Enterprise Neurosystem: Activity Report 2

IBM Research: Acoustics AI For Enterprise - Code Submission: Dinesh Verma, Nancy Greco and Seraphin Calo have gifted the community with an AI code donation from IBM Research. This is the Acoustics AI for Enterprise solution, developed by IBM as a standalone AI product, and already generating revenue.

Use cases include acoustic analysis of HVAC systems, healthcare scenarios, car engines, airplane turbines, manufacturing lines, data centers, oil rigs, and related anomaly identification. Ryan Coffee/Stanford SLAC has expressed interest in potential national lab use cases (Tokamak plasma, etc.). This contribution is also relevant as it maps directly to the core concept of the Enterprise Neurosystem.

Needless to say, we are delighted to receive this donation, and are now arranging a meeting of the community software review committee. For any interested parties, we will arrange a presentation from the IBM team at that time.

https://www.ibm.com/blogs/services/2021/05/03/sound-as-a-new-data-source-for-industry-4-0/

https://dl.acm.org/doi/abs/10.1145/2993422.2996401?casa_token=6agnttQyB2cAAAAA:MYIUfx2BstBGladtOc4CNOKeWV7P-WaJkaP0SuP68mU4Oee4EzusuCKs7E8KrzaN6_7IrBKK0gd5AQ

https://www.researchgate.net/profile/Shiqiang-Wang-6/publication/327663445_Domestic_Activities_Classification_Based_on_CNN_Using_Shuffling_and_Mixing_Data_Augmentation/links/5b9c6bc092851ca9ed0aa8de/Domestic-Activities-Classification-Based-on-CNN-Using-Shuffling-and-Mixing-Data-Augmentation.pdf

https://ieeexplore.ieee.org/document/8904563

Central Intelligence Platform Development: The team led by Dinesh Verma (CTO/Edge, IBM Research) is currently focused on common utilities for distributed enterprise AI systems. They have started to identify a number of gaps in various open source frameworks, and are now in the process of creating a target list for the implementation of related prototypes. The Neurosystem work groups can then leverage these components as common services.

- The first project will be a shared catalog of self describing assets, and this will accommodate different kinds of model formats and artifacts required for training. This foundation architecture is in the design phase, and will be implemented in code for community use. A group of IBM volunteers has been assembled to work on this area - please see the membership update below.

- Tong Zhang (Principal ML Engineer, Intel R&D) has kindly offered to present various Intel AI platforms designed to support this area, which could significantly accelerate development timelines.

Secure AI Connectivity Fabric Development: Sanjay Aiyagari leads this track, which started meeting in January. The purpose is to work on an AI system that can access and manage data originating in a secure environment subject to governance constraints, access/security issues, and with multiparty sharing considerations. Integration, middleware, messaging and networking technologies are all discussed.

This month, the team started to explore the following topics.

- Security of models: Governance constraints for the industries mostly represented in the group require questions about data that has not been adequately addressed to date. For example, distinction between data in-flight vs. at-rest is important in FSI and Telco (in-flight is OK for public cloud, at-rest is not). This requires thinking beyond existing data lake methodologies.
- Shared catalog: One of the key use cases: to leverage someone else's hardware for training. This means that the model catalog needs to be shared, and therefore the format of the shared catalog must be agreed upon. Per the Central Intelligence track above, the proposed concept is that it will be more akin to a digital asset catalog that will accommodate multiple types of model formats, etc.
- Training / Job scheduling: The team began a discussion of how certain types of models will be mapped to specific hardware that can execute those models. This goes beyond standard notions within Kubernetes, as it requires knowledge of different types of hardware. This is important in the current research / DoE use cases under discussion. Ultimately this could become an optimization issue, trading off cost for time to completion.

Certifications, Compliance & Risk: As we are now making progress with software contributions and PoC planning, Lisa Caywood suggested that we begin creating connections with resources familiar with industry certifications, and related compliance & risk factors. We have reached out to the team associated with that area at Red Hat, to establish a relationship and secure their guidance on an as-needed basis.

Membership Activity: A significant group of IBM volunteers are now coming onboard to assist with code development for the Self Describing AI Model Framework. We'd like to welcome our new community members - Janki Vora, Josh Purcell, Amir Khanof, Austin Eovito, Goppinath Nagarajan, Rahul Batra, Shirley Han, Theo Thomas, Mathews Thomas, Sepideh Seifzadeh, SaiSrinivas Gorti, Sharath Prasad and Sathya Santhar. In addition, IBM Research will provide volunteers to assist in supporting the Acoustics AI for Enterprise code base. We'd also like to welcome Blake Shiver, Senior Director, Products & Technologies at Red Hat.

White House OSTP RFI Request: Ryan Coffee/Stanford SLAC reached out and alerted us to a recent Office of Science and Technology Policy RFI, regarding enhancements to the White House initiative for a National AI Research and Development Strategic Plan. The deadline for these AI policy and infrastructure design modifications is March 4th, 2022. We'll arrange a call next week for community members interested in making a contribution to this RFI response.

https://www.federalregister.gov/documents/2022/02/02/2022-02161/request-for-information-to-the-update-of-the-national-artificial-intelligence-research-and?utm_source=federalregister.gov&utm_medium=email&utm_campaign=subscription+mailing+list

RI.SE (Research Institute of Sweden): Susan James kindly introduced us to Johan Kristiansson of RI.SE, the Swedish national technology research institute. He gave us an overview of the new AI platform infrastructure he has been developing, and has previously worked on software solutions based on biological architectures. We invited him to provide a deep dive session on this topic during the Secure AI Connectivity Fabric meeting on 2/15.