Enterprise Neurosystem Update – 6/22

United Nations

We had a recent call with the leadership of the United Nations Technology Executive Committee for the UNFCCC (Paris Agreement). We are now building deeper engagement and collaboration, and have been invited to submit proposals for Enterprise Neurosystem AI presentations at UN events in 2022 and 2023.

US State Department

We have been in contact with the US State Department representative to the UNFCCC TEC. He requested a community summary and proposal for climate engagement areas in various national and international organizations. Ryan Coffee/Stanford SLAC is our Government representative on the board, and crafted the bulk of the proposal (enclosed).

Satellite Data

Tomás Acuña, Yara Mohajerani and Tharshi Srikannathasan have been in conversations with Josh Purcell and the SD Catalog/Central Intelligence group regarding integration of existing and proposed satellite data production models (see update in CI section below). John Overton recently contributed a concept for a new data architecture for planetary mapping.

Acoustics AI / Bee Population PoC

The first demonstration of the sensor is complete with initial data captured, and preliminary analysis is underway - Leo Hoarty's sensor array design is now a reality, and Ryan Coffee's honeybee hive in Portola Valley and a counter-example industrial computing cluster at SLAC served as the initial test locations. Leo will provide a design draft of the modular sensor array so the sensor can be easily replicated at low cost with varying degrees of component sophistication, such that this solution inspires broad adoption and community co-development, with a focus on underserved communities and developing nations. Dr. Noah Wilson-Rich at Best Bees has offered an urban hive to the community for comparative analysis and Coffee is working with collaborators to include international participation in Mexico City and Barcelona to provide examples of comparative counterpoints as well as iterating the partner codesign principle. Coffee has also begun discussions of leveraging private sector support for computer science in minority-serving institutions that in fact improve the comparative results across US urban environments and Native American tribal agriculture environments. Pictures and a video of the sensor and hive are enclosed.

AI For Science Working Group

In addition to supporting the bee project, Ryan Coffee has deployed the AI Acoustic sensor in his data center at Stanford, capturing IT hardware sound signatures and anomaly detection related to a new research thread in hardware failure forecasting. Such failure forecasting is very closely related to a DOE-funded effort in Tokamak fusion instability forecasting. As a demonstration of the power of cross-domain federation of machine learning, Coffee has proposed a comparative study across this industrial acoustic data to honeybee acoustic communication, the plasma fluctuations in the DIII-D Tokamak reactor, and classical music in the highest frequency ranges. The common patterns across these seemingly disparate areas are hypothesized to aid the generalization of collectively trained foundation models, as well as exposing and exercising the privacy and security concerns in so-called Federated Machine Learning.

Central Intelligence Working Group

Last week, David Wood gave an overview of the Java CLI, and we discussed the possibility of including the catalog's publish feature in that project. The CLI has many features that rely on Java, but one interesting feature was made available via a REST service (recording of this meeting is available in our slack channel). Josh Purcell also asked whether the models generated by this tool would be compatible with ONNX, as this is one tool that may facilitate making models more discoverable, and David indicated they are not. This is good feedback, as it helps us understand the limitations and utility of different approaches.

In addition, Surajit and Anindita downloaded the CLI project, and now have their dev environments working to enable code modification. Surajit also put together a new golang-based project, pulling in third-party projects that make creating CLIs much easier, and shared details on this build. There has been no objection to the idea of going with a new CLI over using the previous Java-based CLI. With that in mind, Josh and Surajit's preference would be to use the golang project going forward. Josh believes this will be more familiar for the group (being golang), and uses standard tools for creating CLIs that will provide community support and a vast array of examples.

We also had a meeting with the Satellite working group to discuss details on their data and model assets. We also had a broader discussion to ensure the catalog would make these types of assets discoverable. The main takeaways from this meeting - they validated the benefits of the sd-catalog for their satellite projects, and also mentioned that they had other asset types (aside from data and models) that they would consider for use in the catalog. This was similar to David's comments, as he had other audio assets that were critical to his projects. As workstream lead, Josh believes that focusing on a limited amount of assets while keeping an eye towards supporting a more generic "asset" is a good approach, so we limit the initial scope while working towards a production release.

Secure AI Connectivity Fabric Workstream

Sanjay Aiyagari participated in the recent UOR presentation (see below) and is now looking into incorporating UOR in a PoC with the Secure AI Connectivity Fabric at Stanford SLAC.

Smoky Mountains Computational Sciences & Engineering Conference

The community paper submitted by Dinesh Verma to the SMC2022 on Self-Describing Digital Assets was accepted, and the conference will take place in Kingsport TN on August 23-25. Accepted papers include a presentation at the conference, and publication in the conference proceedings in the Springer-Verlag Communications In Computer and Information Science (CCIS) series.

Telco Vertical Development Track

Ravi Sinha has been working to recruit new members to our Telco group, and to build a relationship between the Enterprise Neurosystem and the O-RAN nGRG (Next Generation Research Group). Members in the nGRG include Reliance Jio, Intel, NVIDIA, AT&T, Ericsson, Samsung, CTC, CMCC, Qualcomm, Rakuten and others.

Universal Object Reference (UOR)

We recently had a fascinating presentation from Alex Flom at Red Hat, who was introduced to us by our community member Audrey Reznik. This is based on his concept of Universal Object Reference, a new method of identifying anything within the known universe through bare particulars, attributes (including space and time) and multiple dimensions. We will plan a wider community presentation in a few weeks.

VentureBeat Transform 2022

I was invited by Steve Huels to participate in a panel discussion at the VentureBeat Transform event. The panel was moderated by Matt Marshall, CEO of VentureBeat, and included Fiona Tan, CTO of Wayfair, Arun Subramaniyan, VP Cloud and AI at Intel, and Arijit Sengupta, CEO of Aible. I was asked by Matt to describe the Enterprise Neurosystem during the session, and as a result, we recruited a few new Neurosystem members following the talk. A link to the panel discussion is provided below, and the Enterprise Neurosystem portion begins at 20:00.

https://venturebeat.com/2022/07/21/intel-wayfair-red-hat-and-aible-on-getting-ai-results-in-30-days/