FG-AI4H-Q-016-A03

Douala, 06-09 December 2022

Source:	TG-Neuro Topic Driver
Title:	Att.3 - Presentation (TG-Neuro)
Purpose:	Discussion

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Abstract:	This PPT summarizes the status of work within TG-Neuro, for presentation and discussion during the meeting.

TG-Neuro

AI for Health

ITU-WHO Focus Group

ITU

World Health Organization

itu.int/go/fgai4h

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TG-Neuro

Aim: investigate machine learning-based diagnostics for neurodegenerative diseases (Alzheimer's disease, Parkinson's Disease, and related dementia syndromes, which are located within the neurological domain of the DSM V) based on real-world imaging and genetic information.

Relevance: As the population ages, the chance of becoming demented is on the rise. Current estimates suggest that there are approximately 48 million people worldwide suffering from dementia.

The social cost of care to 1% of world's gross domestic product – GDP.

These statistics led the World Health Organization to classify neurocognitive disorders as a global public health priority.

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TG-Neuro

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1) **Working with experts to better understand neurological diseases.**
2) **Gathering data from around the world.**
3) **Using AI to identify patterns and trends.**

TG-Neuro- Federated approach working with expert gathering data

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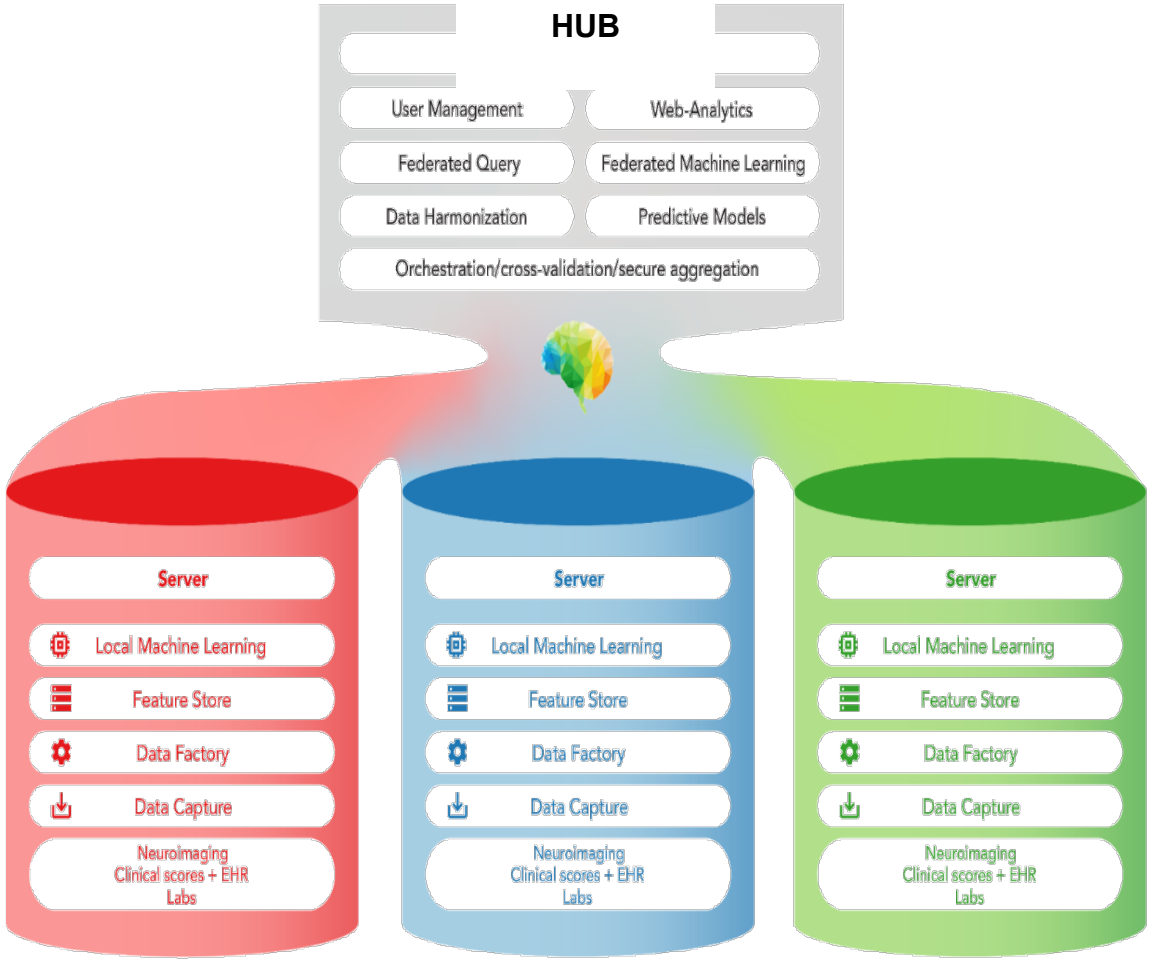
- Whole Brain images from MRI, PET or CT scans.
- Image File Format: DICOM or NIFTI format
- Image File Names: Images names will be anonymised to exclude any patient identifying information.
- Image Resolution: the images will be supplied in their original resolution as captured from the MRI scanner

