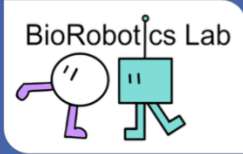


Optimization and Biomechanics for Human Centred Robotics KIT BioRobotics Lab



Prof. Dr. Katja Mombaur

Endowed Chair by Hector Foundation II
Institute for Anthropomatics and Robotics (IAR)

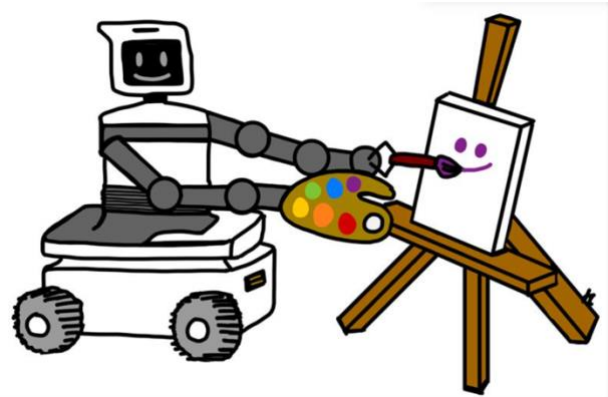


Master's & Bachelor's Theses: Humanoid Robots and Arts

Contact Prof. Katja Mombaur (katja.mombaur@kit.edu)

Background

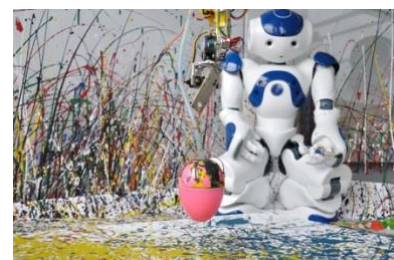
Over the past years, there has been an increasing interest in combining Robotics and Arts in different ways, as shown in special tracks at several robotics conferences, e.g. at ICRA. The topics range from using different robot platforms for special ways of painting or drawing to art installations connected more loosely to robotic and automation technology. We are in particular interested in enabling humanoid robots to create artworks, either in collaboration with humans, a tool operated by humans, or in an autonomous way. In our previous research, we have developed robotics systems based on a manipulator arm, creating action art paintings in the style of Jackson Pollock by dynamic motions of the arm, dripping and . The TiagoPro humanoid robot on a wheeled platform provides a suitable robotic system to pursue this line of robot art further or explore different other styles.



Scope of the theses

We offer various topics on Humanoid Robots and Arts and we are also open to your own proposals in this context. Example topics:

- Creating Jackson Pollock style artworks through dynamic motions of TiagoPro arms, also exploiting mobile base to move around canvas. This can be performed by some sort of teleoperations, or by including knowledge
- Creative combinations of robots with AI engines



Required knowledge

Depending on specific topic, but usually:

- Robotic knowledge
- Programming skills
- Mathematical and algorithmic foundations

M. Raschke, K. Mombaur, A. Schubert: An optimization-based robot platform for the generation of action paintings, *International Journal of Arts and Technology*, Volume 4, Issue 2, pp. 181 – 195, 2011

A. Schubert, K. Mombaur, J. Funke: Mathematical Models of Perception and Generation of Art Works by Dynamic Motions, in *Modeling, Simulation and Optimization of Complex Processes*