Large Language Models as Knowledge Base for Constraint Enforcement and Discovery Systems in Assistive Humanoid Robotics

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1 Projekt

Task-universal assistive robots are expected to operate in highly personal and private settings. This necessitates the development of systems that ensure their behavior adheres to specific rules and norms. Many of these rules are explicitly documented, while others, particularly fundamental human behavioral norms, are implicitly understood and followed. Ensuring that assistive robots adhere to these constraints and can even discover them is a critical part of their task-planning process.

Addressing this challenge can be approached from two key directions. One approach involves the integration of classical rule systems into traditional symbolic planning systems. However, this approach encounters scalability issues, particularly in complex real-world applications and when processing information from multiple modalities. Recently, there has been the option to leverage neural methods, particularly by capitalizing on recent advances in Multi-Modal Large Language Models. While this approach offers flexibility, it may not always provide the necessary guarantees for high-security requirements.

Therefore the research will focus on exploiting neural approaches with increased capabilities of reliability. Furthermore, systems grounded in neuro-symbolic AI will also be investigated to combine the adaptability of neural systems as well as the reliability of symbolic methods.

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