Building an Ontology of Pain – Abstract

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Abstract

Pain data is important for both the management of pain and treatment of its underlying causes. This data is commonly collected through standardized pain testing procedures, such as Quantitative Sensory Testing. Data about pain can be recorded using several pain scales, such as the Kohn Reactivity Scale, and questionnaires, such as the McGill Pain Questionnaire. Due to the heterogeneity of these datasets, it is critical to develop a common semantic framework that can integrate this data. We propose the Pain Ontology to unify data about pain, including information drawn from the types of sources listed above. To represent an individual's experience of pain, we utilize the term 'feeling of pain' from the Emotion Ontology (MFOEM). We considered several other definitions for the experience of pain and rejected them in favor of the MFOEM definition. For instance, both the Human Phenotype Ontology and NCI Thesaurus treat pain as a symptom of a disease, but pain does not necessarily indicate pathology. We also represent the feeling of pain as a process, whereas both the Ontology for MIRNA Target and the Experimental Factor Ontology treat pain as a quality. To relate the feeling of pain to the location in which the pain is occurring, we define the relation 'perceived to occur in'. To guide the bottom-up development of the ontology, we are utilizing the publicly available Orofacial Pain: Prospective Evaluation and Risk Assessment (OPPERA) study and the International Classification of Orofacial Pain (ICOP). OPPERA examines factors that lead to painful, chronic temporomandibular joint disorders using the OPPERA Comprehensive Pain and Symptom Questionnaire. This study offers extensive and high-quality pain related data. ICOP contains an extensive list of terms related to orofacial pain, including definitions, which can be represented in the Pain Ontology.

Keywords

pain, ontology, pain data, pain perception, pain scale, orofacial pain, quantitative sensory testing