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Tribological characterisation through semantic technologies

Casla P.* | Fernandez I. | Quintana I. | Igartua A.

*C/ Iñaki Goenaga, 5
20600 Eibar (Gipuzkoa) Spain
patricia.casla @tekniker.es*

Motivation

Tribology aims to study friction, wear and lubrication of interacting surfaces. Tribological characterisation is key for: **understanding the behaviour** of a material or combination of them (e.g., metal, coating, lubricant) **under specific operation conditions**, developing **new products**, and driving new materials into **sustainable solutions**.

Objective

To reduce the **number** and **size** of **experiments**, as well as the **cost** and **time**, required to identify the behaviour under specific operation conditions by **exploiting own and third party available data**.

Challenge

Results from tribological experiments follow **heterogeneous formats and data models** due to a **lack of standards**.
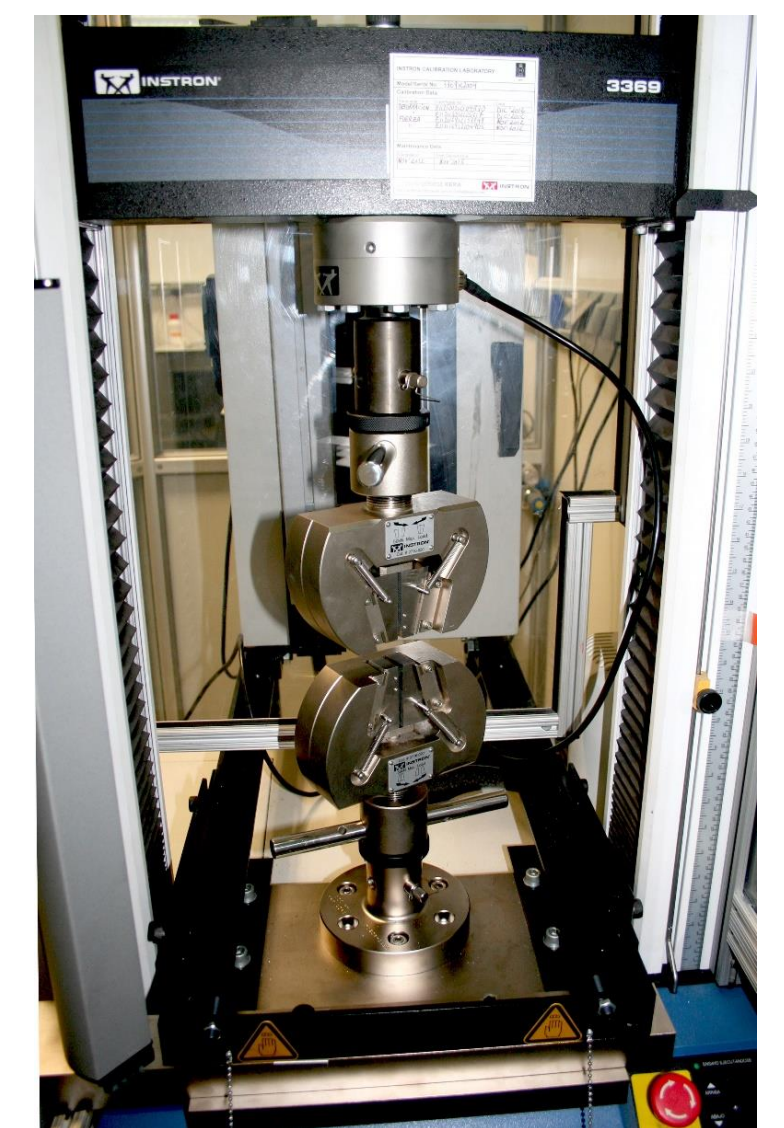
Approach

The proposed implementation approach provides formal and unambiguous data representation and homogeneous data access based on Semantic Technologies.

Main components involved are:

- **Tribo-connector:** IT component, collecting (manually /automatically) relevant information of the **characterization process and results**, and store in a data repository.

- **Semantic Repository:** aimed to **store and make available semantically annotated data**, created by direct ontology instantiation and/or mapping other data repositories schemas & the ontology.

- **TribOnt Ontology::** **domain ontology** providing a common representation of tribological experiments, **aligning** to existing TLO/MLO/DLOs for improved **interoperability** and following a **modular** approach for increased **re-usability**.

- **Added Value Services: parametric web services** and **visual exploration** of historical data taking advantage of advanced **reasoning-based searches**.

Expected benefits

- **Better representation** of materials' tribological experiments

- **Enrich existing data** with additional background knowledge

- **Ease** data **retrieval** and **navigation** through related resources by taking advantage of **reasoning capabilities**