Kickoff - Proseminar
“Gait assistive devices”
## Participants

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Motivation - Why does gait need assistance?

• **Mobility is key!**
  • Moving about our environment is a large part of our life, enabling us to communicate and interact.

• **It becomes possible!**
  • Modern sensors, actuators and microprocessors can be combined to enhance gait training in rehabilitation and restore mobility in medical facilities and communities.

• **It’s needed!**
  • An ageing society generates a large demand for restoring and augmenting mobility.
  • Progress in medicine demands technologies to enhance mobility of handicapped people
  • Biomechanical findings and economic pressure demands for automated gait training
  • ...

**Questions:** What robotic solutions exist which support gait rehabilitation, restoration or enhancement of mobility.

**Goal:** Develop an understanding of the current state and potential of robotic gait assistance while improving your scientific writing and presentation skills.
Proseminar Tasks

• Get motivated! Develop a passion for gait assisting robots!

• Choose one of the available topics (1 student per topic), discuss with tutor

• Perform literature research (exhaustive!) and write survey paper (quality!)

• Get a review for your paper, submission by early December (Renjewski). Update if necessary until acceptance (~December 2015).

• Design a poster and present it (~January 2015)
Discussion: Experience with gait assistance

• Experiences with the topic?
• Accidents / injuries?
• Cultural perspective?
• Limits of technology?
• New use cases?
Research Topics

1. Challenges and state of the art
2. Market potential and customer demands
3. Gait simulation and simulators
4. Control of stationary gait trainers
5. Control of mobility devices
6. Gaming in gait rehabilitation
7. Orthoses and prostheses
8. Non-legged mobility devices
1. Challenges and state of the art

• Target groups of gait assistance?

• Existing devices in research and on the market.
  • product survey
2. Market potential and customer demands

• Current providers of commercial exoskeletons and their products?

• What are likely target groups?
3. Gait simulation and simulators

• What common models of gait simulation exist? What simulators are used?

What are common challenges in gait simulation with impact on control?
4. Control of stationary gait trainers

• What are stationary gait trainers used for?

• Common control strategies in robotic gait trainers
5. Control of mobility devices

• What special challenges do mobile gait assistants face? What control approaches exist?
  
  
  
6. Gaming in gait rehabilitation

• What kind of games can help solving what problems in gait rehabilitation?
  
  
7. Orthoses and prostheses

• Modern control approaches for actuated prosthesis control
8. Non-legged mobility devices

• What are key problems of legged robots and what mobility challenges can be solved by non-legged devices?

• What are current technical challenges in non-legged mobility devices?
Paper submission

• Use provided template (LaTex anybody?)
• Submit by Dec. 13th
• 6-8 pages
Presentation

• January (26.1.2016)?
• 10 min + 10 min discussion
• Minimal content:
  • Detailed problem statement – find a relevant topic that excites you and state it clearly
  • Researched solutions and approaches – identify relevant literature and summarize it
  • Advantages and Disadvantages – state the current state of the art and problems
  • Open Questions – Possible solutions.
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