Attachment 1 – DAGSI Research Topic Template

NOTE: Under the Cooperative Agreement, Technical Directorates have three options for topics. First, a topic can strictly be considered in the pool for the state allocation of funding. DAGSI will work across the TDs for this allocation. Second, the TD can be prepared to be a funding partner with the State of Ohio. This would include: providing additional funds to support additional recipients of a topic, or expand the proposers team to include additional members on a topic. Third, the TD may elect to fully fund a topic not selected for State of Ohio funding or to pursue University teams outside the State of Ohio. Contact Terry.Cunningham.2@us.af.mil for questions

1. **Research Title:** Reinforcement Learning with Analogical Transfer
2. **Individual Sponsor:**

   > Dr. Trevor Bihl, AFRL/RYAR
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3. **Academic Area/Field and Education Level**

   > Electrical Engineering (MS or PhD level)
   > Computer Science (MS or PhD level)
   > Biomedical, Industrial and Human Factors Engineering (MS or PhD level)

4. **Objectives:** Reinforcement Learning (RL) research and development (R&D) advancement through leveraging analogical reasoning
5. **Description:** Reinforcement Learning (RL) has shown incredible abilities to support training algorithms using reward functions to take appropriate actions to maximize success in various operational environment. RL models are typically custom tailored with unique reward functions and useful in individual environments for individual tasks. It is possible to apply transfer learning in some cases to enable the RL trained capabilities to be used in related environments. Biological intelligence does not have this limitation and can quickly apply knowledge from one source to another through analogies. Analogical reasoning (AR), whereby learning by analogy is conducted, involves a collection of methods to emulate this biological ability. This project aims to apply/combine AR algorithms and techniques with RL to enable learning and applying knowledge across environments, or related games or situations.. This approach would allow AI systems to quickly learn new environment by leverage experience.
6. **Research Classification/Restrictions:** unclassified
7. **Eligible Research Institutions:** Ohio State, Ohio University, University of Cincinnati

 NOTE: Topics submitted to DAGSI must be approved for public release. Need PA Approval #