Dataset Description

This dataset contains sensor and control data collected from two CNC machines – a CMX and a DMC – during the production of two distinct components made from Aluminum (Alu) and Steel (S).

Machines: CMX & DMC: Two industrial CNC machine types used for component manufacturing.

Materials: Aluminum (Alu) & Steel (S)

Components: Component 1 (CP1) & Component 2 (CP2)

Initial Dataset Structure:

The original dataset contained 92 columns, including numerous missing values (NaNs).

NaN-containing columns and 6 additional irrelevant features were removed.

The final dataset consists of 52 features and 4 target variables.

Features:

The 52 features include 12 core variables, each recorded across 4 axes: X (1), Y (2), Z (3), and the Spindle (6)

Feature types include load, torque, encoder positions, control deviations, desired positions, and commanded speeds.

Examples include: 'LOAD|1', 'ENC_POS|3', 'TORQUE_FFW|6', 'CMD_SPEED|2', etc.

These features provide high-resolution insight into machine dynamics and control signals during the production process.

Targets:

The dataset includes 4 target variables, corresponding to current consumption at each of the 4 axes: 'CURRENT|1' (X), 'CURRENT|2' (Y), 'CURRENT|3' (Z), and 'CURRENT|6' (Spindle)

These targets reflect the energy consumption behavior and serve as the basis for predictive modeling.

Further Details:

A detailed description of the feature structure and semantic meaning is available in the following publication:

https://www.sciencedirect.com/science/article/pii/S2213846323000676

Source Datasets

Original datasets can be accessed via:

https://publikationen.bibliothek.kit.edu/1000157789

https://radar.kit.edu/radar/en/dataset/kuaelieAdntembVb