Smiley as Skill Performance Criteria in Construction Robotics Skills

• Deploy **SkiROS**
• Package a basic **masonry** operation as a SkiROS skill
• Develop a data gathering scheme in **teach pendant** to collect data on skill performance (**smiley**)  
• Run the skill and **collect some data**
• Present **skill performance**

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Validate Extra-functional Requirements using Gathered Semantic Data in Robot Program

- Use existing **RDF database** KIF (Knowledge Integration Framework) service
- Develop **ontology** to keep track of equipment location and calibration status
- Develop a data gathering scheme through **teach pendant** to update location and calibration status into RDF service
- Allow **robot programs to verify equipment** availability and calibration status through RDF service
- Provide **informed messages** on teach pendant using sparql (query language for rdf), examples:
  - You need equipment X, it is located in cell Y
  - Equipment X lost calibration in this cell yesterday. It must be re-calibrated.
  - Cleaning suggestions after experiment using historical data: Equipment X is usually put in box Y

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Uninterrupted information flow for masonry process steering

• Create **grounding ontology in KIF** for basic robotic masonry process
  • Basically pick and place, and some sawing...

• Create grounded document templates
  • **Configuration** – wall size, type of blocks
  • **Nano-BIM** – position of each brick in wall
  • **Machine-independent process description** – placement operation for each brick
  • **Machine-dependent process description** – picking bricks, placing bricks in specific sequence
  • Cell description – brick stacks, robot placement in relation to wall

• Develop **sample information flow** – configuration -> BIM -> Machine-independent process description -> Machine-dependent process description for a **9-brick wall**

• **Validate** the process description – is it possible to place bricks in selected order without invalidating some (physics...) rules?

• **Execute** information flow for wall within robot work volume in simulation software, possibly real robot

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