

Composable Event Frames for the Integrated Analysis of Sensor Data and Natural Language

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Abstract

Sensors exist as parts of larger systems that have the ability to reason about sensor outputs, to decide upon courses of action to be taken, and to engage control processes that will initiate these courses of action.

We will describe a new sort of ontology-based composable event frame approach to designing a system of this sort which incorporates the ability to merge sensor information with information generated in natural language and to reason about the resulting ensemble. The approach is motivated by ongoing research on exploitation of sensor data in military contexts, where the goal is to capture a sufficient range of natural language semantics to support reasoning useful to intelligence analysts and military decision-makers and planners and by associated research into self-correcting software systems. We have built a prototype ontology-driven information system (ODIS) that we have used to test the hypothesis that a framework of this sort can produce structured information from natural language that is of higher value for reasoning purposes than can be attained through traditional approaches such as FrameNet and entity and relation extraction techniques.

The talk will outline some of the interdependencies between the ontological structure of an embodied system of sensors, reasoners and control processes and the ontological assumptions such a system will make about the world within which it is operating (for instance regarding the persistence of objects). It will also describe how sensor outputs, both simple and fused, can be verbally interacted with using the same grammar as is used to represent the sensor information.