



European Network for Business and Industrial Statistics

Spring Meeting 2024, 15-16 May 2024

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A Robust Multivariate Profile Monitoring Framework

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UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II



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A Robust Multivariate Profile Monitoring Framework

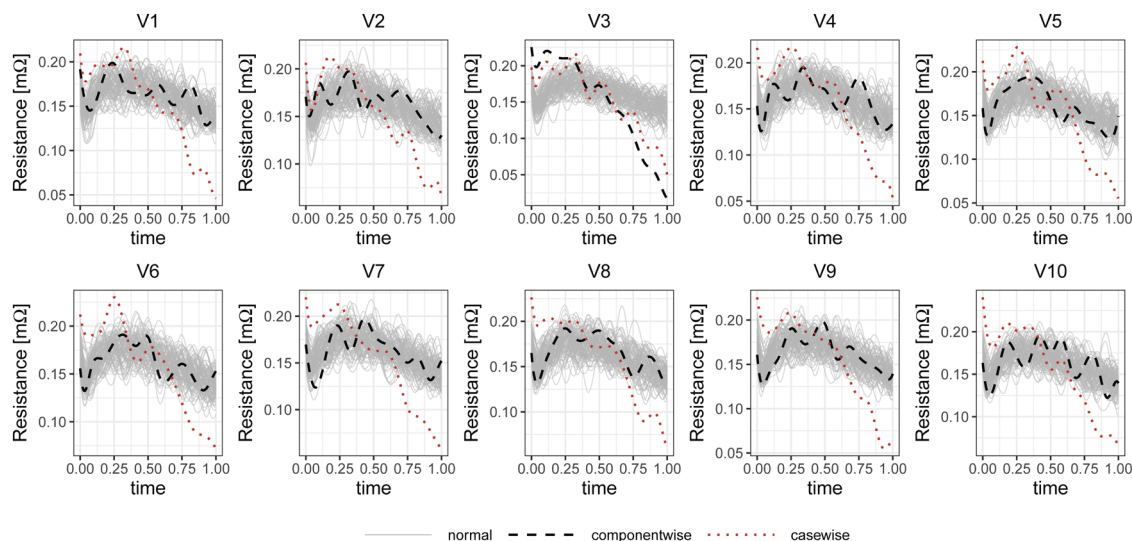
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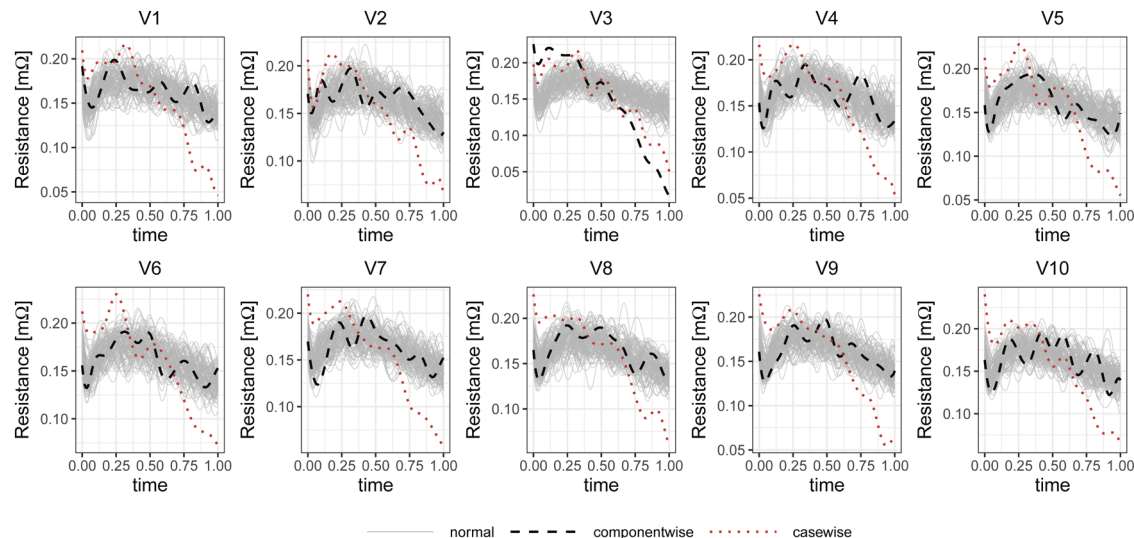
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- The presence of untrustable observations can significantly bias and reduce the power of SPM frameworks.
- When the dimensionality of the data is high, the fraction of perfectly observed cases can be very small
- Outliers may realistically occur in one or a few components only (componentwise), rather than in all components (casewise).



