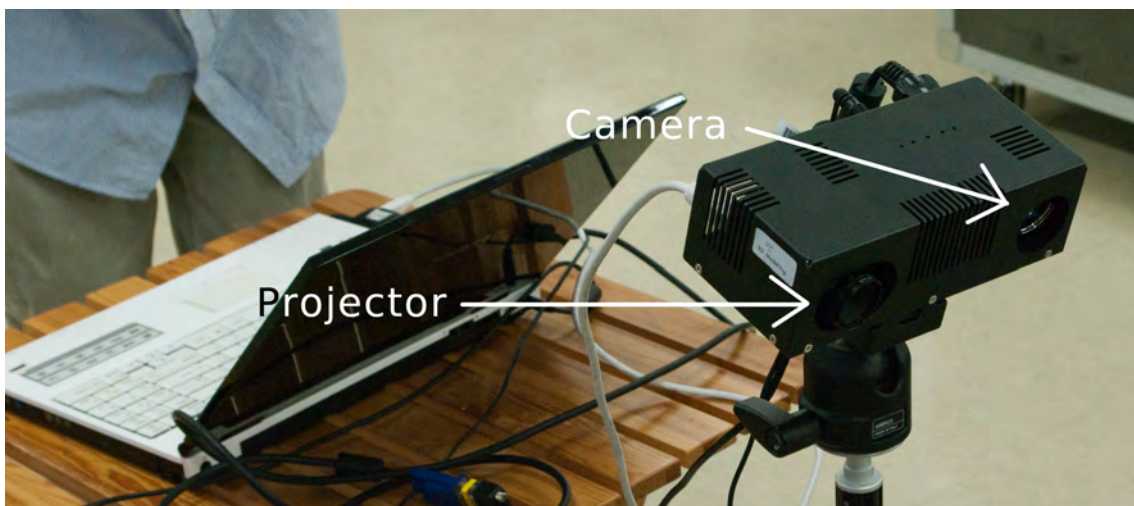
Main people:

- Zhaojin Lu (presenting) [http://isri.skku.ac.kr/people/people\\_detail.php?idx=9](http://isri.skku.ac.kr/people/people_detail.php?idx=9)
- Bui Quang Lam [http://isri.skku.ac.kr/people/people\\_detail.php?idx=8](http://isri.skku.ac.kr/people/people_detail.php?idx=8)

30hz 640x480 B&W camera with 0.5mm (at this distance,  $\approx 1$ m) precision projector.

Particle filtering + inverse deformation model of the project patterns (grids/boxes/stripes of varying size).

Asked them to try on different object, did not work well on pattern composed objects. Suggested to add most opposed/best contrasting color (with impact on the B&W of the camera) to the projected pattern. Or even best contrasting color evolution of the pattern. Entails some changes in the model to take different diffraction into account. Mostly ok. Works relatively well.





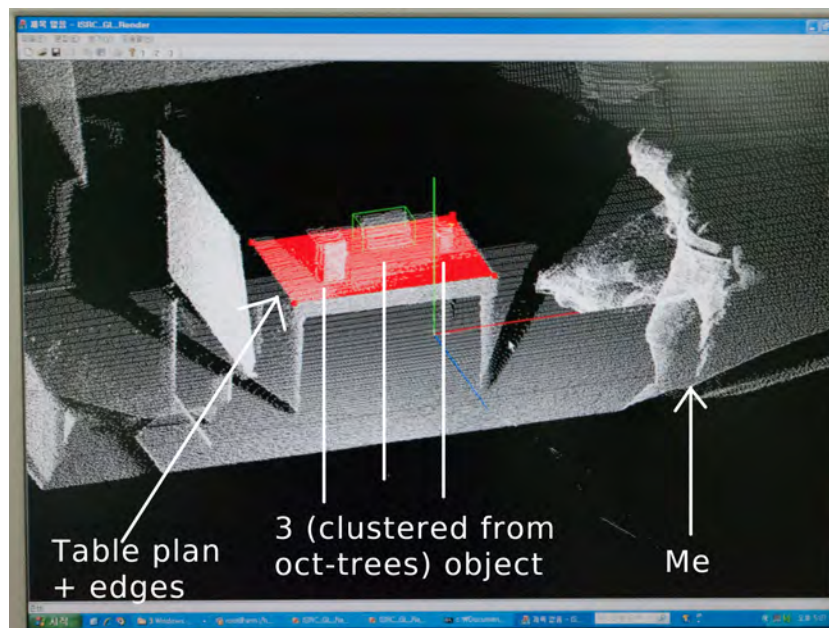
## 2 Object/environment self modeling from stereo image stream + lidar

