ARTIFICIAL INTELLIGENCE

Dyclee: Dynamic Clustering for tracking Evolving Environments

Predictive maintenance relies on clustering algorithms to track unwanted changes in industrial processes and infrastructures. However, most of them tend to fail to detect slow deviations indicating a gradual deterioration of the system.

DESCRIPTION*

Monitoring the condition of industrial systems is critical to safety and efficiency. Shocks, vibration, heat, friction or dust for instance can degrade processes behaviors. Yet data science can detect the emergence of anomalies before they cause failure.

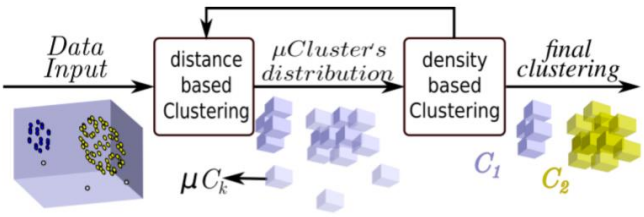
Data clustering, or unsupervised learning, looks for undetected patterns in a data set with no pre-existing labels and with a minimum of human supervision. Unusual events can be identified when an unintended pattern arises. But traditional clustering algorithms may fail to detect changes arising slowly over time.

Dyclee, a clustering algorithm developed at LAAS-CNRS offers remarkable capabilities due to its ability to dynamically track smooth and/or abrupt changes in evolving conditions.

It uses a two-stages distance-based and density-based approach that can detect high overlapping clusters even in multi-density distributions, making no assumptions about cluster convexity.

It shows fast response to data streams and good outlier rejection properties. Only a single parameter, the size of desired clusters, is required.

This unique set of capabilities make it particularly useful for domain expert's willing to engage in data science and predictive maintenance.



TECHNICAL SPECIFICATIONS

Data	• Quantitative • Qualitative e.g. [open, closed]
Language	Python
System(s)	Linux, Windows, MacOs

COMPETITIVE ADVANTAGES

- Dynamic tracking of even the slowest deviations
- Effective cluster detection and good outlier rejection properties
- Simplified configuration with a single parameter

APPLICATIONS

- Predictive maintenance
- System health diagnosis
- Process monitoring
- Data analytics

INTELLECTUAL PROPERTY

- Software

DEVELOPMENT STAGE

- Technology validated at lab level

1 2 3 **4** 5 6 7 8 9

LABORATORY

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