

Stream-Based Reasoning Support for Autonomous Systems *

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For autonomous systems such as unmanned aerial vehicles to successfully perform complex missions, a great deal of embedded reasoning is required at varying levels of abstraction. To support the integration and use of diverse reasoning modules we have developed DyKnow, a stream-based knowledge processing middleware framework. By using streams, DyKnow captures the incremental nature of sensor data and supports the continuous reasoning necessary to react to rapid changes in the environment.

DyKnow has a formal basis and pragmatically deals with many of the architectural issues which arise in autonomous systems. This includes a systematic stream-based method for handling the sense-reasoning gap, caused by the wide difference in abstraction levels between the noisy data generally available from sensors and the symbolic, semantically meaningful information required by many high-level reasoning modules. As concrete examples, stream-based support for anchoring and planning are presented.

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