LEUPHANA
UNIVERSITÄT LÜNEBURG

HUMAN-CENTRIC LOW COST AUTOMATION

LASER ASSISTANCE FOR SMART FACTORIES IN INDUSTRY 4.0

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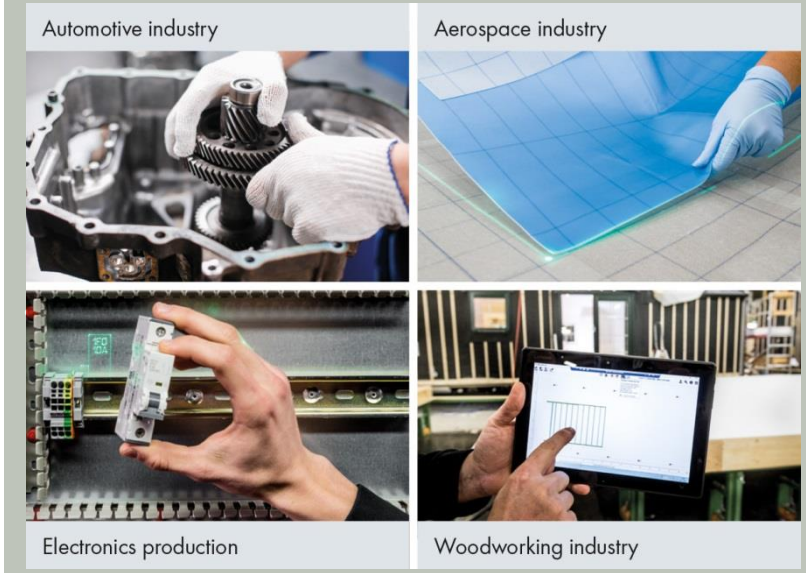
Motivation: Enhancement of laser assistance for low cost automation

- Laser assistance is used for industrial worker guidance and visual quality inspection tasks
- Laser assistance increases process efficiency and quality with in-situ projection of information
- Manufacturing is changing rapidly with Industry 4.0 and digitalization on the shop floor
- However, automation technology is capital intensive and often not preferred by SME with long-term and experienced workforce in place
- There is an identified need for human-centric and factory integrated low cost automation



laser projection enriched reality

SME: Small Medium Enterprises

Objective: Develop effective and efficient low cost automation with high usability

Evaluate and realize improvements on:

<u>Human-to-machine</u>

- Natural user interfaces for intuitive system control - system ergonomics - acceptance

<u>Machine-to-human</u>

- Design of digital work plans - situational information presentation - 3D printed work piece carriers

<u>Machine-to-machine</u>

- MES and PLC integration - plug and produce - RFID - cloud services - data analytics

Smartwatch

Gesture recognition wristlet

Assembly workplace with laser projector

Proof of concepts in the center for digital transformation at Leuphana University

- Center for digital transformation at Leuphana University provides an industry type environment with practical digital technologies
- The interdisciplinary set-up supports research at the human and machine domains
- Develop and optimize digital technologies as driving forces for industrial application
- Test and develop digital low cost automation solutions that are accepted by employees
- Share research findings with the community

Speech recognition considering haptics and usability is rated highest

Importance of quality management for MES integrated laser assistance increases to 54%

30% efficiency potential in switchboard manufacturing using laser assembly assistance

Summary and outlook

- We work on the enhancement of laser assistance for low cost automation tasks
- We develop effective and efficient low cost automation with high usability
- We proof our concepts in the center for digital transformation at Leuphana University
- We share our research findings with the community supporting a positive development of future work environments

Wissenschaftsjahr | 2018
ARBEITSWELTEN DER ZUKUNFT