RE4DY

MANUFACTURING DATA NETWORKS

RE4DY TOOLKIT

Name of the Tool	**Decentralised data management & analytics**
Tool Owner	Industry Commons Foundation
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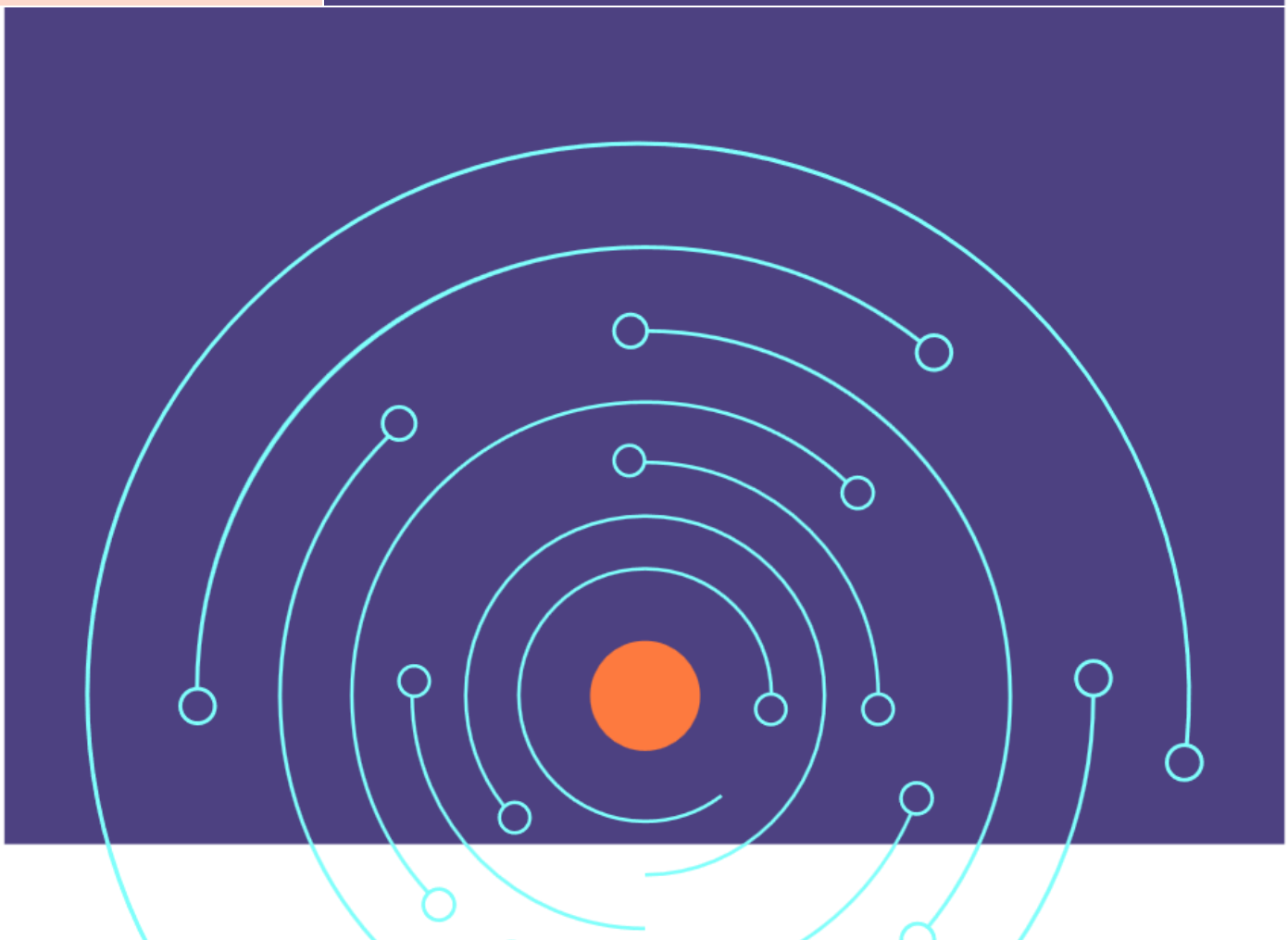

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1. Component Description

The component will provide a set of completely decentralized ML algorithms supporting extraction from local data, targeting specifically unsupervised ML cases. It innovates with respect to conventional Federated Machine Learning as nodes will be fully responsible to self-organise their federation(s) in order to exchange partial models and train them in a collaborative fashion.

This component will allow optimized management of local data, which will not be shared among locations, still extracting knowledge out of them through the collaboration between the involved nodes.

Specifically, the component will be specialized at least for the task of unsupervised clustering in order to identify classes of quality products.

2. Input

The component requires a series of collection of datasets describing a certain physical phenomenon, where each data point must be described according to a feature vector defined by the domain owner. Ideally, classification of data points according to feature similarities should allow the data owner to clearly identify classes relevant to the required task (e.g., presence of classes of low-quality parts in the case of production environments).

3. Output

The component provides a set of classes identified, on a node-by-node basis.

4. Information Flow

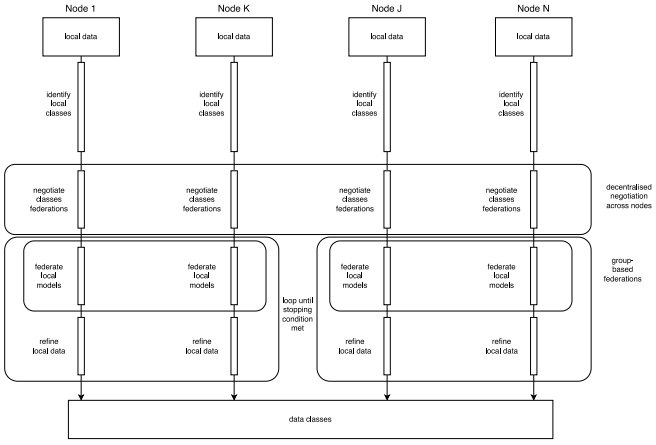

Figure 1 Information flow

5. Internal Architecture

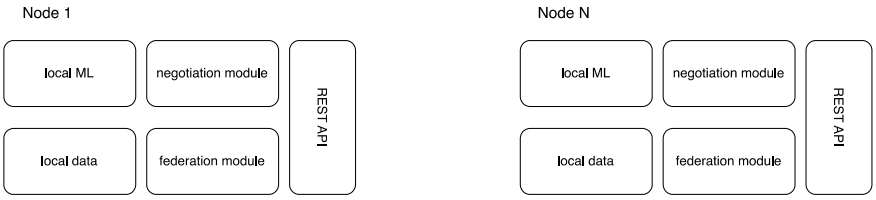

Figure 2 Internal architecture

6. API

The component is basically a set of algorithms packed in a library. The specific APIs will be specified based on the requirements of the pilot where the algorithms will be used.

In general, similar to other complementary components developed in the project (such as the "vanilla" Federated Learning libraries), the algorithms exploit the Flower open-source toolkit for the internals of decentralized learning.

7. Implementation Technology

Python using conventional ML libraries, depending on the specific task the component is applied to.

8. Comments

N/A.