SIEMENS
Ingenuity for life

Autonomous Robotics

Company Core Technology

Background

Robotics, a technology originating from the last century, is now disruptively changing the world of manufacturing. Many dull, unhealthy and dangerous tasks have to be performed by humans today, just because they are too complicated for today's automation technology. Enabled by digitalization and rapid progress in various fields of artificial intelligence and machine learning, increasingly autonomous robots will soon start to make our lives easier, both at home and at work. In industry, the demand for more flexible machines is rising, meaning that machine building and robotics will begin to merge more and more. Experts estimate that the proportion of tasks assumed by robots will increase from 10 percent today to 25 percent in 2025.

The global market for robot technology will also grow – to a volume expected to reach $67 billion by 2025. In other words, it will double within 10 years. One reason for this growth is that the developments in the field of autonomous systems are opening up entirely new business areas. With its global setup, Siemens can build upon our strengths in the different regions and can provide individually targeted products for all of the vastly growing regional markets.

China, which has already become the leading manufacturing country in the world, sees a huge demand for new installations of robots in its factories. Hundreds of China-based robotic OEMs have aggressively rushed into the multi-axes robots market, despite still lacking advanced control and algorithms, which require years of technology accumulation.

Growth in Europe and the United States will mainly be driven by reindustrialization, the trend to highly individualized products, the need to efficiently and thus automatically produce smaller lot sizes as well, and by demographic change. Siemens intends to contribute to the global transformation of modernizing industry.

Based on this market momentum and the strength of the Siemens China R&D team, the bulk of our research activities for robotics technology will be driven by China. Siemens is collaborating with universities and research institutes in China, Europe (e.g. TUM) and the United States (UC Berkeley, Georgia Tech, Carnegie Mellon, Washington University and Stanford).

Importance for Siemens

Siemens' position as the market leader in industrial automation is based on deep understanding of the requirements and a huge installed basis of automation equipment. As such, Siemens is ideally positioned to shape the autonomous systems revolution.

Siemens aims to enhance its Totally Integrated Automation platform by seamlessly incorporating the state-of-the-art technologies that the robotics industry has to offer. The newest version of the TIA Portal also includes robot functions. Robot manufacturers, such as Kuka and Yaskawa, have already made block libraries available for programming robots in the TIA Portal.

The Sinumerik Run MyRobot /DirectControl solution allows the CNC to control the robot arm directly, as was proved during the collaboration between Siemens and the robot manufacturer COMAU. In this way, control and robot technologies are becoming more closely intertwined, and Siemens offers a uniform solution ranging from engineering to the operation of robots. The goal is to combine the industrial automation portfolio with robotics and realize top-notch manufacturing solutions.

Success stories and research focus

In addition to the established solutions that Siemens already provides for basic robotic applications, such as in handling or autonomous guided vehicles, Siemens invests in R&D collaborations with universities around the world to boost the technologies for autonomous robots in industrial applications.

The research work in Europe (with TUM and other top universities in Germany and the rest of Europe) focuses on autonomy as a system-level property. In China, we focus on robot control platforms.

Research collaborations with leading U.S. universities explore the promising field of machine learning for autonomous robots.

In order to further solidify the user base of Siemens industrial automation and lower the entry barrier of robotics manufacturers and system integrators, Siemens also develops engineering tools and digital twins that are seamlessly compatible with the company's existing software toolsets.

Siemens aims to create an ecosystem in which customers co-create with Siemens researchers. To achieve this, we also leverage the innovative power of the Robotics Operating Systems (ROS) community to realize their technological ideas. Siemens also scouts and integrates advanced adjacent technologies, such as smart drivetrain, enhanced human-robot collaboration and artificial intelligence, which may shape the robotics market in the future.

Further information

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