Accommodating Irish Sign Language in an extended Role and Reference Grammar lexicon architecture

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This paper is concerned with the definition of a Role and Reference Grammar (RRG) lexicon architecture (Nolan 2011a, 2011b) to accommodate the linguistic phenomena unique to sign languages, in particular to this research Irish Sign Language (ISL), in linguistic terms. To date, there is no definition for the architecture of the ISL lexicon in computational terms.

ISL is a visual gestural language articulated in 3D space with no written or aural form. ISL is a linguistically complete, very rich and complex language. Communication across Sign Languages (SLs) occurs using visual-gestural modality, encompassing Manual Features (MFs) and Non-Manual Features (NMFs) (Leeson and Saeed, 2012). MFs include hand shapes, hand locations, hand movements and orientations of the palm of the hands. NMFs include the use of eye gaze, facial expression, mouthing, head and upper body movements. The visual gestural realisation of a word in SL involves the simultaneous and parallel expression of a varied number of MFs and NMFs, each with their own duration, orientation and relative configuration and movement.

In pursuit of defining a lexicon architecture to accommodate ISL, we argue that the theory of qualia structures defined within the theory of the Generative Lexicon (GL) (Pustejovsky, 1991) must to be extended to cater for SLs and their associated linguistic phenomena. We propose that semantic properties, which contribute to the meaning of a sentence, will need to be extended to accommodate ISL within the lexicon.

We motivate a new level of lexical meaning termed *Articulatory Structure Level*, such that the computational phonological parameters associated with this visual gestural language are accommodated. This level of lexical meaning will represent the essential (computational) phonological parameters of the lexical item. These parameters will be used to account for the various linguistic phenomena pertaining to ISL MFs and NMFs, which are necessary to adequately represent ISL within an RRG lexicon architecture (Van Valin and La Polla, 1997; Van Valin, 2005).

We refer to our newly developed linguistically motivated computational framework as the *Sign_A* framework, with the "A" within this term representing Articulatory Structure Level. We leverage our proposed Articulatory Structure Level for lexical meaning to accommodate the linguistic phenomena of ISL and to propose a lexicon architecture capable of accommodating ISL in computational linguistic terms. The Sign_A framework together with Articulatory Structure Level, enables us to provide a definition within RRG for the ISL lexicon in computational linguistic terms. We leverage the Sign_A framework to extend the RRG model to account for lexical entries for ISL verbs, ISL classifiers and ISL nouns within the RRG lexicon.

References

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