AICE Working Group Online Meeting

April 07, 2022

Agenda

> **Introduction**

> **AICE WG News**

> **AURA presentation**

> **Next steps & Q&A**

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> **Next steps & Q&A**

Three new prospective strategic areas meet in the AICE OpenLab

Cloud

Artificial Intelligence

Edge

Requirements

- Testbeds and tools
- To Trust AI
- OSS is necessary
- Interoperability
- Frugality / Embedded
- AI OSS ecosystem
- Predictability
- Benchmarks

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Mission AICE Working Group

Promote the advancement, development and experimentation of open source software for *AI, Cloud & Edge* technologies

> Foster vendor neutral collaboration in AI, Cloud and Edge open source technologies
> Deliver verified reference architectures, blueprints and distributions
> Provide test suites, test tools, calibrated demo datasets
> Setup and operate the AICE OpenLab, a dedicated experimental infrastructure
> Ensure privacy, security, ethics and frugality requirements integrated in OpenLab activities

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Opportunity 2021	Proposal H1 2022	Incubating H2 2022	Operational

Opportunity 2021

- Working Group Initiation Agreement
- Draft Charter

Proposal H1 2022

- Working Group Participation Agreement
- Evolve Charter
- Develop draft Program
- Pitch Deck
- Launch Plan

Incubating H2 2022

- Finalize Charter
- Implement Charter
- Infra: hardware, test beds, data sets
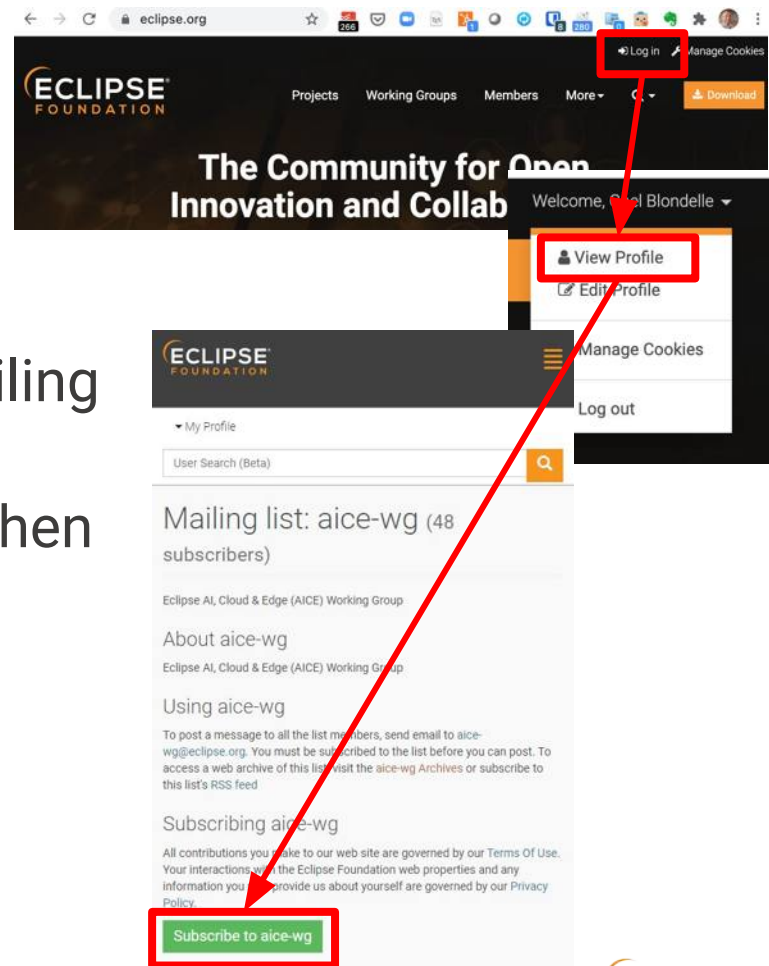- Committees & Staff
- Back office: staff & collaboration tools

Operational

- Market credibility
- Technology federation
- Business opportunities

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Join the ML

> Create an Eclipse.org Account
> Go to your Profile page then the Mailing List Tab
> Click on Manage your Mailing lists then search for AICE
> Click on Subscribe to aice-wg

Help us grow the ecosystem

Bring your projects & Use Cases

> Platform projects
> Vertical application frameworks
> Use cases / Testbeds / demonstrators
> Research project results for better dissemination and exploitation

Sponsor computing power for the OpenLab

> Provided by SDIA for the moment

Point us to potential partners / projects

> You are our best ambassadors!

