

Bottom up development of a robot's basic socio-cognitive abilities for joint action

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

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Bottom up development of a robot's basic socio-cognitive abilities for joint action



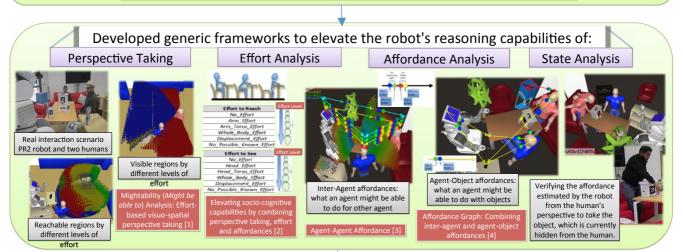
Amit Kumar Pandey, Aurélie Clodic, Lavindra de Silva, Severin Lemaignan, Mathieu Warnier, Rachid Alami LAAS, CNRS, 7 avenue du colonel Roche, BP 54200, 31031 Toulouse, France akpandey@laas.fr, aurelie.clodic@laas.fr, Idesilva@laas.fr, severin.lemaignan@laas.fr,

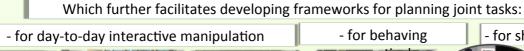
mwarnier@laas.fr, rachid.alami@laas.fr



Inspired from Child Development and Human Behavioral Psychology
Identified key Challenges from Human-Robot Interaction (HRI) and Social
Robotics perspectives

Discovered basic blocks for socio-cognitive capabilities for Joint action







To give: PR2 robot is giving the object by estimating effort, visibility, reachability and graspability

To hide: PR2 robot hiding the object from human's perspective

Planning day-to-day HRI tasks [5]



To show: PR2 robot is showing the object by analyzing from the human's perspective The robot estimates the comfortable

The robot estimates the comfortable hand-over position and proactively reaches out to take the object from the human. Reduces human effort and confusion in the joint task.

Proactive robot [6]



Shared plan generated by the robot to clean the table, reducing each individual's effort

[1] Amit Kumar Pandey and Rachid Alami, "Mightability Maps: A Perceptual Level Decisional Framework for Co-operative and Competitive Human-Robot Interaction", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2016)

[1] Amit, Kumar Pandey, Janachi (Alami, Yisuo Spatial Ability, Effort and Affordance Amalyses: Towards Practical Realization of Building Blocks for Robot's Complex Socio-Cognitive Behaviors", Cognitive Robotics in conjunction with AAAI-2012 (CogRob-AAAI 2012)
[3] Amit Kumar Pandey, Jean-Philippe Saut, Daniel Sidobre, Rachid Alami, "Towards Planning Human-Robot Interactive Manipulation Tasks: Task Dependent and Human Oriented Autonomous Selection of Grasp and Placement", IEEE/RAS-EMBS International Conference Biomedical Robotics and Biomedical Robotics

[4] Amit Kumar Pandey and Rachid Alami, "Taskability Graph: Towards Analyzing Effort based Agent Agent Affordances", 21st IEEE International Symposium on Robot and Human Interactive Communication (Ro-Man 2012

[2] Amit Kumar Pander, Muham All mid Rachind Alami, Towards Sak-Aware Proxider-Social Bedout based on Muham Pander, Muham Pander