This project focuses on designing humanoid robotic tasks that can be created in a simulation environment and later imported into physical humanoid robots for use in industrial settings and everyday life. The goal is to develop reusable task modules that enable humanoid robots to perform complex movements efficiently and adaptively. In industry, this work has the potential to transform factory environments, reduce labor costs, and increase productivity. In the long term, similar tasks could support everyday household activities once humanoid robots are mass-produced and distributed globally.

The motivation for this project is strongly supported by the rapid growth of the robotics industry. According to Mordor Intelligence, the global robotics market reached USD 73.64 billion in 2025 and is projected to grow to USD 185.37 billion by 2030, representing a 20.28% compound annual growth rate. Additional market research indicates that the robotics industry could surpass USD 200 billion in the early 2030s, driven by increased automation, artificial intelligence integration, and demand for flexible robotic systems. This growth highlights the need for continued investment of time, funding, and research into robotics, particularly humanoid robots that can operate in environments designed for humans.

Industry leaders such as Boston Dynamics emphasize that humanoid robots are well-suited for manufacturing because they can work within existing factory layouts without requiring expensive infrastructure changes. Beyond manufacturing, automation has historically reduced workloads and improved quality of life, and robotics represents the next major step in this progression by taking over repetitive, physically demanding, or unsafe tasks.

The project will be completed using a simulation-based approach combined with an AI assistant. The simulation will allow humanoid tasks to be designed and tested safely before deployment. The AI assistant will calculate movement paths and positioning, enabling the robot to adjust its actions based on vision inputs and environmental conditions rather than relying solely on fixed motions. This approach aims to balance reliability with adaptability.

So far, initial work has begun on developing the AI assistant, and research is ongoing to identify a suitable simulation platform capable of accurately modeling humanoid motion and sensor input. The expected outcome of this project is the completion of at least one fully functional humanoid robotic task that can be exported and imported onto a humanoid robot, potentially via USB or a similar method. This task will serve as a proof of concept for scalable humanoid task design applicable to both industrial and everyday use.

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