Journal of Robotics

Special Issue on

Multiple Autonomous Robots Coordination and Navigation

CALL FOR PAPERS

A team of autonomous robots working in parallel has a high potential to accomplish an assigned task faster than a single robot. To achieve this target, two fundamental challenges need to be addressed: The first challenge is to assign actions to robots under the coordination of the team so that the task can be finished more effectively. The second challenge is the environment mapping for robots navigation and path planning under unknown environments. As the above, the dynamic task assignment of multiple robots may be achieved using a self-organizing map based feature, reaching real-time collision-free robot path through sensor measurement in the environment. Therefore, the development of an algorithm to incorporate task assignment, path planning, and tracking control of a multirobot system is an indispensable mission for autonomous robots.

The key point of the communication mechanism in multirobot coordination is to enable the individual robot to escape collision when planned in a decentralized manner. The ability of the algorithm should be able to place the different robots judiciously for near-optimal collision avoidance. A good coordination strategy should consider time consuming and completion efficiency and should not overly depend on a robot. On the other hand, autonomous navigation algorithms for mobile robots have gained an increasing attention for many applications. Some problems such as material transportation, exploration, or mapping reconstruction require effective solutions that may be realized by a set of autonomous robots working together. A number of reported approaches consider probabilistic localization tools, environment recognition and modeling methods, sensor based mapping, global wireless sensor systems, vision-based strategies, and so on. Currently, however, the navigation issue is still an open problem.

This special issue is seeking contributions in innovative techniques that enable teams of robots to explore environments more efficiently. All related research outcomes are welcome.

Potential topics include but are not limited to the following:

- Autonomous robots coordination
- Autonomous robots navigation
- Environment recognition for multirobot navigation and path planning
- Robot path planning
- Strategies of multirobot task allocation and implementation
- Machine-learning approaches to multirobot coordination
- Tracking control of a multirobot system
- Simultaneous localization and mapping (SLAM) for mobile robots
- Deep learning in robot path planning and control
- Remote robot monitoring and control
- Other robotic control methods and applications

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