Construction and Control of a Mobile Platform with Omnidirectional Drive

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More and more applications in industry and everyday life can be taken over by automated mobile platforms. One of the core attributes of a mobile robot is its drive, as this is the key to its movement characteristics such as speed and manoeuvrability. In the context of this work, a robot with omnidirectional drive was developed, which allows it to move in any direction independent of its current orientation and also to rotate around its own axis. This saves time and space, especially in confined spaces. First, a mathematical model of the kinematics of such a robot was derived, which was then implemented in an Arduino microcontroller. In addition to the physical construction of the platform, the execution of the desired driving maneuvers required the development of suitable software to control the robot. In order to prevent a course deviation due to disturbances, several control stages were implemented. In addition, the operability could be facilitated by integrating a remote control. A control by measuring the wheel rotation speed was much more complex, but did not produce as good results as a control of the orientation by the data of a compass sensor, which could significantly improve the driving behavior. Further developments could help to illustrate the advantages of the used drive by implementing a concrete application.

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