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Aurélie Clodic, Séverin Lemaignan, Amit Kumar Pandey, Lavindra de Silva,
Matthieu Warnier, Rachid Alami

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On robot decisional abilities for human-robot joint action

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LAAS-CNRS, Université de Toulouse



Questions for a robot which collaborates with humans:
What, who, where, when, how ?



Integrative approach for a robot that acts in interaction with humans

Work on Collaborative / Interactive task achievement

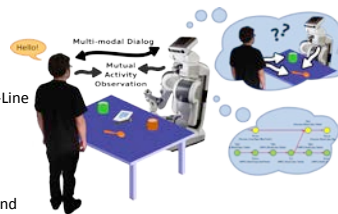
- based on a study of human-robot interaction
- inspired from Joint activity / Teamwork
- concretized as a set of robot decisional abilities

is progressively producing a coherent basis for **Joint Human-Robot Activity**

A Task Oriented Architecture

- **Task-Oriented:** How to perform a task, in presence or in interaction with humans, in the best possible way
 - Efficiency
 - Safety
 - Acceptability
 - Intentionality
- **Plan-Based:** Planning and On-Line Deliberation
 - Reasoning
 - Anticipation
 - Pro-active behaviour
- **Theory of Mind** – Predicting and reasoning about human activity and mental state

H&R Sharing Task and Space

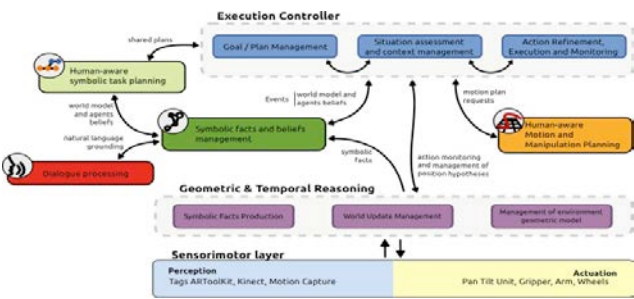


Building a « good » plan

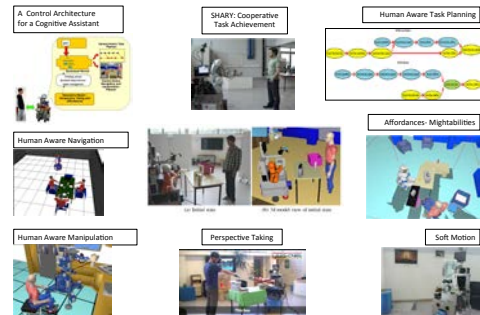
- Managing Joint task achievement
- Legibility of robot actions and intentions (intentionality)
- Acceptability of robot actions
- Compliance with "conventions"
- Coherent attitudes and behaviours

=> **Constraints on robot plans**

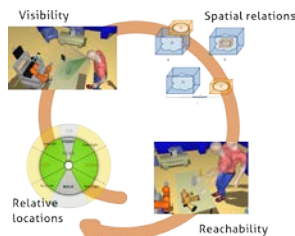
Robot Decisional Architecture



Decisional Ingredients



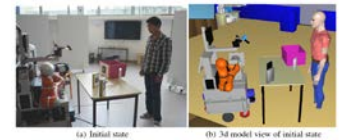
Perspective-taking and geometric reasoning



Real Video Recording Motion Planner 3d Display



Facts related to objects, robot and human (from the robot perspective)



ROBOT	HUMAN
FINE_TASABIN isReachable false	FINE_TASABIN isReachable true
WALL_TAPE isReachable false	WALL_TAPE isReachable true
SOFT_TAPE isReachable true	SOFT_TAPE isReachable false
GREY_TAPE isReachable false	GREY_TAPE isReachable true
WALL_TAPE isVisible true	WALL_TAPE isVisible true
SOFT_TAPE isVisible true	SOFT_TAPE isVisible true
GREY_TAPE isVisible true	GREY_TAPE isVisible true
WALL_TAPE isOn TABLE	WALL_TAPE isOn TABLE
SOFT_TAPE isOn TABLE	SOFT_TAPE isOn TABLE
GREY_TAPE isOn TABLE	GREY_TAPE isOn TABLE

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