

# A smart Warehouse 4.0 approach for the pallet management using machine vision and Internet of Things (IoT): A real industrial case study

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## ABSTRACT

Printing companies are commonly SMEs with high flow of materials, which management could be significantly improved through the digitalization. In this study we propose a smart Warehouse 4.0 solution by using QR code, open-source software tools for machine vision and conventional surveillance equipment. Although there have been concerns regarding the usage of QR in logistics, it has shown to be suitable for the particular use-case as pallets are static in the inter-warehouse. The reliability of reading of QR codes was achieved by using multiple IP cameras, so that sub-optimal view angle or light reflection is compensated with alternative views. Since surveillance technology and machine vision are constantly evolving and becoming more affordable, we report that more attention needs to be invested into their adaptation to fit the needs and budgets of SMEs, which are the industrial cornerstone in the most developed countries. The demo of proposed solution is available on the public repository <https://github.com/ArsoVukicevic/PalletManagement>.

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