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Fault detection and diagnosis for PV systems using machine Learning

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Context

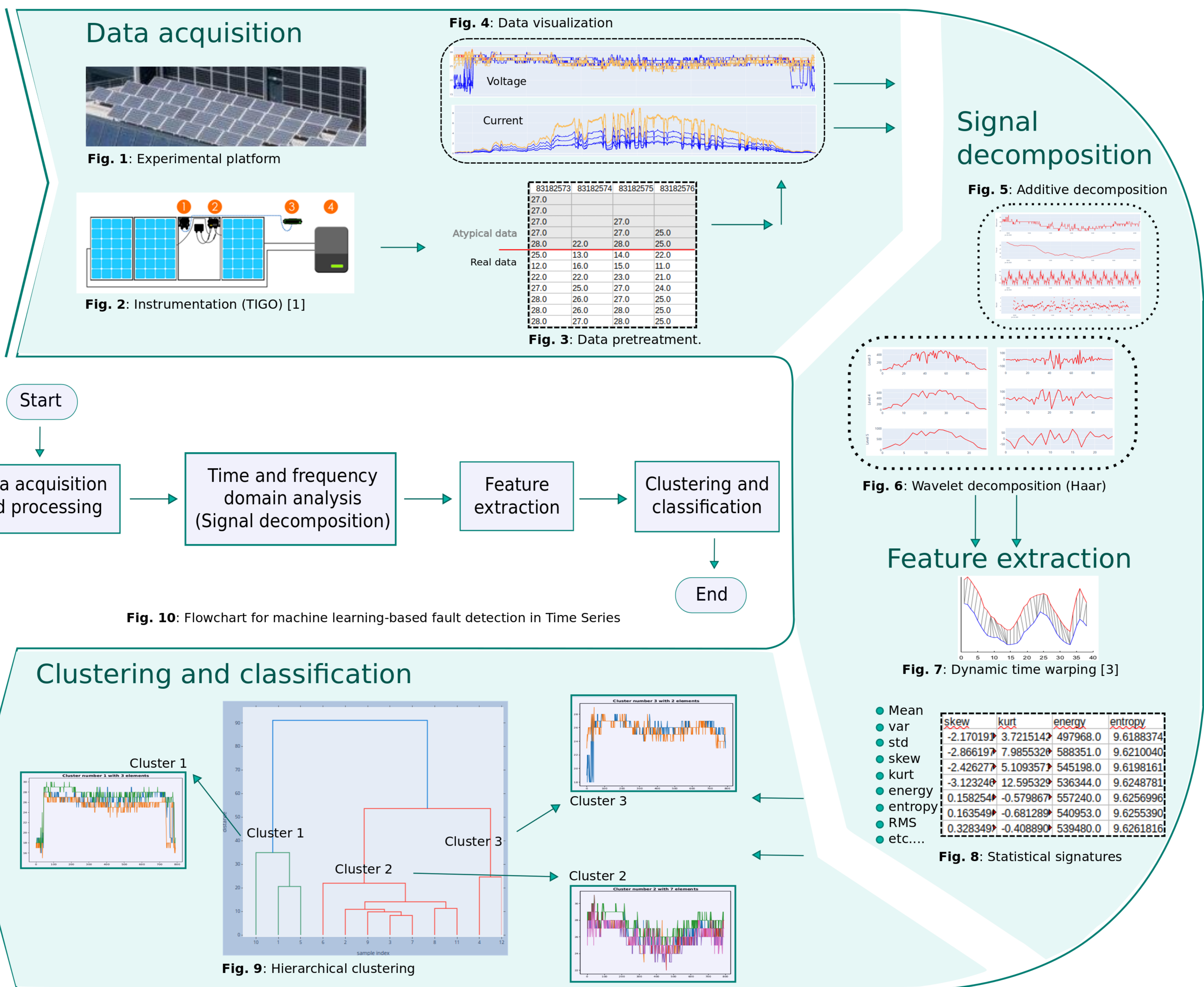
This work is developed on the experimental platform provided by Quantum. This platform has known faulty panels and healthy panels. The Quantum company specializes in the monitoring of PV plants and the diagnosis of performance losses, helping its clients to make the right choice to optimize the production of their plants. The main challenge of this work is to carry out the diagnosis in situ and in real time.

Thesis directors

- Corinne Alonso (Professor, Toulouse University, LAAS - CNRS)
- Louise Travé-Massuyès (Research Director — LAAS - CNRS, Chair on Diagnosis — ANITI)
- Audine Subias (Associate Professor, INSA Toulouse, LAAS - CNRS)
- Marko Pavlov (CTO at Quantum)

Research objectives

- Detect and diagnose failures in photovoltaic panels in real time using machine learning.
- Carry out the fault diagnosis without cutting off the production of the photovoltaic system.
- Adjust this solution in terms of cost / benefit in productivity or uptime.



Next steps of work

- Continue testing new artificial intelligence algorithms.
- Increase the data sampling rate.
- Include the algorithms in an embedded system.
- Installation of new sensors
- Use statistical signatures as input to AI algorithms.
- Attach the temperature and irradiance variables

References

- [1] TIGO Energy. <https://www.tigoenergy.com/es/downloads/brochures-datasheets-tuv/>
- [2] Thill, M., Konen, W., Bäck, T.: Time series anomaly detection with discrete wavelet transforms and maximum likelihood estimation. In: International Work-Conference on Time Series (ITISE2017)
- [3] Y.S. Jeong, M.K. Jeong, O.A. Omitaomu. Weighted dynamic time warping for time series classification. Pattern Recognition, 44 (2011), pp. 2231-2240.
- [4] Y.S. Jeong, M.K. Jeong, O.A. Omitaomu. Weighted dynamic time warping for time series classification. Pattern Recognition, 44 (2011), pp. 2231-2240