Optimization and Biomechanics for Human Centred Robotics
KIT BioRobotics Lab

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

Bachelor's or Master's Thesis:
Modelling personal transport equipment: Motorbikes

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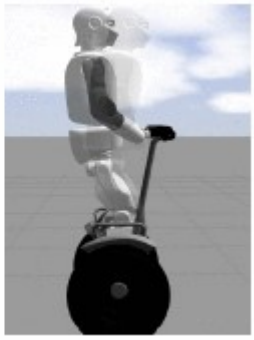
Background

Balance is a task that is both challenging and relevant to every robot platform, but particularly interesting in human-like bipedal robots. A general challenge is the riding of personal transport vehicles and some work has been done in the area of humanoid balancing in operating a Segway (see references).
To push the envelope further, we would like to extend this work to other modes of personal transportation. Where the Segway was a self-balancing transporter, we aim to extend this to non-self-balancing transporters.

Scope of the thesis

This thesis will focus on the modelling a personal bi-wheeled tranporter in the form of a motorbike. The goal is to create a model in a form that is useful for this kind of analysis, i.e. in an appropriate simulation environment like Gazebo. Furthermore, the model is to be designed in a way that it can be controlled in simulation, and this property will be demonstrated by controling this model in a variety of simulated circumstances, paving the way for using it in conjunction with a humanoid robotic platform.



Recommended knowledge

- experience in Gazebo or similar simulation environments
- experience in 3D modelling for such environments
- programming experience

References

V. Rajendran, J. F. -S. Lin and K. Mombaur, "Towards Humanoids Using Personal Transporters: Learning to Ride a Segway from Humans," *2022 9th IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob)*, Seoul, Korea, Republic of, 2022, pp. 01-08, doi: 10.1109/BioRob52689.2022.9925458.