Report on the outcomes of a Short-Term Scientific Mission[1]

Action number: CA18209

Grantee name: Dagmar Gromann

Details of the STSM

Title: A cognitive semantic approach to improve interoperability of resources on a linguistic linked data hub

Start and end date: 16/10/2022 to 23/10/2022

Description of the work carried out during the STSM

Description of the activities carried out during the STSM. Any deviations from the initial working plan shall also be described in this section.

(max. 500 words)

Together with the host institution the Semantic Technology Laboratory (ISTC-CNR) and the University of Bologna and the hosts Aldo Gangemi and Stefano De Giorgis, the objective was to investigate common cognitively plausible connections underlying linguistic, lexical, terminological, and factual resources on the linguistic linked data hub called Framester [1]. To this end, we relied on the theory of image schemas proposed by Lakoff and Johnson rooted in embodied cognition and built an image-schematic layer to Framester, which entailed modeling an image schema ontology we call the Image Schema Abstraction And Cognition (ISAAC) ontology. This ontology represents the basis to interconnect FrameNet, VerbNet, and WordNet with image schemas on Framester and utilize frame annotation tools to automatically detect image schemas in natural language sequences based on this Linked Data modeling. Since this STSM was originally planned in 2019 and had to be postponed due to the pandemic, we had already conducted this work prior to the STSM in October 2022. This STSM was utilized to further specify the description of image schemas in ISAAC by building on new theories (e.g. SUPPORT also entails hanging from, adhering to, etc.) and increase the coverage to other dimensions of natural language, i.e., moral values (Loyalty, Betrayal, Liberty, Oppression, etc.) and emotions (joy, fear, happiness, etc.).

This STSM centrally contributes to Task 1.1. (LLOD modeling), Task 1.2 (on the creation and environment of LLOD resources in a distributed environment) and Task 2.5. (LLOD in terminology and knowledge management). Given the new focus on multi-dimensionality it also contributes centrally to Task 3.4. on multidimensional Linked Data and on the analysis of time-space in LLOD, since image schemas are considered spatio-temporal cognitive building blocks.

[1] http://etna.istc.cnr.it/framester_web/

Description of the STSM main achievements and planned follow-up activities

Description and assessment of whether the STSM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the STSM. Agreed plans for future follow-up collaborations shall also be described in this section.

(max. 500 words)

In terms of tangible achievements, we contributed a Semantic Web journal publication on the image-schematic layer of Framester called ImageSchemaNet [2], a publication on the ISAAC ontology [3] and a publication of the automated extraction of image schemas from natural language [4]. All of these resources are publicly available [5]. Furthermore, one expected future outcome is to provide a web application of an image-schematic natural language parser. Building on new research avenues started during the STSM, we now investigate the interconnection of image schemas, emotions and moral values as evidenced and expressed in natural language, but also in other modalities, such as videos and images. To this end, the collaboration network will also be extended to other colleagues at the ISTC-CNR. An initial discussion of this planned collaboration has been started within the context of a research presentation by the grantee at the host institution on 21 October 2022.

[2] De Giorgis, S., Gangemi, A., & Gromann, D. (2022). Imageschemanet: Formalizing embodied commonsense knowledge providing an imageschematic layer to framester. Semantic Web Journal.

[3] De Giorgis, S., Gangemi, A., & Gromann, D. (2022). ISAAC: Image Schema Abstraction and Cognition ontology. Proceedings of Joint Ontology WOrkshops (JOWO) 2022. Forthcoming

[4] De Giorgis, S., Gangemi, A. & Gromann, D. (2022). The Racing Mind and the Path of Love: automatic extraction of image schematic triggers in knowledge graphs generated from natural language. The Sixth Image Schema Day (ISD6), Bd. 3140, CEUR Workshop Proceedings.

[5] https://github.com/StenDoipanni/ISAAC