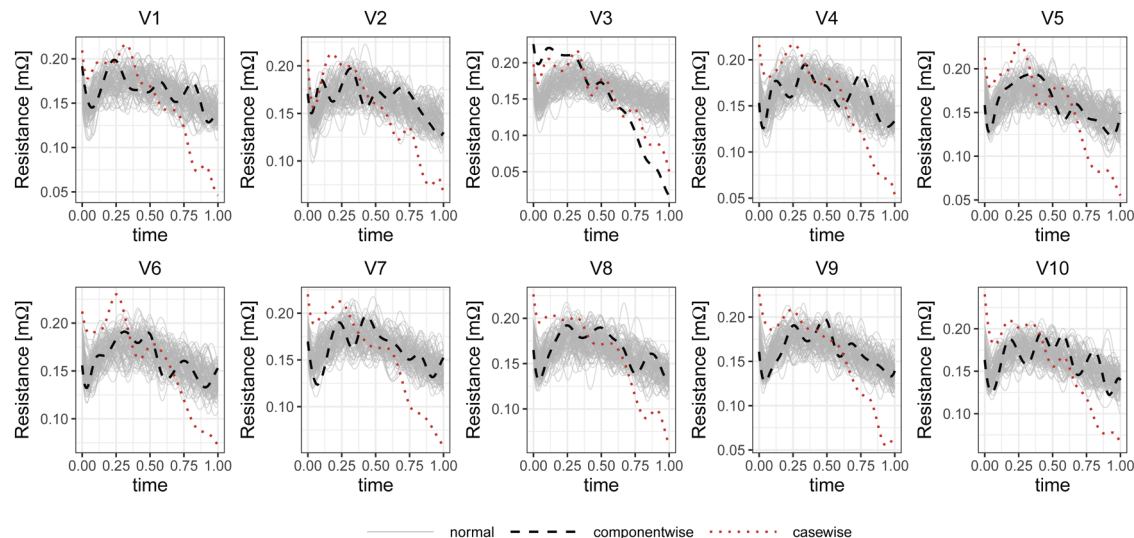
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- The robust multivariate functional control chart (RoMFCC) is a novel framework for multivariate profile monitoring, which is robust to the influence of both functional casewise and componentwise outliers.



