

Type: Masterarbeit / Semesterarbeit

Contents: experimentell / theoretisch /

Beschreibung:

Thesis Proposal: Surveying the Development Status of Standards Related to AI in Collaborative Robots (Cobots) and Their Implications on Safety Regulations



1. Title:

"Surveying the Development of Standards Related to AI in Collaborative Robots (Cobots) and Their Implications for Safety under the Upcoming EU Machine Directive (2026)"

2. Background:

The integration of Artificial Intelligence (AI) into collaborative robots (cobots) represents a significant evolution in industrial automation, enabling robots to work alongside humans in dynamic and unstructured environments. However, the increasing complexity and autonomy of these systems raise critical safety concerns, necessitating a robust framework of standards and regulations. The European Union has acknowledged these challenges, and a new EU Machine Directive incorporating AI for cobots is expected to be implemented by 2026. This directive is anticipated to reshape the landscape of safety standards, impacting both manufacturers and users of cobots.

3. Problem Statement:

While AI-enhanced cobots offer significant potential for increased efficiency and productivity, their safe deployment in industrial settings remains a critical concern. As AI systems become more autonomous, traditional safety standards may no longer be sufficient to address the unique risks posed by these technologies. There is a need for comprehensive standards that consider the nuances of AI, especially in the context of human-robot interaction. This thesis aims to assess the

current state of standards development related to AI in cobots, identify gaps, and evaluate the ongoing research that informs these standards. The findings will provide valuable insights into the readiness of the industry to meet the safety requirements of the new EU Machine Directive.

4. Objectives:

The primary objectives of this thesis are as follows:

1. To survey the existing standards related to AI in cobots, with a particular focus on safety aspects.
2. To evaluate the ongoing research and development efforts aimed at addressing the safety challenges associated with AI in cobots.
3. To identify gaps in the current standards and propose recommendations for their enhancement in light of the forthcoming EU Machine Directive.
4. To assess the potential impact of the new EU Machine Directive on the adoption and evolution of AI standards in the cobot industry.

5. Research Questions:

1. What are the current standards related to AI in cobots, and how do they address safety concerns?
2. What are the key areas of research focusing on AI-related safety in cobots, and how are these efforts influencing standardization?
3. What gaps exist in the current standards, and what additional considerations are necessary to ensure the safe deployment of AI in cobots?
4. How will the new EU Machine Directive impact the development and implementation of AI-related standards for cobots?

6. Expected Outcomes:

1. A detailed overview of the current AI-related standards for cobots and their effectiveness in ensuring safety.
2. An identification of key research areas and their contributions to the development of safety standards for AI in cobots.
3. Recommendations for enhancing existing standards to address gaps and prepare for the 2026 EU Machine Directive.
4. Insights into the implications of the new directive on the future of AI standardization in the cobot industry.

Desired Skills: Background in machine learning and deep learning. Eager to do extensive literature study and make analysis of the data. Basics of English is required as thesis would be in English.

Project Benefits:

1. Deep Expertise in AI and Robotics
2. Research and Analytical Skills
3. Industry and Regulatory Insights