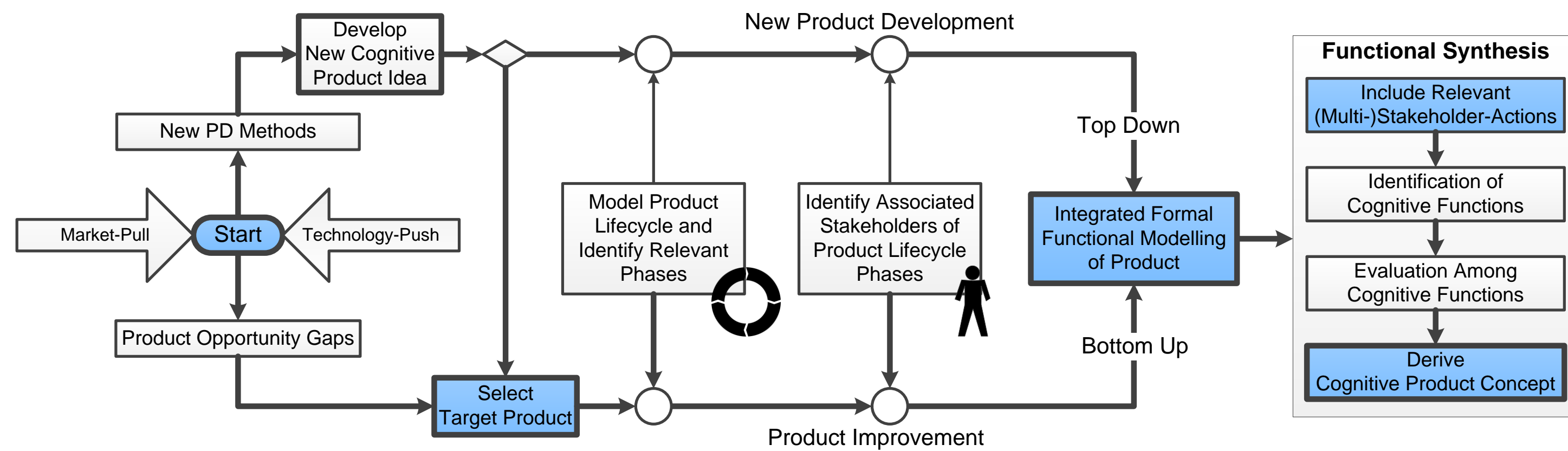


Improving the Development of Companion Robots for Elderly Care by Integrating Meaningful Cognitive Functions



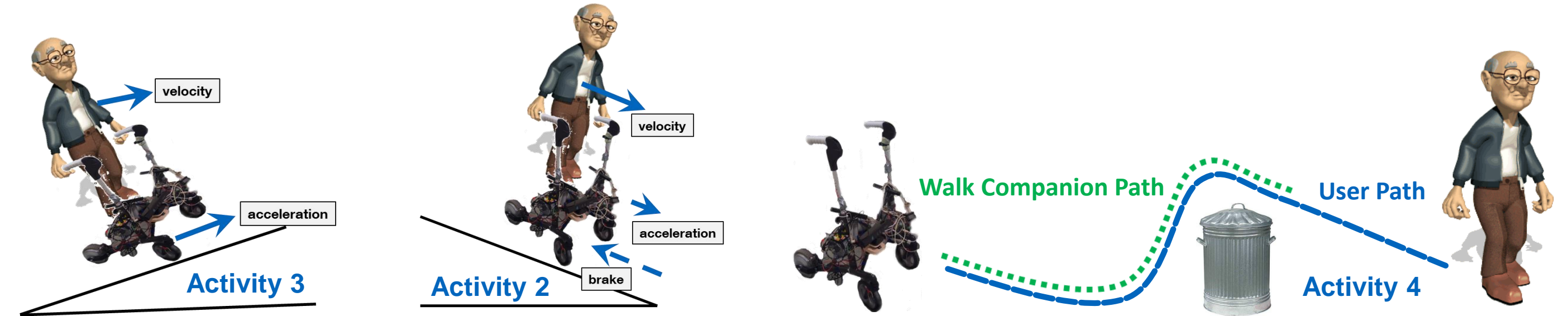
Holistic Procedural Model for Integrating Cognitive Functions



