IMPROVING THROUGHPUT OF
MULTI-ROBOT WORKCELLS

There is a great opportunity to have multiple robots work together in many application domains, including manufacturing and logistics. The potential performance advantage of being able to use multiple robots is similar to the benefits of being able to use multiple people to complete a task.

realtime robotics

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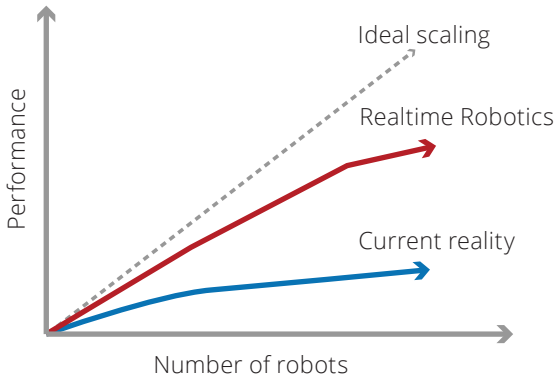
DEPLOYMENT PROCESS

Unfortunately, today's reality is far from ideal. Working together in the same space requires serious coordination to perform simultaneous tasks without collision. In these shared workspaces, robots often spend much of their time either stopped while waiting for an opportunity to move or moving in unproductive ways to avoid collisions. Thus, when a second robot is added, the performance might only improve by 20-30%. Adding more robots provides even smaller marginal benefits. The figure below shows ideal linear scaling and today's reality which is far less than linear. While linear scaling is not possible indefinitely, we seek performance that is far closer to ideal.



Engineers must solve the following challenges to deploy and achieve the best possible performance with robots:

Allocating

Every robot has a different set of capabilities (reach, function, tool-tip, etc.). Engineers determine which robot will accomplish which set of tasks, while understanding the limitations and complexities of each choice.

Sequencing

This is the order and priority of each robot allocated to complete the given tasks.

Robot Programming

Once tasks have been allocated and sequenced, a program is written to instruct each robot where, when and which way to go.

Avoiding Collisions

Programmers need to guarantee that robots avoid collisions while performing various tasks. Detecting and rerouting a robot to avoid collisions during a task has been computationally difficult and slow. Due to the complexity, programmers use conservative practices, such as pauses, interlocks and interference zones as a way to avoid collisions. Rather than using these tedious and performance hindering solutions, developers now have the option of using Realtime Robotics' technology.

REAL APPLICATION

75%+ reduction in programming time/costs:

A global automotive manufacturer had a 4-robot workcell in which the robots needed to reach 22 targets and spend a half-second at each target to perform the desired task. Their skilled automation engineer spent 13 weeks developing and iterating to achieve the desired 25-second cycle time. Realtime's technology took less than 3 weeks to achieve a more desirable result. The most time-consuming task during Realtime's process was to create a model of the robot and workspace to build a configuration file, which is a standard requirement. The Realtime Controller could get the workcell online and in production 10 weeks earlier and save 10 weeks of engineering effort.

REAL SOLUTION

Realtime Robotics has developed a proprietary way to empower and streamline multi-robot workcells to be far more productive. The Realtime Controller and toolkit produce multi-robot deployments that are far faster than those that can be created manually. When adding a second robot to a workcell, Realtime can provide throughput increases of 70% or better, which is far greater than manually developed solutions. The Realtime Controller and toolkit automate the optimization of task allocation, sequencing, and collision avoidance—and completely remove the need to program interlocks and interference zones. Additionally, this automation saves weeks or even months of engineering effort to complete all aspects of deploying a robot workcell.

REAL BENEFITS

+ **Increased throughput** with interlock-free multi-robot workcells
+ **Faster, easier robot programming** with accelerated offline motion planning
+ **Flexible workcells** with collision-free planning in real-time
+ **Safely deploy industrial robots** in shared workspaces for collaborative solutions

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