TRACTAT, CAMELOT, RICAIP

Transfer of Control in Distributed Industrie 4.0 Use Cases

Autonomous robots, such as transport robots, should also be used in industrial scenarios. In contrast to rigidly programmed robots, autonomous robots can adapt their movements or behavior to current situations. For example, an autonomous transport robot can change its route if obstacles block the original path.

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The robot may not be able to work as quickly as the human, but it can prevent a complete standstill of production. In this exhibit, we will present two demonstrators to show how both cases can be realized using an intelligent control-handover system. On the one hand, a fast robot teach-in by means of a multimodal dialog system is shown. Here, a human can give the robot a new task using speech and gestures. The robot proactively asks the human for missing parameters, and then starts its work.

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In the second demonstration, a system is illustrated which, in the event of an unforeseen situation that cannot be solved by the robot itself, automatically notifies a human and provides him with a comprehensive overview of the robot's situation and the error that has occurred. In addition, the system offers technical options tailored to the situation for further analysis and rectification, such as various camera views or a remote control of the robot. For this purpose, the helping person does not have to be in the immediate vicinity of the robot, but can also, for example, be in another country or on another continent.

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An important tool for displaying the current situation of the robot are videos of the direct robot environment. The system shown here automatically selects the most appropriate cameras in the robot's vicinity. In cases where there is no camera nearby, a camera drone can be called to automatically fly over the robot's current position to give a better overview.
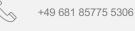
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For example, an autonomous transport robot can change its route if obstacles block the original path. However, autonomous robots can also get into situations where they cannot find a solution by themselves and need outside help, e.g. from a human. For this purpose, a so-called transfer of control can be initiated, i.e. the robot temporarily gives up autonomy and transfers its control to a human until the latter has rectified the situation. In the reverse case, a human wants to temporarily hand over a part of their workflow to a robot.

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