

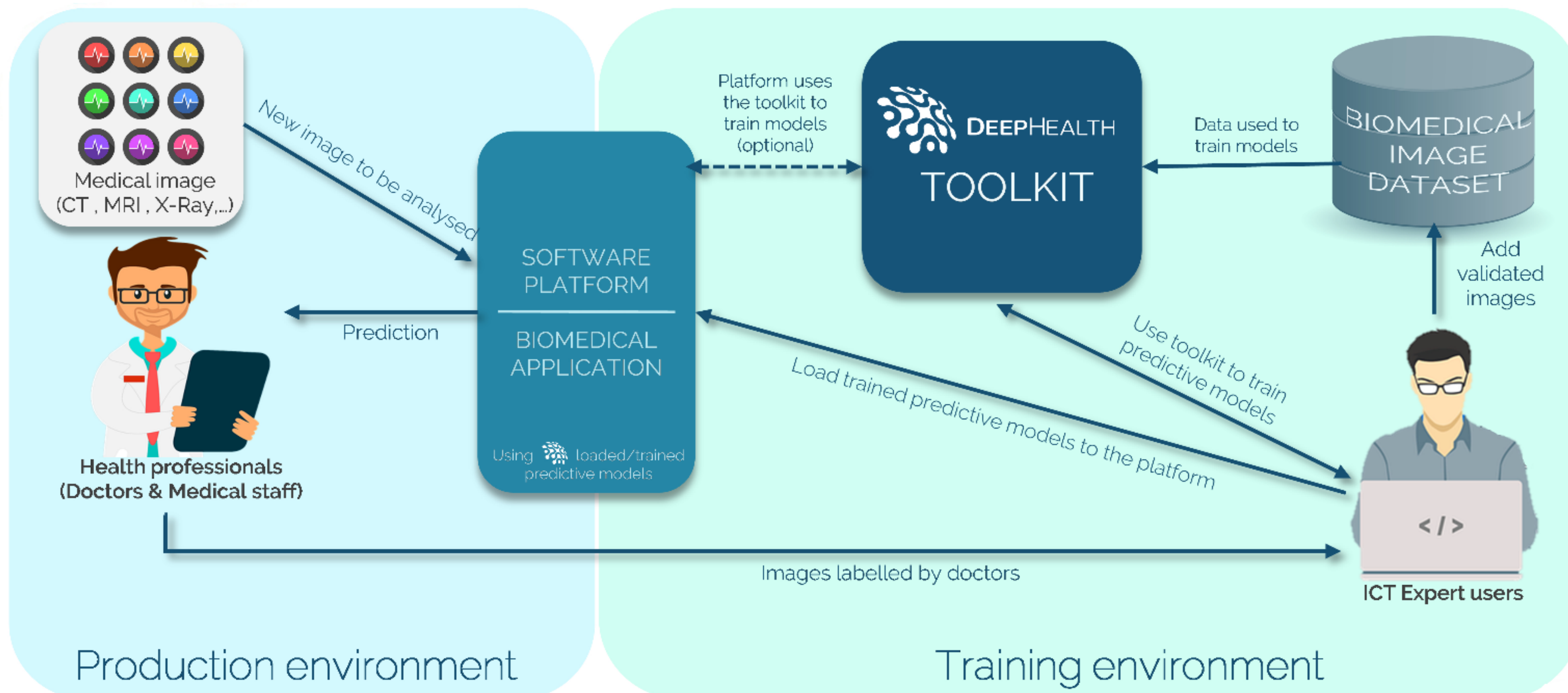


DEEPHEALTH

# High Performance Computing boosting Biomedical Applications

## 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 expert-users 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 decision-support tool**

## Development & Results

### DeepHealth Toolkit

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

### 7 Enhanced biomedical and AI software platforms

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

## 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

## EXPECTED IMPACT

- **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

## KEY FACTS

- STARTING**  
January 2019
- DURATION**  
36 MONTHS
- FUNDING**  
€ 14m

## CONTACTS and MORE INFORMATION

Project Coordinator: Mónica Caballero  
[monica.caballero.galeote@everis.com](mailto:monica.caballero.galeote@everis.com)  
 Technical Manager: Jon Ander Gómez  
[jon@upv.es](mailto:jon@upv.es)

<https://deephealth-project.eu>



## PARTNERS

| Research organizations | Health organizations | Large Industrial partners | SME Industrial partners |
|------------------------|----------------------|---------------------------|-------------------------|
|                        |                      |                           |                         |