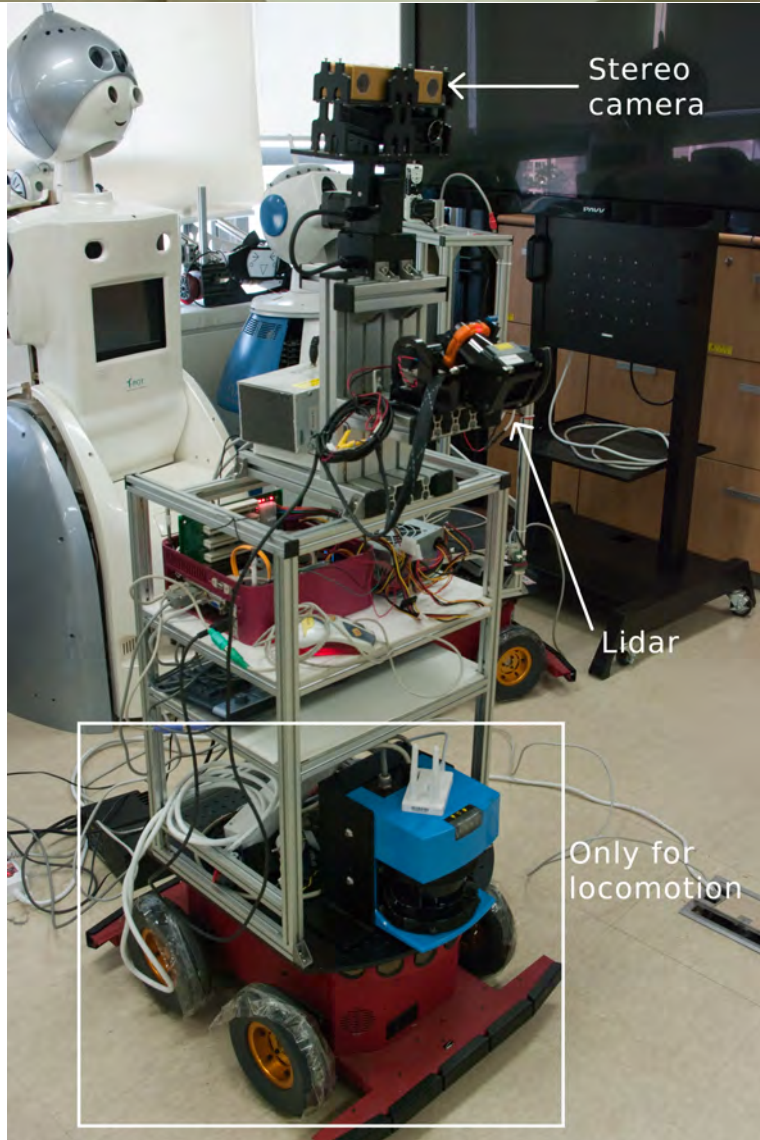
Main people:

- Jaewoong Kim (presenting) [http://isri.skku.ac.kr/people/people\\_detail.php?idx=1](http://isri.skku.ac.kr/people/people_detail.php?idx=1)
- Seung Lee [http://isri.skku.ac.kr/people/people\\_detail.php?idx=12](http://isri.skku.ac.kr/people/people_detail.php?idx=12)
- Daesik Kim [http://isri.skku.ac.kr/people/people\\_detail.php?idx=17](http://isri.skku.ac.kr/people/people_detail.php?idx=17)

Planes recognition + octree based hierarchical clustering of objects. Fusion of 3D (stereo) cam + lidar point clouds with statistical technique.

Jaewoong Kim was interested by Bayesian sensor fusion (following Cédric Pradalier's ADAS presentation) for 3D cam + lidar fusion. Objective to model the whole robotic room (many different types of tables and objects on it).





