

Multiple part feeding – Real-world application for mobile manipulators

Mads Hvilshøj, Simon Bøgh, Oluf Skov Nielsen and Ole Madsen

*Department of Mechanical and Manufacturing Engineering, Aalborg University, Denmark
{mh, sb, olnie, om}@m-tech.aau.dk*

Abstract

Purpose – The purpose of this paper is to present experience from a real-world demonstration of autonomous industrial mobile manipulation (AIMM) based on the mobile manipulator “Little Helper” performing multiple part feeding at the pump manufacturer Grundfos A/S.

Design/methodology/approach - The different AIMM technologies exist at a mature level - the reason that no mobile manipulators have yet been implemented in industrial environments, is that research in the right applications have not been carried out. We propose a pragmatic approach consisting of: a commercial-off-the-shelf (COTS) mobile manipulator system design (“Little Helper”), a suitable and comprehensive industrial application (multiple part feeding), and a general implementation concept for industrial environments (the “Bartender Concept”).

Findings – Results from the three days of real-world demonstration show that “Little Helper” is capable of successfully servicing four part feeders in three production cells using command signals from an Open Process Control (OPC) server. Furthermore, the paper presents future research and development suggestions for AIMM, which contributes to near-term industrial maturation and implementation.

Originality/value – The paper presents a full-scale demonstration of a state-of-the-art COTS autonomous mobile manipulator system with particular focus on industrial utilization and application.

Keywords - Mobile Manipulation, COTS, part feeding, logistics, task programming