Knowledge Models for Diagnosing Postharvest **Diseases** of Apples

JOWO Graz, 2019 Armin Niederkofler Markus Zanker **Giancarlo Guizzardi** Gabriel Sottocornola Sanja Baric [UNIBZ, Italy]

DSSApple

- The cultivation and export of apples is a big economic factor for many countries around the world with the US, China, and Italy leading the list. In 2014, such exports amounted to a total value of 7.5 trillion dollars
- Defects in Post-Harvest activities can still cause losses of up to 10% in integrated production and up to 30% in organic production
- Many diseases have similar-looking symptoms that make diagnoses harder
- We are developing a Decision-Support System combining Machine Learning and Ontology-Based Reasoning

A Methodological Note

- In practice, a rather common "anti-patterns" is the mixing of separable concerts (e.g., in building taxonomies)
- Here, we break down the problem in different coherent concerns, namely:
 - Apple Characterization (e.g., the thing itself, its parts and qualities)
 - Apple Handling (e.g., the processes of the post-harvest apple handling process, its qualities and participants)
 - Apple Pathology (e.g., diseases, disorders and their manifestations)
 - Dispositional Factors
 - Apple Pathology Representation (e.g., pictures of symptoms and pathogens signs that can become prototypical examples of symptom types and Pathogen types, respectively)

UFO

(Unified Foundational Ontology)

 Over the years, we have built a Philosophically and Cognitively well-founded Ontology to contribute to the general goal of serving as a Foundation for Conceptual Modeling

This Ontology has been used to as a theory for addressing may classical conceptual modeling constructs such as Object Types, Identity and Taxonomic Structures (CAISE 2004, CAISE 2007, CAISE 2012, Synthese 2015), Part-Whole Relations (CAISE 2007, CAISE 2009, FOIS2010, CAISE 2011), Intrinsic and Relational Properties (ER 2006, ER 2008, ER 2011, CAISE 2015, DKE 2015), Weak Entities, Attributes and Datatypes (ER 2006), Events (ER 2013, BPM 2016), Multi-Level Modeling and Powertypes (JOWO 2015, ER 2015, DKE 2017), etc...





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Dispositional Factors



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unibz

gguizzardi@unibz.it