Help us frame the Working Group

> Your requirements are the best!

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AICE website

Currently a Work in Progress

> Registration to the Mailing-list
> AURA Demonstrator Article

[New version](#) in active development

> About the WG
> Charter & Participation agreements
> News & Events
> Participants / Members
> Resources
> AURA Article v2
> 🔗 https://gitlab.eclipse.org/eclipsefdn/it/websites/aice.eclipse.org

Online next week
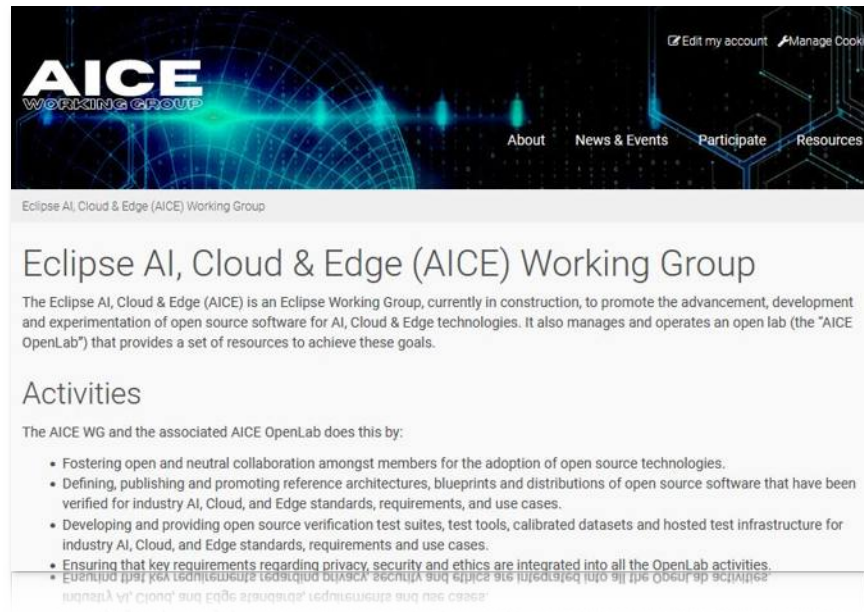
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AURA

AICE
7 april 2022

An **open** and **non-profit** project
to **improve comfort of the epileptic
patients** in daily life

Association AURA

🔗 www.aura.healthcare

🐦 @AssociationAura

📘 https://www.facebook.com/AssociationAura/

🐙 https://github.com/Aura-healthcare

What's epilepsy?

#1 impairing neurological disease in Europe

- **Permanent stress and anxiety in private and professional life for patients and relatives**

- **Accidents in daily life**

- **Social isolation**

- **Unpredictable seizures :**
- Diverses clinical characteristics: convulsions, strange sensations, emotions, and behaviors
- More than 40 differents types of epil**epsy**

6 millions
in Europe

600 000
in France

30%

drug-resistant

AURA

AURA mission

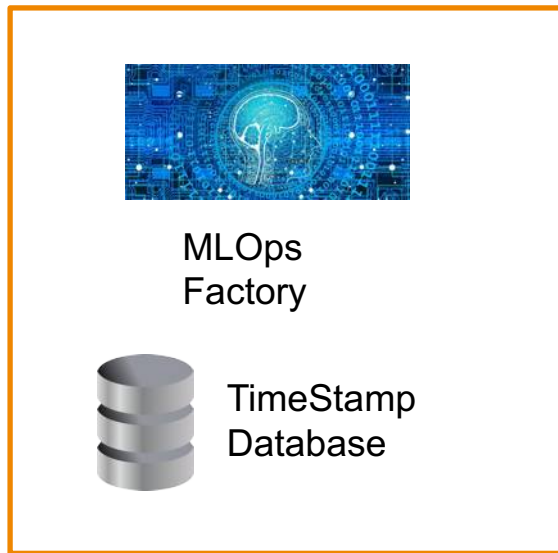Design and industrialize a connected device that detects early signs of seizure and alerts the patient