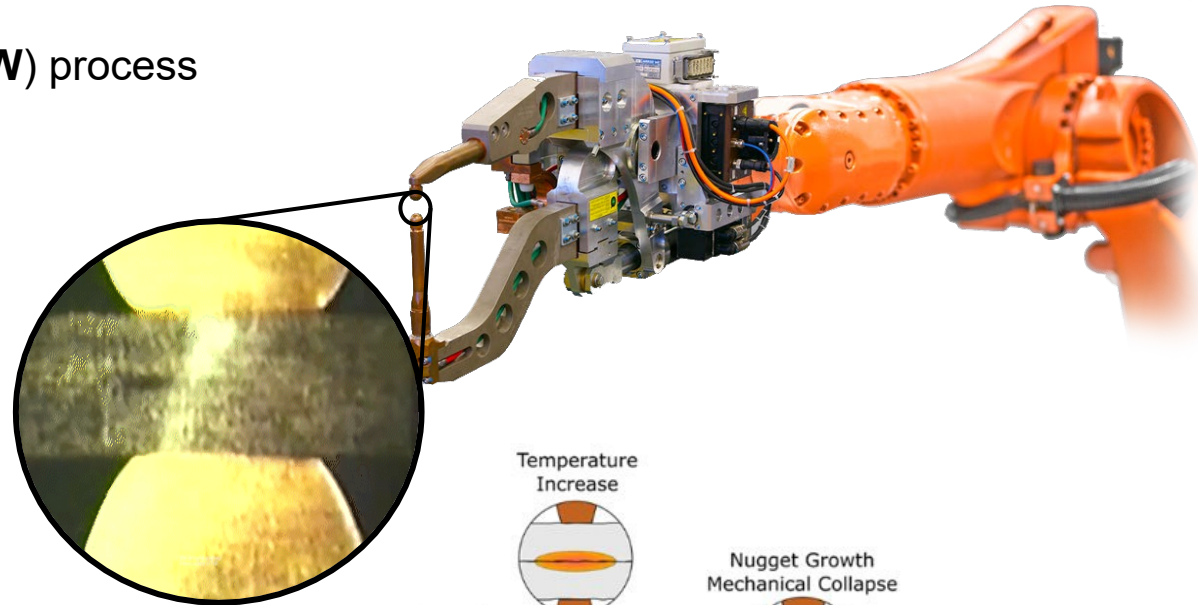
A Robust Multivariate Profile Monitoring Framework

- The robust multivariate functional control chart (RoMFCC) is a novel framework for multivariate profile monitoring, which is robust to the influence of both functional casewise and componentwise outliers.
- The RoMFCC is implemented in the R package `funcharts`, openly available on CRAN.

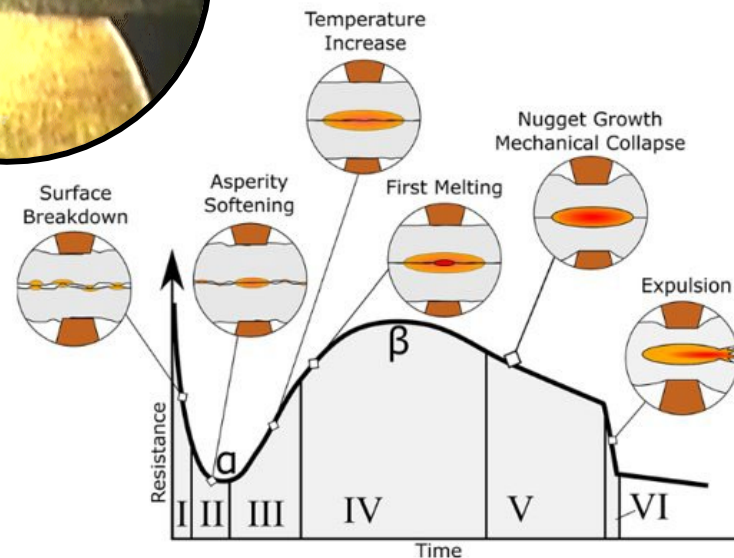
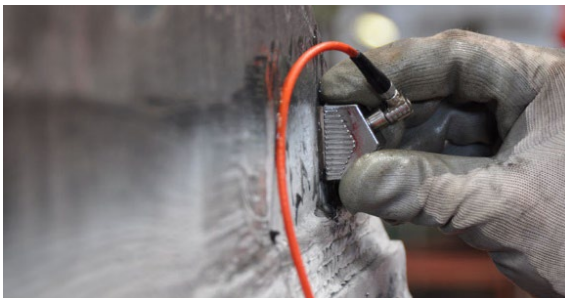


Real-case study: resistance spot welding process

- Resistance spot welding (**RSW**) process (Dickinson et al, 1980)