- Count Vascular lesion
- History
- Genetic
- Memory Score
- Executive functioning scores
- Co-morbidity symptoms
- Verbal fluency
- Delayed memory scores
- Motor scores
- Psychiatric questionnaires
- Alcohol Use
- Temperature

The diagnosis of cognitive disorders an disease severity:

- Alzheimer's Diseas
- Mild cognitive impairment (MCI)
- Cognitively normal (CN)
- Other Mixed Dementia (MD)



Data Catalogue

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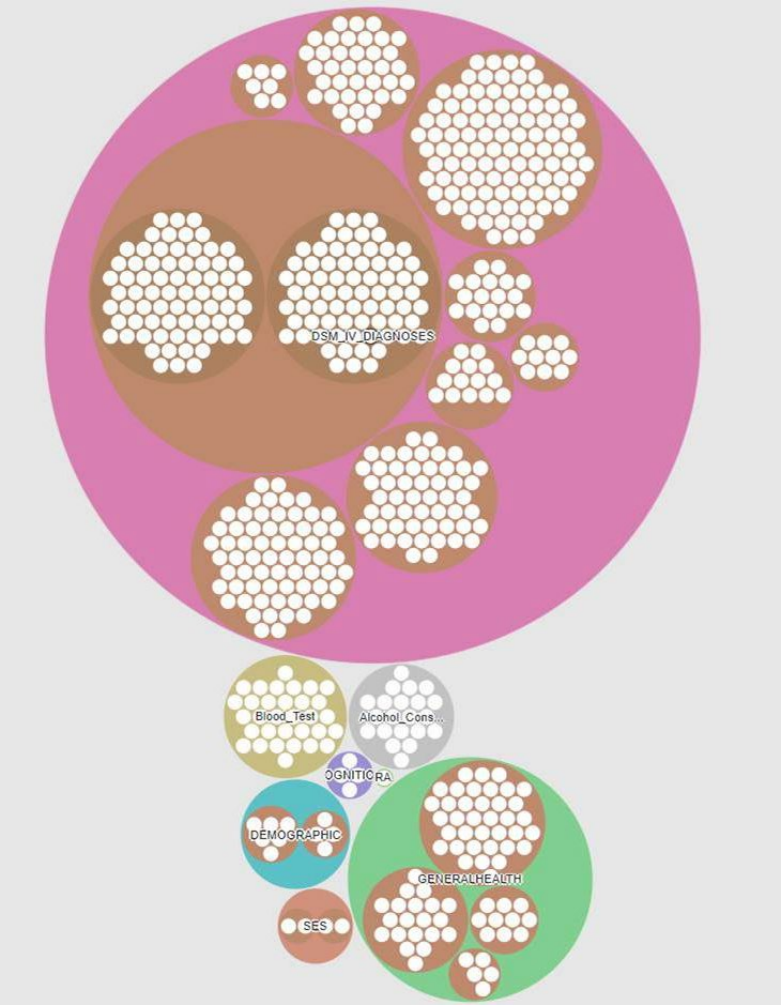
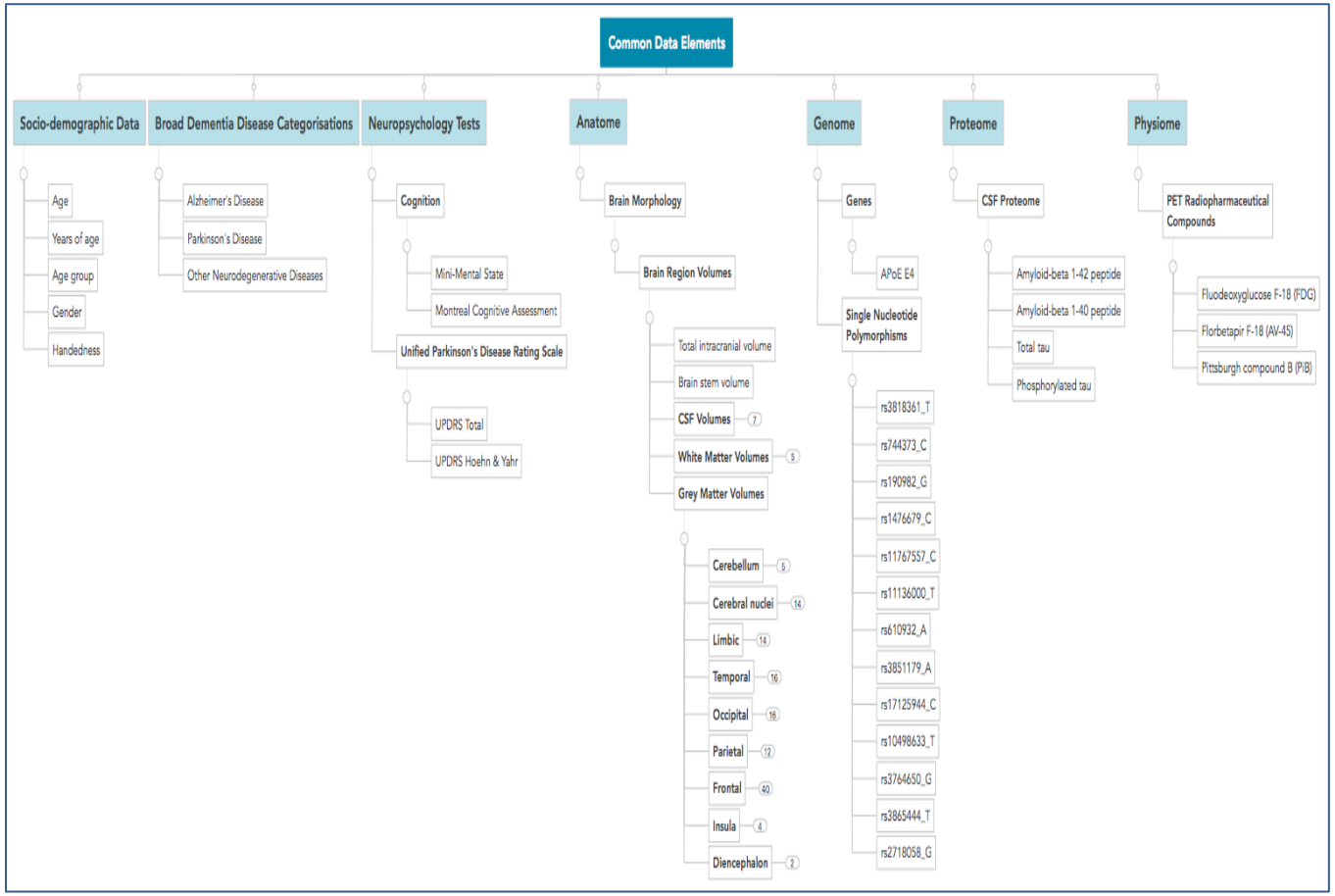
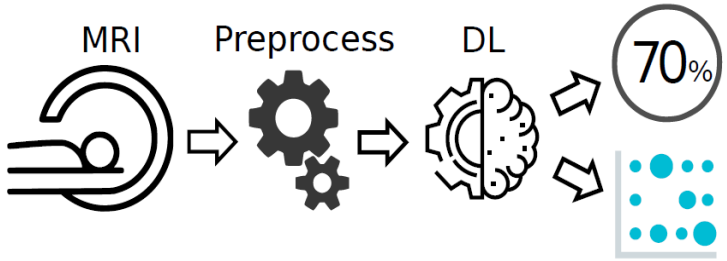


