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**Project abbreviation:** USeA

**Project name:** Universal Semantic Annotator

**Project coordinator:** Roberto Navigli

**Project consortium:** Sapienza University of Rome

**Funding:** European Language Grid (ELG) Project Nr. 825627

**Project duration:** 1 year

**Main keywords:** Natural Language Understanding, REST API, Word Sense Disambiguation, Semantic Role Labeling, Semantic Parsing, Multilinguality

**Background of the research topic:** Although machines are nowadays able to process massive amounts of text and information, current approaches to artificial intelligence are still not able to fully capture the underlying meaning structure. Developing techniques that capture and represent semantic information is, arguably, key to enabling Natural Language Understanding (NLU). Over the years, researchers have made encouraging steps towards achieving this goal, but the barriers to entry are still high as current tools require expert knowledge of advanced NLU topics.

**Goal of the project:** The goal of this project is to create the first unified API for three major tasks in Natural Language Understanding (NLU), i.e., i) Word Sense Disambiguation (WSD), ii) Semantic Role Labeling (SRL), and iii) Semantic Parsing (Abstract Meaning Representation, AMR).

We aim at offering a simple yet efficient way to use state-of-the-art multilingual models within a single framework accessible via REST API, browsers, and programmatically. This will ease the integration of NLU models in NLP pipelines (also for low-resource languages), allowing it to exploit the information obtained from one semantic task to improve the performance of another one. In addition, WSD, SRL, and AMR, when used jointly, can help the resolution of each other, e.g. WSD can help the disambiguation of predicates in SRL, and predicate-argument structures can be used in AMR parsing.

**Project abstract:** Universal Semantic Annotator (USeA) is the first unified API for high-performance Natural Language Understanding (NLU), with the aim of enabling easy integration of semantic knowledge into real-world applications.

The API integrates state-of-the-art multilingual models developed recently at Sapienza NLP. With a simple HTTP request, they will allow to annotate texts with multiple semantic annotations. Specifically, we will release the APIs for the following models:

- WSD: Conia and Navigli, EACL, 2021
- SRL: Conia et al. NAACL, 2021
- AMR parsing: Bevilacqua et. al, AAAI, 2021

**Publications:**

Riccardo Orlando, Simone Conia, Fabrizio Brignone, Francesco Cecconi, Roberto Navigli. 2021. AMuSE-WSD: An All-in-one Multilingual System for Easy Word Sense Disambiguation. In Proceedings of EMNLP 2021: System Demonstrations. Association for Computational Linguistics.

Simone Conia, Riccardo Orlando, Fabrizio Brignone, Francesco Cecconi, Roberto Navigli. 2021. InVeRo-XL: Making Cross-Lingual Semantic Role Labeling Accessible with Intelligible Verbs and Roles. In Proceedings of EMNLP 2021: System Demonstrations. Association for Computational Linguistics.



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Rexhina Blloshimi, Michele Bevilacqua, Edoardo Fabiano, Valentina Caruso, Roberto Navigli. 2021. SPRING Goes Online: End-to-End AMR Parsing and Generation. In Proceedings of EMNLP 2021: System Demonstrations. Association for Computational Linguistics.