IT ML infrastructure initiative

2nd workshop - October 11th, 2023
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https://indico.cern.ch/event/1298990/

Motivation

Machine Learning and Deep Learning techniques are investigated for a broad variety of tasks at CERN and in HEP

ATS: heavily studying ML/DL for beam control, simulation, engineering, …

LHC experiments: trigger, reconstruction, analysis, simulation…

>   Different levels of maturity from prototyping stage to production

>   Need to insure model robustness, reliability, customization, efficient deployment

IT: Infrastructure anomaly detection, …

Essential to have access to both reliable and scalable software and hardware

CERN IT has a role to provide the research community with the needed tools

A Machine Learning infrastructure Initiative in IT

ML/DL workloads don't have a monolithic profile.

> Depending on task and deployment constraints, computing requirements can be very different.

Map the ML/DL R&D landscape

Lack of resources could hinder algorithm development and the exploration of new research directions

CERN IT ML Initiative, with concrete workshops for infrastructure, use cases,

- Taking into account existing, related efforts at CERN

- Focusing on better understanding current and future needs for ML infrastructure at CERN

Goal:

Evaluate infrastructure and tools used today

> Better exposing the current possibilities from CERN IT, both on-premises and public clouds

Proposing synergies and solutions for ML/DL at the medium/long term

> Collecting use cases and prototyping using the different available options

First workshop

https://indico.cern.ch/event/1253881/

→**Propose ML initiatives with all business engagement units**

  To help track requirements from the different communities

  To assert the offering in CERN IT is aligned with those requirements

→**Improve GPU sharing between different IT services**

  Given the scarcity of this type of resource

  With the short-term goal of optimizing the overall usage of the existing infrastructure

  Note: A short term task, split from the goal of thinking the future ML infrastructure

→**Investigate integration of public cloud resources**

  Low level (GPUs) as well as higher level services
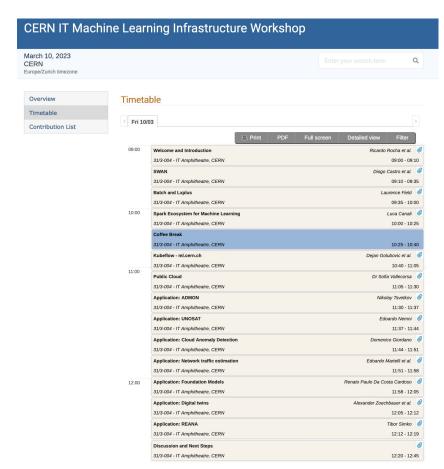
  Consider usage reporting, accounting, etc

→**Ensure ML needs are taken into account in long term resource procurement**

  Access to public cloud services, procurement of accelerators

→**Improve dataset and model registry and bookkeeping**

  Both local and external (reusable) models

CERN IT Machine Learning Infrastructure Workshop

March 10, 2023
CERN
Europe/Zurich timezone

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Overview
Timetable
Contribution List

Timetable

‹ Fri 10/03 ›

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Time	Session	Speaker / Time
09:00	**Welcome and Introduction**	*Ricardo Rocha et al.*
	31/3-004 - IT Amphitheatre, CERN	09:00 - 09:10
	SWAN	*Diogo Castro et al.*
	31/3-004 - IT Amphitheatre, CERN	09:10 - 09:35
	Batch and Lxplus	*Laurence Field*
	31/3-004 - IT Amphitheatre, CERN	09:35 - 10:00
10:00	**Spark Ecosystem for Machine Learning**	*Luca Canali*
	31/3-004 - IT Amphitheatre, CERN	10:00 - 10:25
	Coffee Break	
	31/3-004 - IT Amphitheatre, CERN	10:25 - 10:40
	Kubeflow - ml.cern.ch	*Dejan Golubovic et al.*
	31/3-004 - IT Amphitheatre, CERN	10:40 - 11:05
11:00	**Public Cloud**	*Dr Sofia Vallecorsa*
	31/3-004 - IT Amphitheatre, CERN	11:05 - 11:30
	Application: ADMON	*Nikolay Tsvetkov*
	31/3-004 - IT Amphitheatre, CERN	11:30 - 11:37
	Application: UNOSAT	*Edoardo Nemni*
	31/3-004 - IT Amphitheatre, CERN	11:37 - 11:44
	Application: Cloud Anomaly Detection	*Domenico Giordano*
	31/3-004 - IT Amphitheatre, CERN	11:44 - 11:51
	Application: Network traffic estimation	*Edoardo Martelli et al.*
	31/3-004 - IT Amphitheatre, CERN	11:51 - 11:58
12:00	**Application: Foundation Models**	*Renato Paulo Da Costa Cardoso*
	31/3-004 - IT Amphitheatre, CERN	11:58 - 12:05
	Application: Digital twins	*Alexander Zoechbauer et al.*
	31/3-004 - IT Amphitheatre, CERN	12:05 - 12:12
	Application: REANA	*Tibor Simko*
	31/3-004 - IT Amphitheatre, CERN	12:12 - 12:19
	Discussion and Next Steps	
	31/3-004 - IT Amphitheatre, CERN	12:20 - 12:45

Today

2nd CERN IT ML Infrastructure Workshop

Focusing on representative use cases and CERN wide requirements

Next

We are organising a set of talks/seminar inviting experts from other communities or industries to collect best practices in different domains

Questions?