### 3 Object shape/type and position recognition for manipulation

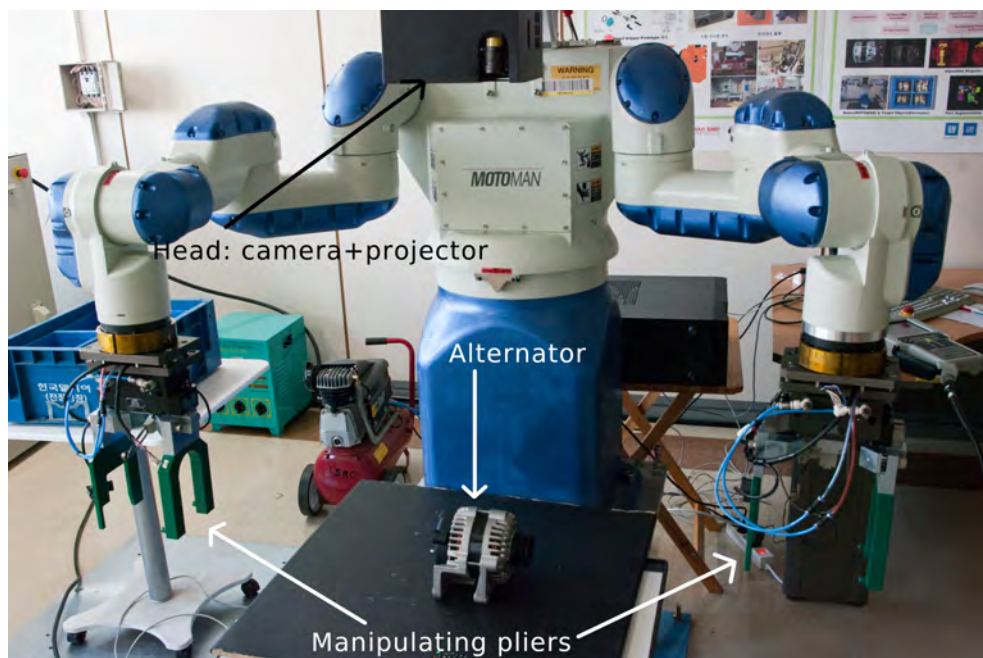
Main people:

