

DAGSI Research Topic

1. **Research Title:** Event Sequence Learning from Textual Scenario Descriptions
2. **Individual Sponsor:**

Dr. Michael L. Talbert, AFRL/RYPAR
AFRL/RYPAR Bldg 620, rm 301
2241 Avionics Circle
WPAFB, OH 45433-7333
Michael.talbert@us.af.mil

3. **Academic Area/Field and Education Level**

Computer Science, Natural Language Processing, Information Retrieval, Pattern Learning
(BA/BS, MS or PhD level)

4. **Objectives:**

This topic seeks the development and application AI techniques, including Natural Language Processing (NLP), Machine Learning (ML), Search and Indexing, and Artificial Generalized Intelligence (AGI) to:

- a) Extract entities, events, and relationships from published narrative activity reports and open source information;
- b) Characterize, cluster, and label extracted events with respect to a pre-defined mission context;
- c) Demonstrate automated simple event sequencing by timestamp;
- d) Demonstrate inferred event sequencing by context when timestamp is not explicitly represented;
- e) Demonstrate ability to infer and propose corollary or intermediate events that while not explicit in the text, might also be expected in a recognized sequence within a mission context;
- f) Demonstrate the ability to infer, recognize, and record the emergence of new event sequences;
- g) Automatically assemble time-ordered event sequences into text-based rule sets for automatically recognizing activities of significance within a specified mission context.

5. **Description:** The Air Force acquisition community continuously develops state of the art intelligence data analytics capabilities, yet often fails to ensure the operational user community can adapt the tool into their workflow with minimal disruption or retraining. A goal for any such capability should be to let the analyst increase their focus on the analytical problem, not the tool. One such tool is a multi-domain situation awareness recognition and prediction capability called MAD-E (Multi-domain Analytics and Discovery - Evolution). AFRL is maturing this tool to ready it for transition to the multi-source analysis community. After a half-dozen demonstrations of diverse scale, duration, and complexity, three conclusions are clear: 1) this is a game changing analysis and prediction capability, 2) users of the prototype have assessed that the workflow disruption for the tool as-is would prevent its ready adoption, and 3) the modular design of the tool make it well positioned to adopt emerging artificial intelligence (AI) methods to increase the speed and reduce the effort of interaction with it.

6. **Research Classification/Restrictions:** The envisioned work can be done at any level of classification. The source documents which describe scenarios from which to extract event sequences will ultimately drive the classification of the effort.
7. **Eligible Research Institutions:** No restrictions.

PA Approval #: pending