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ONTOLOGY-DRIVEN DATA DOCUMENTATION FOR INDUSTRY COMMONS

Nanomaterials Characterisation

Use Case 8

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IRES

- Established in 2015, bridging gap between academia and industry, within TRL transition

Key Company Activities:

- Data Science and Digitisation in Materials Science Applications
- Health, Risk and (Nano)Safety
- Environment, Sustainability and Circular Economy

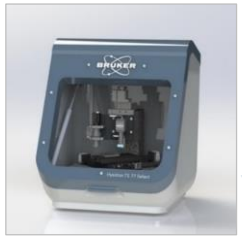
- Participating in EC clustering activities: EMCC, EMMC, NSC and others

Use case 8: Nanomaterials Characterisation

Coupling AM, safety/exposure and nanoindentation

Filament material selection → Filament Characterisation → Printing Process– Exposure measurements → Printed Object Characterisation → Collect Data – Ontology Inferencing

commercial polymer-based filaments will be used



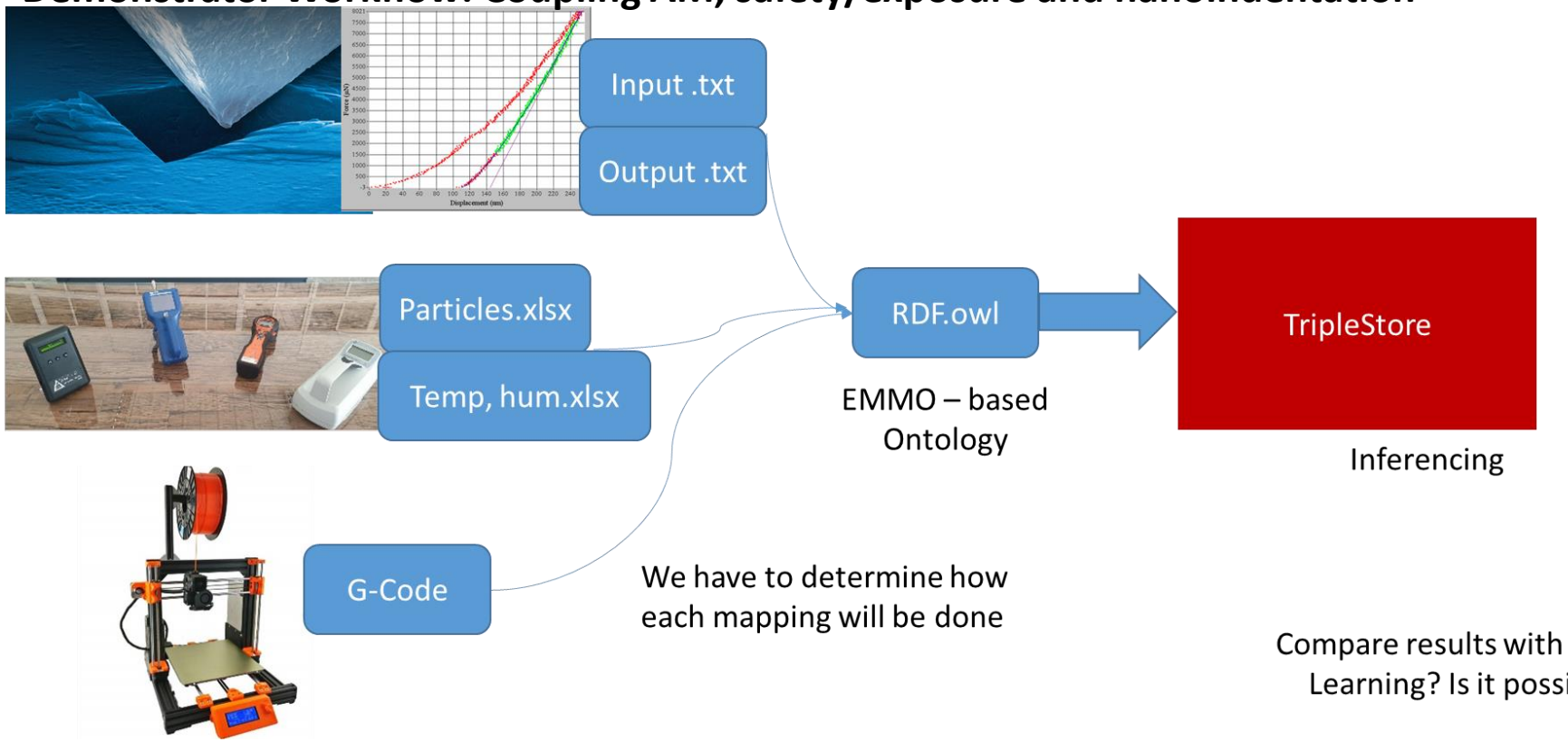
- Nanoindentation data (filament nanomechanical assessment)
- 3DP parameters, emissions in enclosure
- Nanoindentation data (printed object nanomechanical assessment)
- Results of Inferencing

Use case 8: Nanomaterials Characterisation

Coupling AM, safety/exposure and nanoindentation

- Purposes for using ontologies:
  - Semantic Data Integration
  - Inferencing

Demonstrator Workflow: Coupling AM, safety/exposure and nanoindentation



- Main Challenges:
  - Domain ontologies of interest are based on different top level Ontologies
  - Limitations regarding available data

Use Case requirements

- Integrate data extracted from exposure measurement with nanoindentation data using the required ontologies
- Potential extensions of existing domain ontologies to cover the needs of the use case
- Harmonisation of ontologies that are based on different top-level ontologies (EMMO/BFO)
- Select and deploy an appropriate RDF Triple Store

Main expected benefits

- Automation of the experimental data collection process
- Semantic Integration of data from different experimental measurements
- Study the correlation between Material Characterisation and Safety Domain through reasoning

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Thank you very much for your attention!

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