

Multimodal interaction design for humanoid robots

Pol Barrera Valls

Main Supervisor: Oskar Palinko

Co-supervisor: Leon Bodenhagen

Motivation:

Recent years have seen an increase in interest in humanoid robots. This has led to many people to concern about an ethical implementation of those. This study will research how these robots should be designed for the acceptance and wellbeing of people

Research questions:

- How can we improve communication with a robots using verbal and non-verbal cues ?
- How should LLMs be implemented on humanoid robots working with people?
- How can humanoid robots and people interact physically and safely?



Background

Although humanoid-human robot interaction is a vast and rapidly evolving field, particularly with the rise of generative AI, the integration of these technologies into public spaces faces significant challenges and remains a topic of debate among legal and regulatory institutions.

The goal of the field of this PhD study, is to explore how robots can be designed in a way that encourages public acceptance and enhances overall human wellbeing.

In particular, the integration of multiple sensor inputs into LLMs provides great opportunities in the HRI field and specifically in the interaction with humanoid robotics. This study will focus greatly on this concept as well as how to enhance communication both in verbal and non-verbal modalities.

Main contents

Use of Multimodal LLMs to integrate multiple sensor inputs to reason and produce an answer, action or decision.

Conduct experiments with users to advance humanoid-human interaction and collaboration.