Automatic analysis and adaption of the interface of automated material flow systems to improve backwards compatibility

Today’s industrial automation production systems (aPS) have to deal with the requirement to produce many different products. Hence, not only a flexible modularized aPS, but also a flexible modularized material flow system (MFS) is required in order to improve modifications to the system, i.e. extending, reducing or modifying parts of the system. To reduce the engineering effort involved in setting up modularized MFS and to deal with the complexity of the system, a definition of the architecture, behavior and (pre)defined interfaces of such modules is provided by a model-based engineering approach, which is based on an appropriate meta model. In addition, the modules can interact with neighboring modules to execute specific logistic functionalities by using (pre)defined interfaces. Since the development of automated material flow modules (aMFM) can be considered as an evolutionary process, the aMFM are frequently redeveloped using current-state-of-the-art technologies, which, in some circumstances, also require newly-developed interfaces. Thus, an inconsistency between older and newer modules containing different version numbers occurs when different (pre)defined interfaces are used, leading to a reduction in system flexibility. To implement the backward compatibility of newer modules, the (pre)defined software interfaces of the newer modules, or even of its neighboring modules, usually have to be adapted.
manually, which increases the engineering effort and propensity for errors. This paper introduces a model-based approach to analyzing and adapting the interface of aMFM automatically in order to enable interaction with neighboring modules across different version numbers, i.e. modules containing a different version number. Hence, the engineering effort and error-proneness for the adaption can be reduced. For instance, the automatic analysis and adaption of the interface of a newly-developed QR Code Scanner is considered here.