Workflow Tracking for Industrial Manufacturing

WorkIT – Workflow and Tool Process Modelling
Guide – Guidance and Assistance

Pro²Future

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MOTIVATION & GOALS

Workflow Tracking is an important and complex stepping stone for the implementation of cognitive industrial **assistance and quality assurance** systems. Knowledge of the current work step enables **correlation of the worker's observed activities** with the **scheduled tasks** and thus decision making with respect to assistance provisioning and monitoring.

In the frame of the WorkIT and Guide projects, such a workflow tracking system was successfully instantiated for **industrial assembly and manufacturing**. The goal of this system is to automatically determine the current work step during assembly of industrial digging machines based solely on the **workers' hand movements and noises** in their surrounding.

Project FactBox

**Project Name** WorkIT/Guide
Project ID DP1.6/DP1.1
Duration 36 Months

Area 1
Perception and Aware Systems

Project Lead
Prof. Dr. Alois Ferscha

APPROACH AND ARCHICTECTURE

Combination and **comparison** of different **machine learning approaches** (deep learning; ensemble classifiers) towards implementation of a **classification pipeline** for industrial workflow tracking.
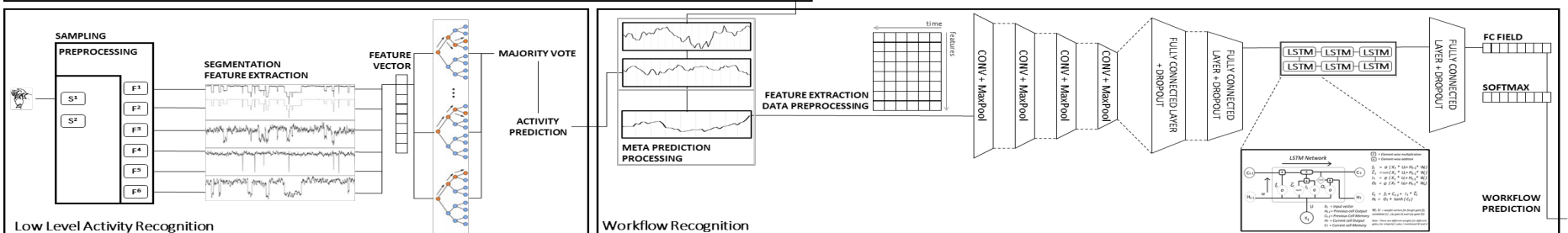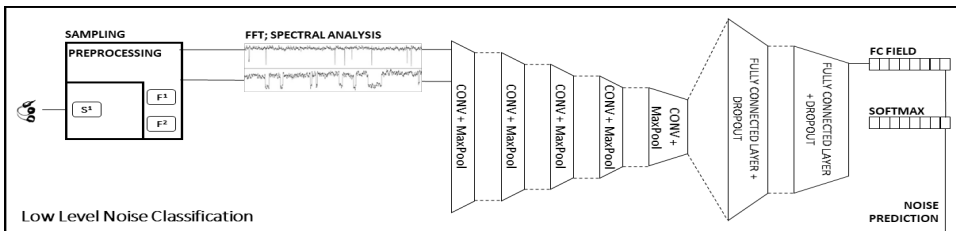

CONTRIBUTION

Scientific contribution
Combination of different, established machine learning approaches towards the implementation of workflow tracking. Comparison of their strengths and weaknesses. Applied research in the field of industrial manufacturing.
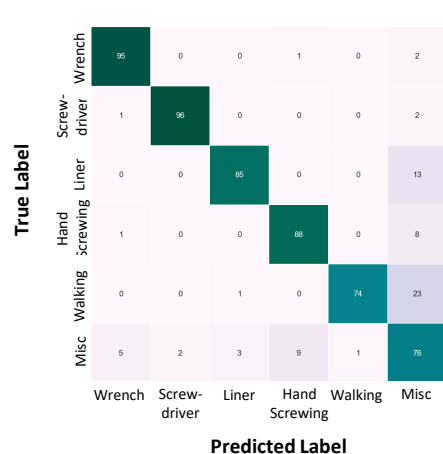
Economic contribution
Implementation of quality assurance.
Increasing manufacturing efficiency.

RESULTS LOW LEVEL RECOGNITION

Noise Recognition (audio data)
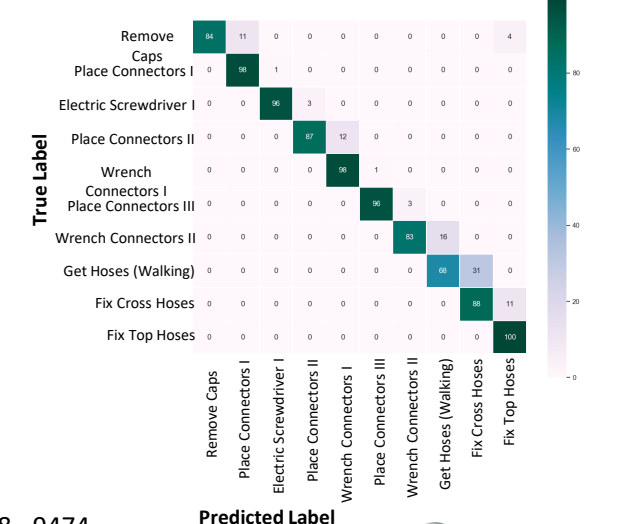3 states; 120ms window; deep learning
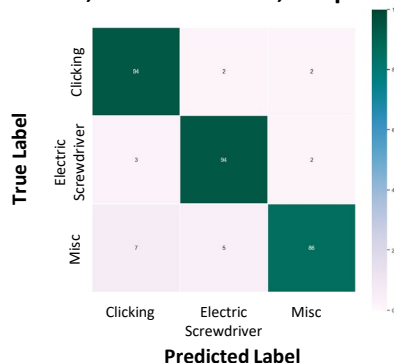
Activity Recognition (IMU data)
6 states, 700-1400ms windows; random forest

RESULTS WORKFLOW RECOGNITION

10 states, 10000ms window; deep learning using features state management, state post processing