Dementia and general Population Data



Application



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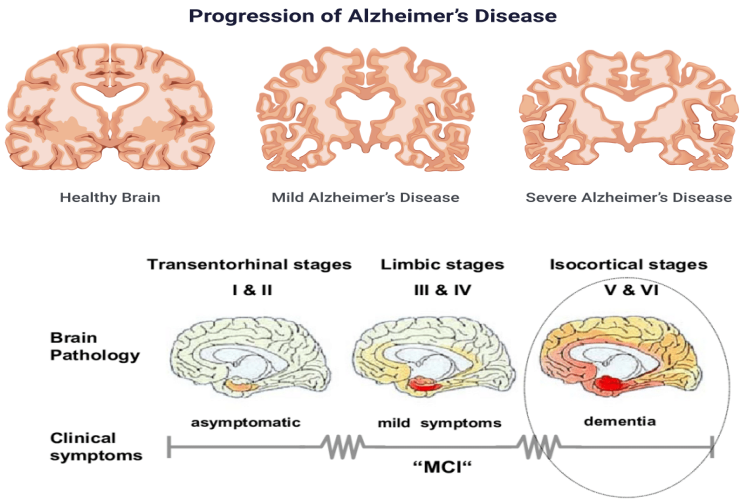
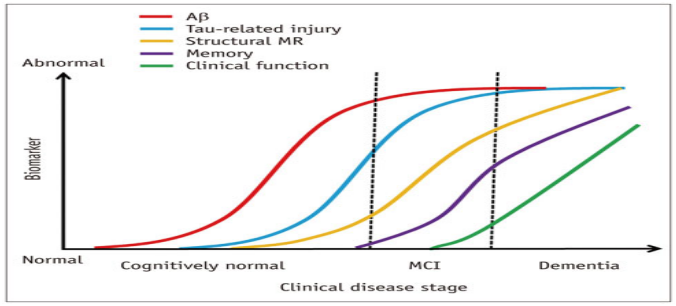
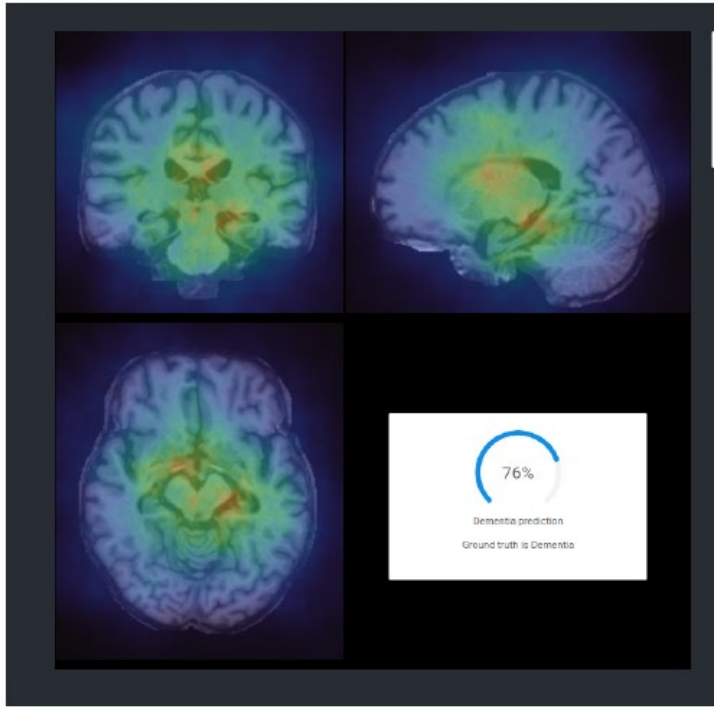
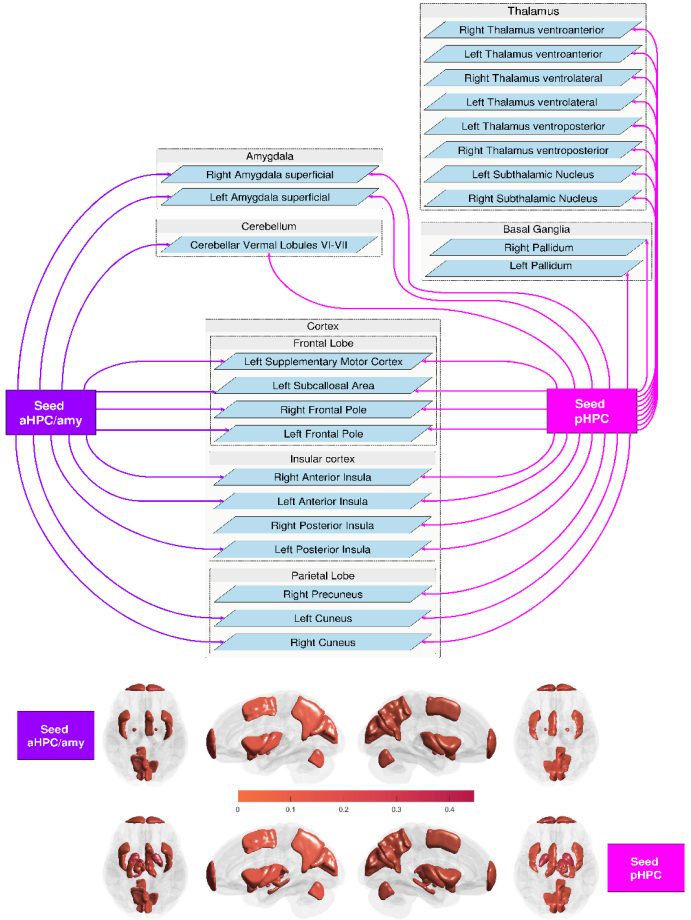
Dynamic systems









