



- Ease of use of Deep Neural Networks by IT staff with no profound knowledge on Deep Learning
- Run training and predicting algorithms in hybrid HPC + Big Data environments
- Increase early diagnosis and improving treatments
- Extend the knowledge about diseases and pathologies
- Save direct and indirect healthcare costs

CONTACTS



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Performance Computing boosting Biomedical Applications

High



DEEPHEALTH



ABOUT

Aim

Provide **High Performance Computing (HPC)** power at the service of biomedical applications; and apply **Deep Learning** (DL) and **Computer Vision** (CV) techniques on large and complex biomedical datasets to support new and more efficient ways of diagnosis,

monitoring and treatment of diseases



Goals

- Filling the gap between the availability of new technologies and making extensive use of them
- Reducing the time to design and develop end-user applications/software platforms
- Increasing the productivity of expertusers by allowing them to design, train and test many more predictive models in the same period of time
- Providing medical personnel with a friendly and individualized digital decisionsupport tool

Development & Results DeepHealth Toolkit

- Free and open-source software with two core libraries and a dedicated front-end
- Ready to be integrated into end-user software platforms or applications
- Ready to run algorithms on Hybrid HPC
 + Big Data architectures with heterogeneous hardware
 - **EDDLL:** the European Distributed Deep Learning Library
- ECVL: the European Computer Vision Library

7 Enhanced biomedical and AI software platforms

- Commercial platforms: everis Lumen, PHILIPS Open Innovation Platform, THALES PIAF
- Research-oriented platforms: CEA's ExpressIFTM, CRS4's Digital Pathology, WINGS MigraineNet

CONCEPT

Use Cases

14 pilot test-beds in 3 areas:

Neurological diseases

- Migraine and Seizures prediction
- Major Depression
- Dementia
- Study of structural changes in lumbar spine pathology
- Population model for Alzheimer's Disease
- Epileptic seizures detection
- Objective fatigue assessment for multiple sclerosis patients

Tumor detection and early cancer prediction

- Chest cancer detection
- Prostate tumor diagnosis
- Skin cancer melanoma detection

Digital pathology and automated image annotation

- Classification of whole-slide histological images of colorectal biopsy samples
- CT brain perfusion maps synthesis
- Deep Image annotation
- Image Analysis and prediction for Urology