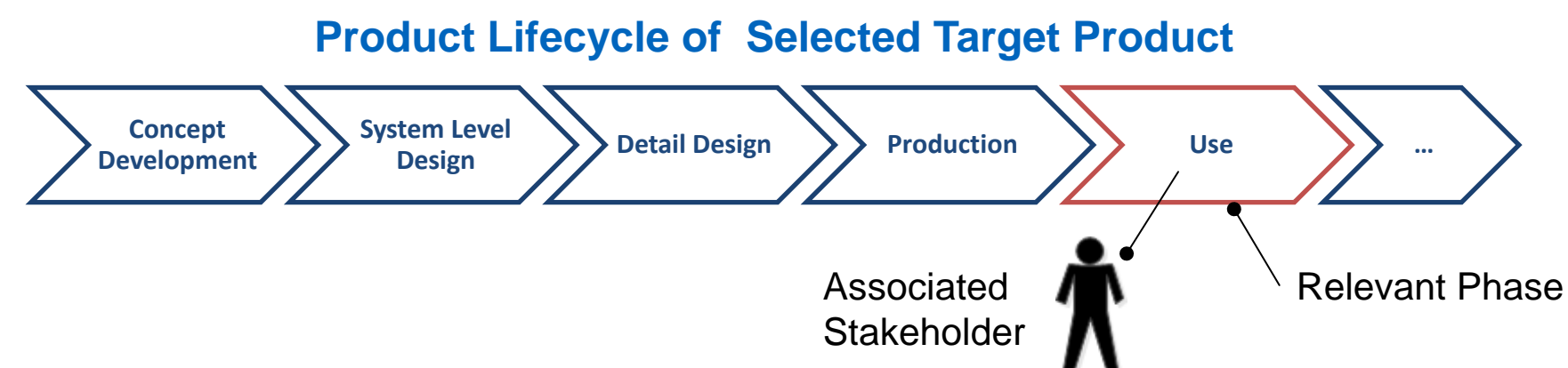
Companionship Enabled by Cognitive Functions

The Walk Companion combines companionship and freedom of movement and offers the user feelings of security and agility. The following companionship functions are implemented in the Walk Companion:

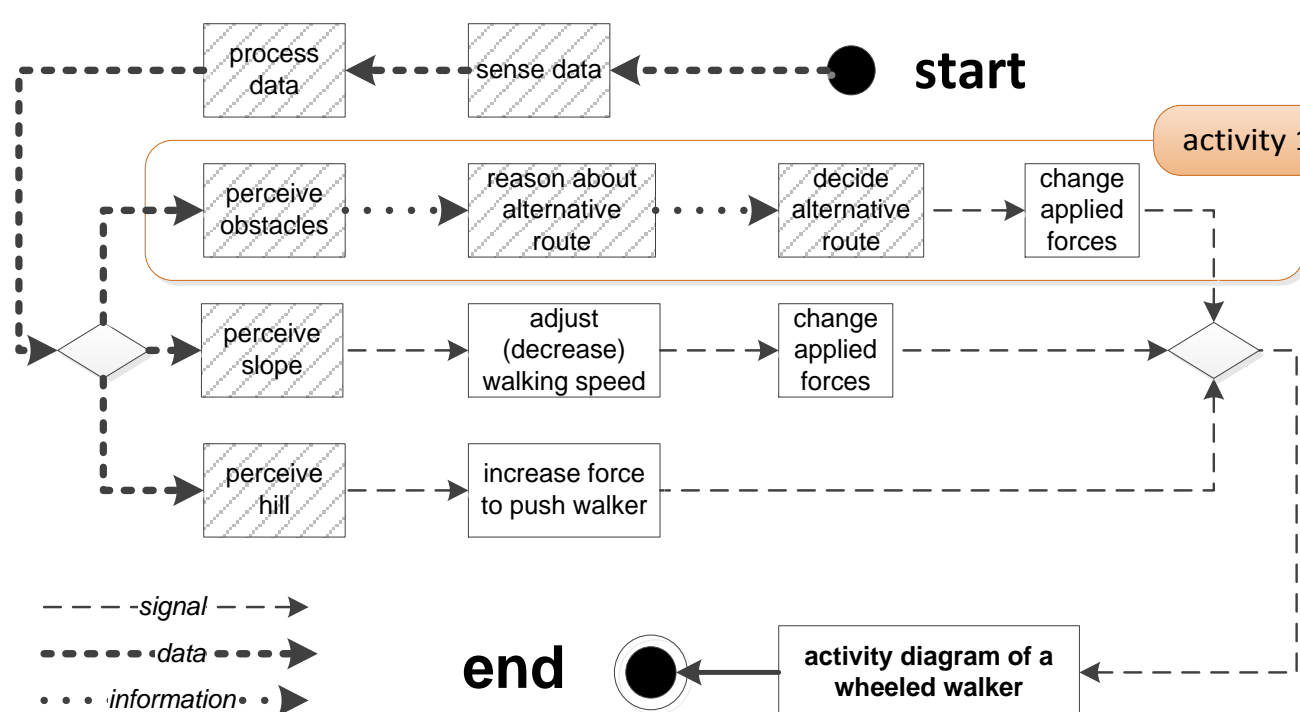
- Compensation of dead load to support the user, especially up-hill
- Deceleration while walking down-hill, according to learned user characteristics
- Follows user when assistance is not needed, e. g. on plain ground
- Shared perception of sensors to avoid obstacles and prevent crashes