TG-Neuro ongoing plan

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- **Integration of new subtopic explore psychiatric aspect and co-morbidities.**

TG-Neuro ongoing plan

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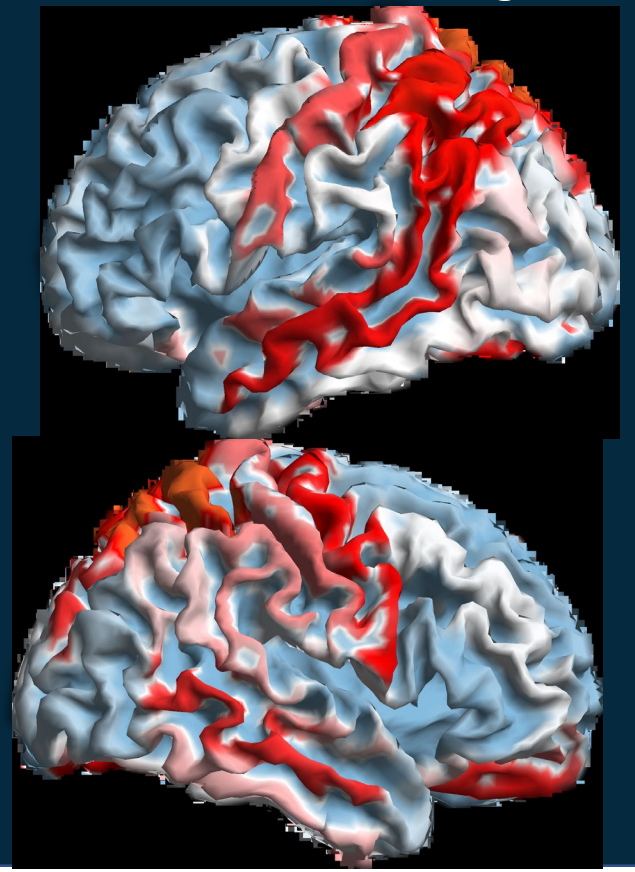
lung-brain axis link pulmonary disorders and neurodegenerative disorders and behavioural changes