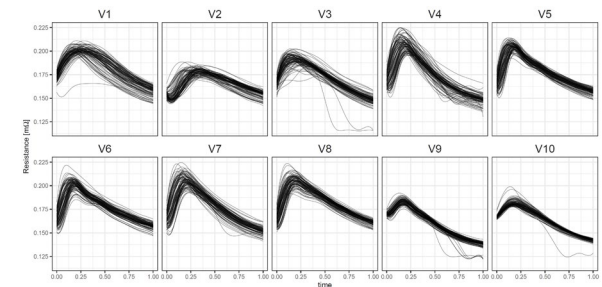
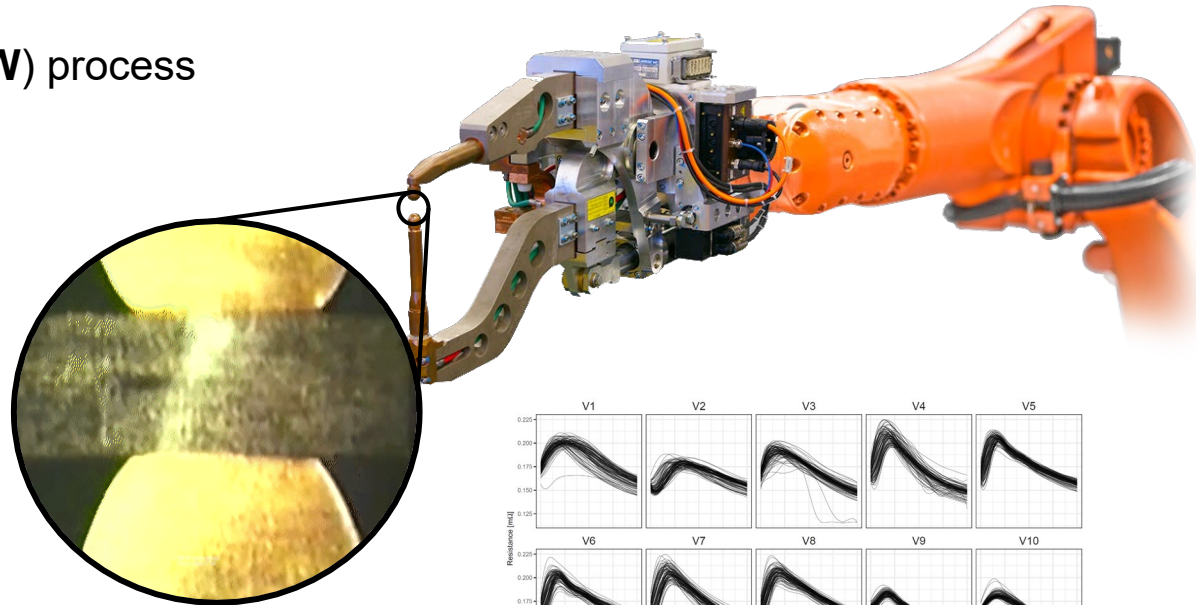


- Technological signature of the process: the dynamic resistance curve (**DRC**)

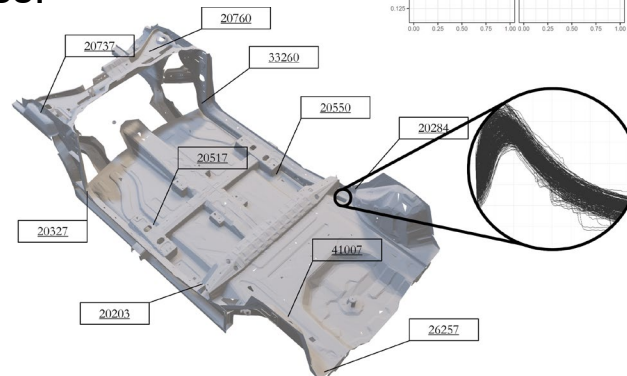
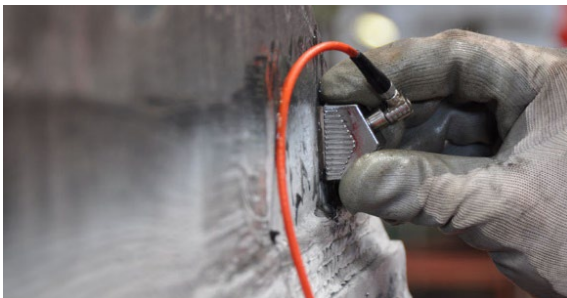


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