DEEP: Hybrid approach for Deep Learning

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Hybrid DataCloud https://deep-hybrid-datacloud.eu



The DEEP-Hybrid-DataCloud project researches on intensive computing techniques such as needed for deep learning. This requires access to specialized GPU hardware to explore very large datasets. DEEP applies a hybrid-cloud approach that enables such access. We understand the needs of our user communities and help them to combine their services in a way that encapsulates technical details the end user does not have to deal with.

DEEP Architecture components

DEEPaaS API

Deep Learning Use-cases

Exampled use-cases demonstrating usefulness and scalability of the approach

DEEP as a Service API is a REST API focused on providing Basic Users with web access to machine learning models. Advanced users can integrate arbitrary machine learning models.

DEEP Marketplace

The Open Catalog provides the universal point of entry to all services offered by DEEP:

- Browse modules and learn from others
- Re-use and re-train existing modules
- Implement new

User-centric Policy



Image classification module

Generic model to train and test image classifiers (e.g. ResNet50, Xception). Several services are derived:

- Plants (Plantnet dataset)
 Seeds
- Conus marine snails
- Phytoplankton





An image super-resolution service for satellite imagery (Sentinel2, Landsat8, VIIRS, MODIS) to upscale low resolution bands to high resolution with Deep

Pilot Testbed

Heterogeneous sets of resources are provided:



Access to resources through orchestrator



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Nextcloud

Alien4Cloud for a graphical composition of complex infrastructures

HPC resources

Supporting Nextcloud for remote synchronization

docker hub

:cpu-test, :gpu-test

:latest, :cpu, :gpu

DEEP Open Catalog

Authentication - Authorization - Storage - Computing - Orchestration

DEEP takes care of supporting users with different levels of experience by providing different integration paths

> Fig.: dataset, prediction (train), prediction (test). 6 month monitoring dataset for network traffic

Learning (e.g. DSen2)

Massive Online Data Streams

A service is aimed at analyzing online data streams in order to generate alerts in real-time. The principle is proactive time-series prediction adopting artificial neural networks (e.g. LSTM, GRU).



Jenkins CI/CD





Delivery to the

registry

Retinopathy

A deep learning approach (e.g. ResNet50, InceptionV3) for automated classification of retinopathy based on color fundus retinal photography images



Color fundus retinal photography images for a healthy (DR0) and the most pathological level (DR4)

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