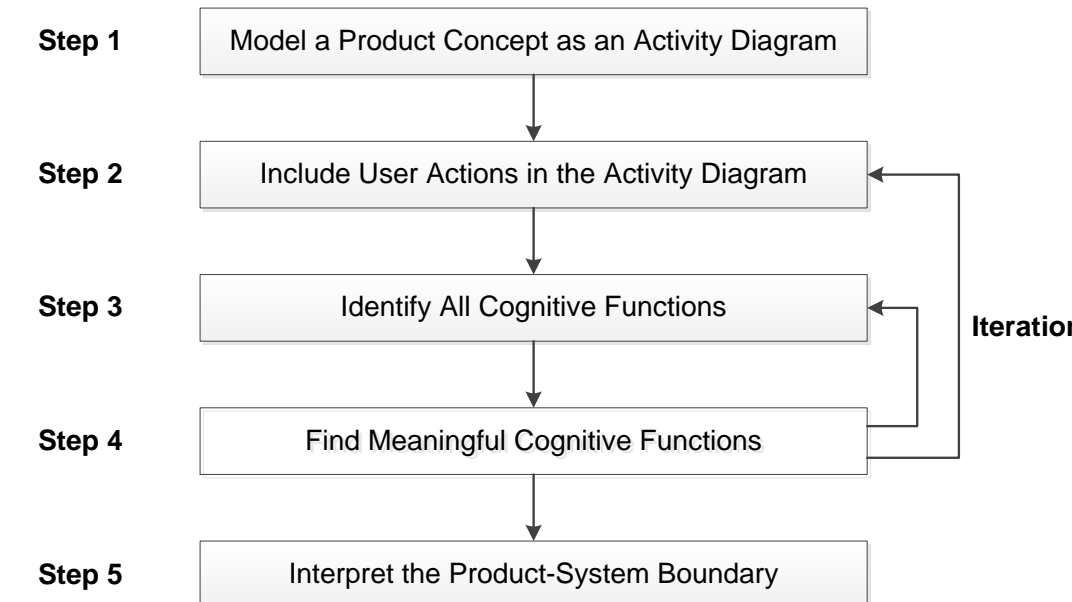
Simplified Application for Single Use Case and Stakeholder