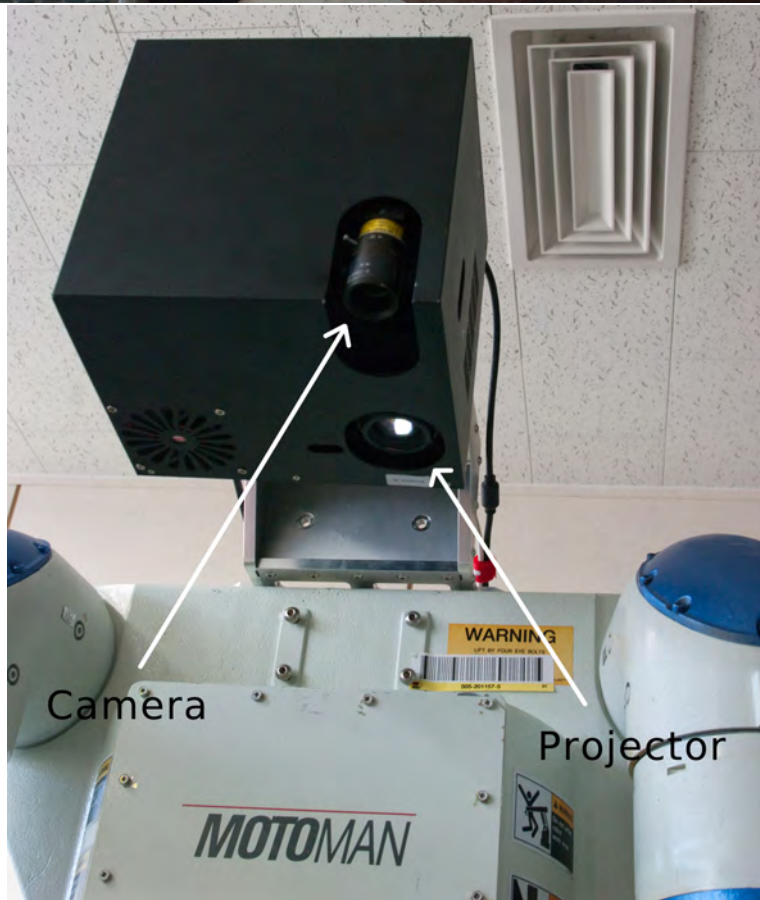
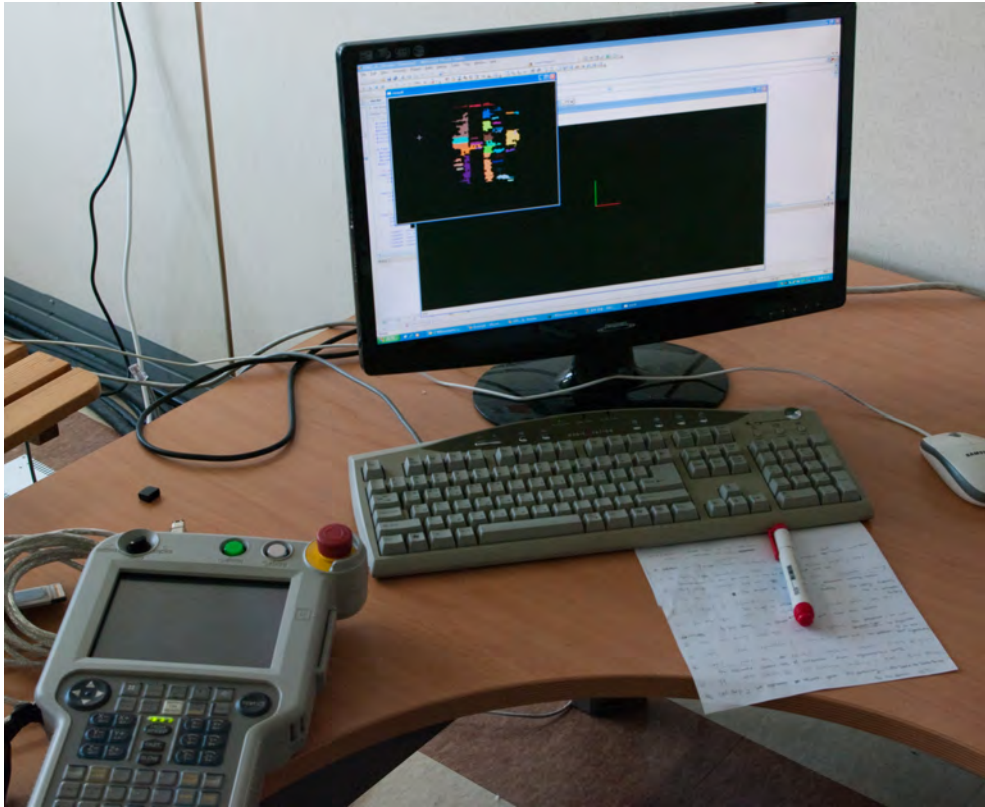
- Jaewoong Kim (presenting) [http://isri.skku.ac.kr/people/people\\_detail.php?idx=1](http://isri.skku.ac.kr/people/people_detail.php?idx=1)
- Seung Lee [http://isri.skku.ac.kr/people/people\\_detail.php?idx=12](http://isri.skku.ac.kr/people/people_detail.php?idx=12)
- (An engineer of MotoMan)

Object reconstruction from the same “projected patterns + deformations computation” system as above. Mapping of the points cloud on the CAD model of the object to find axes, and orientation of the object for manipulation.

Notes: the MotoMan manipulation robot is used in production lines. They have a very basic points cloud to CAD model matching system/model for the moment and improvements on this part are the very next step.

I proposed to do the points cloud to CAD model matching with a Bayesian model incorporating sensor error (perhaps even trained on model-specific error, because of different models materials), Jaewoong Kim was interested.







## 4 Presentations

### 4.1 ADAS + BAP

[http://dl.dropbox.com/u/14035465/SKKU\\_Sept\\_2011.pdf](http://dl.dropbox.com/u/14035465/SKKU_Sept_2011.pdf)

### 4.2 StarCraft AI

[http://dl.dropbox.com/u/14035465/skku\\_StarCraft.pdf](http://dl.dropbox.com/u/14035465/skku_StarCraft.pdf)