

Knowledge Representation and Reasoning

Unit 6: Introduction to Ontology Building and Online and Offline Tools

Formative Activities

(Demoly et al., 2019)

The table below summarizes different ontology development strategies, including their benefits, drawbacks, and the scenarios they are best suited for.

Strategy	Benefits	Drawbacks	Best Suited For
Top-Down (Conceptual/Expert-Driven)	Ensures strong semantic clarity and expert validation. Well-suited for stable and well-understood domains. Aligns easily with upper ontologies like SUMO or DOLCE.	Resource- and time-intensive. Can miss lower-level, practical details. Harder to scale in dynamic environments.	Scientific disciplines and domains with formal taxonomies (e.g., biology, engineering design).
Bottom-Up (Data-Driven)	Grounded in actual usage and data. Faster to develop with large datasets. Effective for emerging domains.	Risk of incoherent semantics. Limited generalization. Requires significant data preprocessing.	Business intelligence, social media analysis, and exploratory research.
Middle-Out (Hybrid)	Balances expert input with real-world data. Supports iterative development and adaptability. Scope is manageable.	Requires coordination across knowledge sources. Still relatively time-consuming.	Collaborative projects and industrial applications like Product Lifecycle Management (PLM).
Reuse-Based	Saves time by leveraging existing standards. Promotes interoperability and standardization. Improves reliability and credibility.	Reused models may not fit all needs. Requires adaptation and integration effort.	Government, healthcare, and education sectors where standards are critical.
Automated (Ontology Learning)	Highly scalable and fast. Can process unstructured text and large corpora.	May require manual validation for accuracy. Can lack semantic richness.	Preliminary exploration or fast-changing domains.