TG-Neuro ongoing plan

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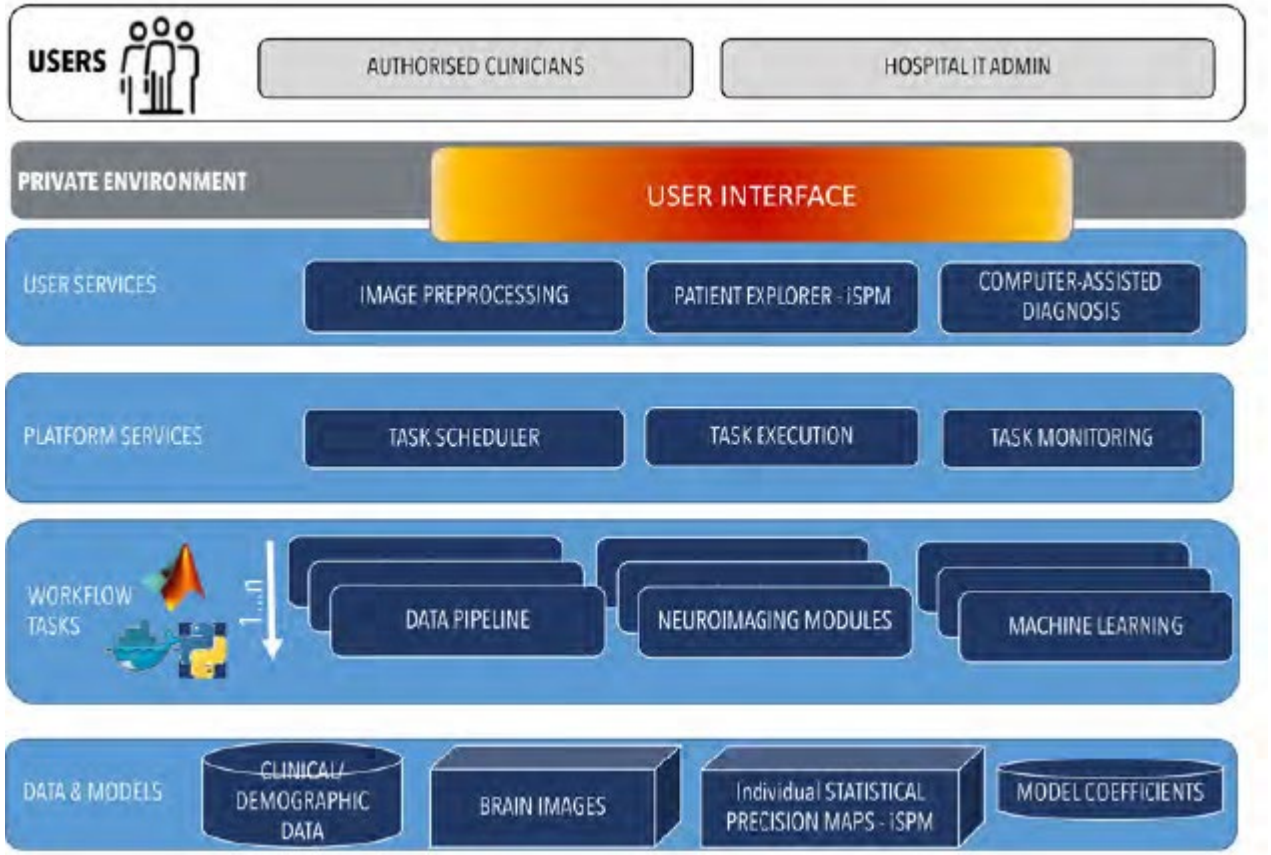
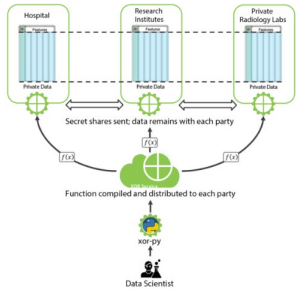
Rethinking the different benefits of AI for Patient vs Clinicians vs Researchers

Patients : Diagnostic -> Access to service (care, emotional and communication support)
Clinicians: Diagnostic -> Quantify patient health (physical activities, mood, medication)
Research: improved clinical trial (sampling, bias)

TG-Neuro

Federated Learning (FL) and secret sharing





Secure Multi-Party Computation

In collaboration ⊕inpher secret sharing

FPGA hardware acceleration

Cloud computing and Hardware acceleration

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Thanks for your attention

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