Activity Diagram of Wheeled Walker with User-Actions



Simplified Procedural Model



Product Functionality of Activity 1

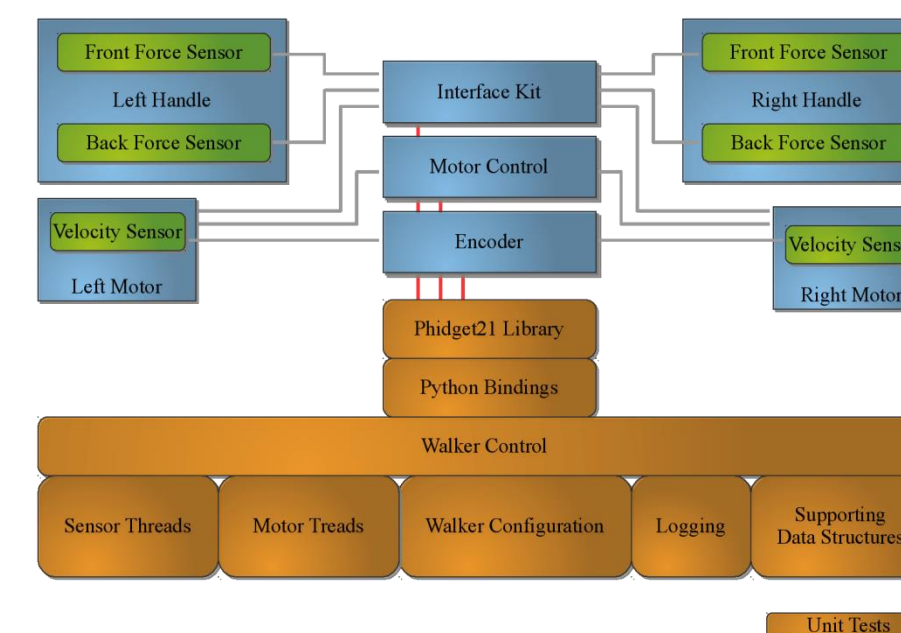


Prototype

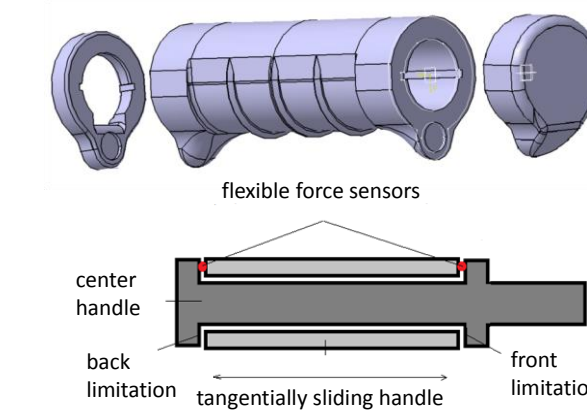
Implemented Functionality

- Fall prevention
- Weight compensation
- User guidance through shared perception
- Independent user following
- Folding Mechanism

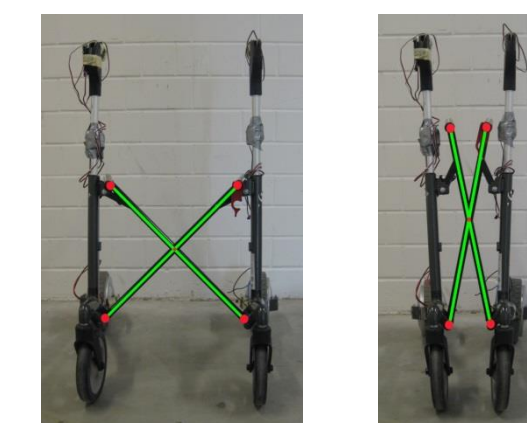
Software Architecture



Minimal Force Controller



Folding Mechanism

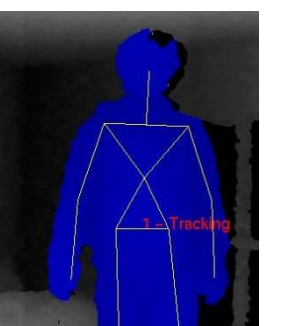


The Walk Companion



Perception

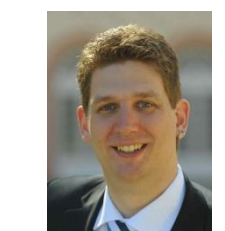
User Perception



Gesture Recognition



Obstacle Perception



Contact Details:
Torsten Metzler
Email: metzler@tum.de
Phone: +49 89 289 15154



Acknowledgement: This research is part of the Innovation@CoTeSys project within the Cluster of Excellence, Cognition for Cognitive Technical Systems – CoTeSys (www.cotesys.org), funded by the Deutsche Forschungsgemeinschaft (DFG). It was carried out by the Virtual Product Development Group supervised by Kristine Shea.

Technische Universität München