An open source and flexible platform to monitor epileptic patients in real life
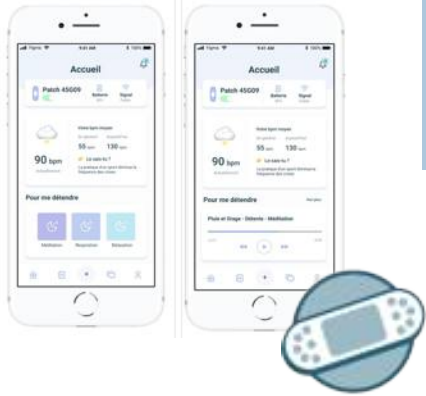
ECG

Patient

MLOps
Factory

TimeStamp
Database

Secured
cloud

Data Scientist
And Neurologists

AURA

Timeline R&D

2019-2021 develop AI algorithms, smartphone Companion Apps select usable patches

2022 **Pilot Study**
with 30+ patients,
5 - 10 day of recordings per patient

End 2023 **Real Life Trial**
with 50+ patients

2023 Industrialization with Commercial Companies

AURA

AICE / AURA Use Case

The selected use case to demonstrate the AICE platform is AURA:

- AURA is a not-for-profit organization that designs and develops a device that detects epileptic seizures and warns patients ahead for safety purposes. See https://aura.healthcare

- Their workflow is open, well-documented, and under active development. https://github.com/Aura-healthcare

- AURA data scientists have developed a prototype and want to scale it up.

- Challenge is great: passionate people, great cause, real data science problems: perfect match for our use case.

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AICE / AURA pilot objectives

- Classic AI workflow:
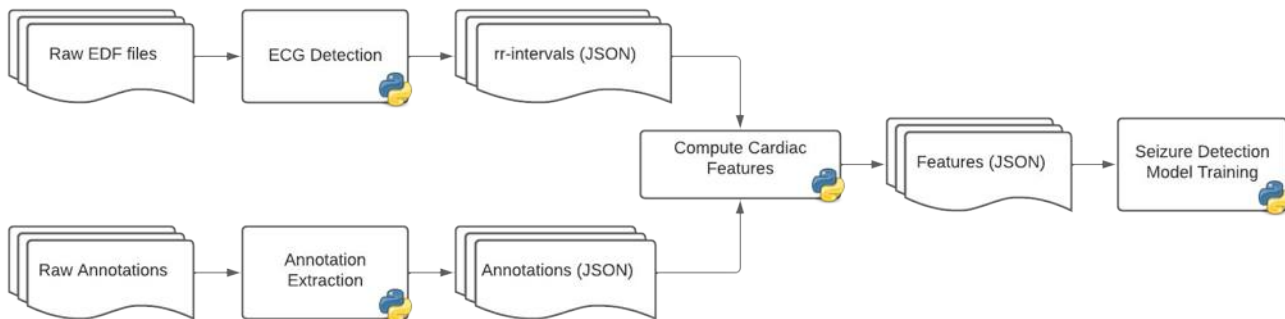
- Goals of the use case:
  - **Improve portability** in order to run it outside of the lab (e.g. on K8s clusters).
  - **Improve performance** to enable execution and fine-tuning of the ML model on larger datasets.
  - **Provide guidance** and good practices for the industrialisation of the process.

AICE / AURA pilot improvements: Portability

Working on the portability of the workflow:

