ISIF Working Groups Report

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UPDATES ON WORKING GROUPS

International Society of Information Fusion (ISIF) sponsors working groups by providing recognition, status, and support. The support includes a meeting place during the FUSION Conference and related website links. It can also include support for virtual meetings. The working groups bring together researchers who share a common interest. For more information, or to submit a proposal for a new working group, please see the ISIF website: https://isif.org/about/working-groups/isif-working-groups or contact Darin Dunham, Vice President Working Groups. Currently, there are currently two working groups that ISIF supports. Here is a quick summary of their focus areas and activities.

ETUR WORKING GROUP ACTIVITIES BY PAULO COSTA (GMU) AND ANNE-LAURE JOUSSELME (CS GROUP)

The Evaluation of Techniques for Uncertainty Representation Working Group (ETURWG) was discussed at FUSION 2010 in Edinburgh and charted by the ISIF BoD in July 2011. Since its inception, the group organizes special sessions at the FUSION conference every year, edited a JAIF special issue (vol. 13, issue 2, Dec. 2018), organized a tutorial at FUSION 2020, and holds bi-weekly meetings (142 so far) gathering 78 members including roughly 15 core members. ETURWG provides a forum for collectively evaluating techniques for assessing, managing, and reducing uncertainty. Activities include establishing features required for any quantitative uncertainty representation to support the exchange of soft and hard information in a net-centric environment, developing a set of use cases involving information exchange and fusion requiring reasoning and inference under uncertainty, and defining evaluation criteria supporting unbiased comparison among different approaches applied to the use cases. The ETURWG encourages a community experience within the areas of focus.

Recent progress includes:

- A methodology to enable formal analysis of Large Language Models (LLMs) uncertainty handling, supported by the Uncertainty Representation and Reasoning Framework (URREF) ontology. The experimental setup proved its efficiency in capturing aspects of ChatGPT uncertainty handling. This piece of work was recognized as the first runner-up paper at FUSION 2023 (see page 22).
- Identified possible modifications to the URREF ontology that will be discussed and eventually implemented in URREF ontology Version 4.0 under development.
- An analysis of the machine learning problem complexity utilizing Qualitative Models of Data Generating Processes (QM-DGP). The approach: (i) informs the design of the models, such that the relevant information can be absorbed through machine learning; and (ii) enables determination of the quantities of training data required for learning of good quality models.
- The first challenge for high-level information fusion, submitted at the FUSION 2024 conference. Participants to this challenge should propose AI solutions to increase pilots' situational awareness by fusing flight-related information disseminated via "Notice to Airmen" (NOTAMs) https://hlif-challenge.s3g-labs.fr/.

The group will focus in 2024 on advancing the design of an URREF-driven workflow for heterogeneous data fusion as well as the analysis of the framework's strengths and limitations.

STONE SOUP BY PAUL THOMAS (DSTL)

The other working group supported by ISIF is the Open-Source Tracking and Estimation Working Group (OSTEWG), also known as the Stone Soup project. It exists to provide the tracking and state estimation community with a framework for the development and testing of algorithms. The working group has formed a community focused on development of a software architecture which allows code components to be plugged-in in a modular fashion, such as algorithms, sensor models and simulators. The idea is to provide a flexible and unified software platform for researchers to develop, test, and benchmark a variety of existing multi-sensor and multi-object estimation algorithms. It also aims to allow rapid prototyping of new algorithms in Python by providing a set of libraries that implement the necessary functions for tracking and state estimation, together with metrics for their evaluation.

- OSTEWG currently has 48 members.
- The working group meets every year at the FUSION conference.
- The meeting comprises 'development-level' briefings and discussions (i.e., less mature and more collaborative than full FUSION papers).
- Competitive awards ("The Mini-Stronies") are presented at the FUSION conference for: (i) best Stone Soup contribution; (ii) most improved class; (iii) small code contribution; and (iv) best documentation.
- OSTEWG will hold a special session at FUSION 2024.