- We built **containers** for the main steps (data preparation, model training).
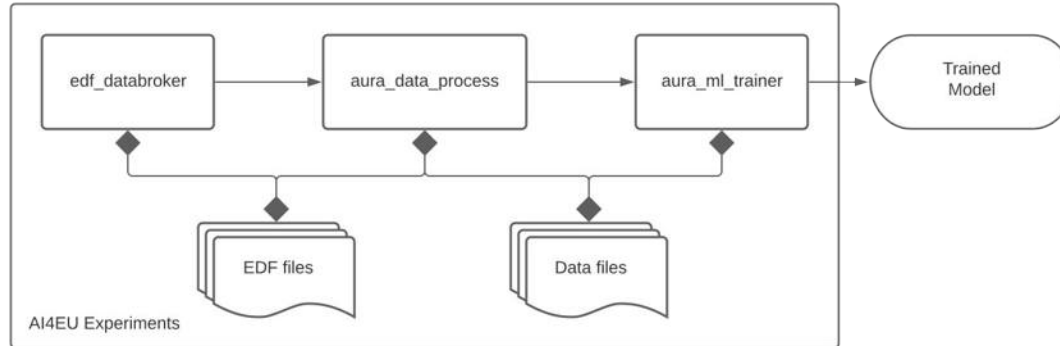
- Scripts allow to easily, and automatically, build containers from the latest sources.
- Resulting workflow can be executed locally (**Airflow**), with **simple Docker** or **Docker-compose**, or through **Eclipse Graphene**.

AICE / AURA pilot improvements: Performances

Working on the performances of the workflow:

- Set up parallel processes where it's possible:
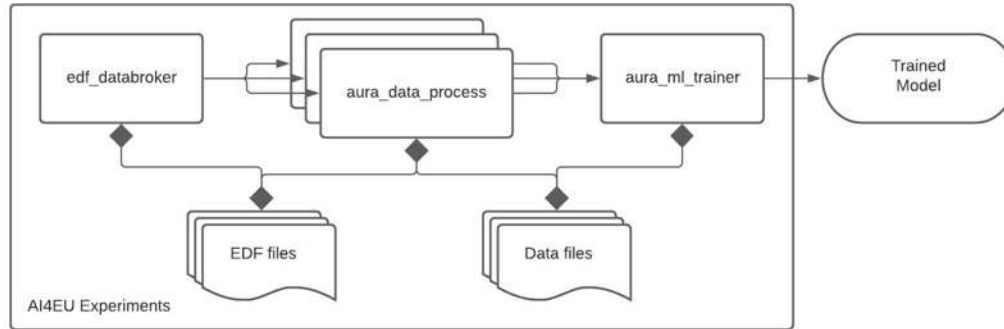
- Run the workflow on powerful computers: 48 threads, SSD Disks, 32GB RAM
- Cut down the full execution time from **20 hours** on the lab's computers to **4 hours** on the AICE servers.

AICE / AURA pilot improvements: Summary

Working on the industralisation of the workflow:

- Publication of a **clean repository structure** and a set of **best practices** for future developments, with up-to-date documentation and passing tests

- Industrialisation of the workflow to improve **performance**, **reliability** & **reproducibility** across environments.
    - Fix and improve the process for reliability and portability.
    - Identify workflow steps for parallel execution.
    - Set up automatic build of containers from the repository's structure.

- Working down the full execution cycle to 4 hours enables data scientists to run more tests, fine-tune parameters, and better optimise the whole workflow.

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AICE collaboration – experience feedback

Thanks to Eclipse :
- Robust code
- Running on Container / cloud

Next steps ?
- Open Data
- Federated learning
- Continuous Integration of the MLOps factory
- Work on HPC

AURA

AICE / AURA pilot results

- A fine example of **collaboration to improve maturity** of AI development.

"We worked with AICE to audit our current setup and improve the performance of our MLOps pipeline for epileptic seizure detection. We started from a working, although non-optimal, prototype and turned it into a fully optimised, reproducible and scalable workflow that can be seamlessly deployed almost anywhere.

We now have a clean and well-structured repository that we can reuse for future developments, and a set of established best practices to help us build and deliver better software solutions."

Alexis Comte, data scientist at AURA.

- Report is available at: https://aice.eclipse.org/articles/aice_aura_demonstrator

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Coming next...

> Gaël Blondelle presents the AICE WG in a Session with Huawei at WAICF, in Cannes, on April 15th, 2022, at 10:00AM-10:30AM CEST
  - Free registration at https://worldaicannes.com/

> Planning a face to face meeting at EclipseCon community day in Ludwigsburg, Monday, October 24th
  - Save the date!

> Monthly meetings
  - Next one in May with CEA
  - Presentation of N2D2
  - https://github.com/CEA-LIST/N2D2
  - Date to be announced on the ML

Thank You

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