



ANALYSIS AND CORRELATION BETWEEN WHOLE GENOME SEQUENCE AND BRAIN ACTIVITY FOR THE DIAGNOSIS ENHANCEMENT OF ALZHEIMER'S DISEASE



PhD Student: **Aarón Maturana Candelas**

PhD Advisors: **Carlos Gómez and Roberto Hornero**

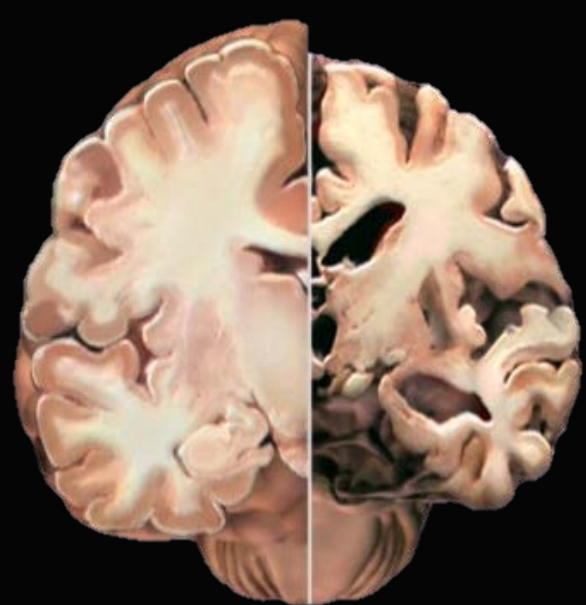
Biomedical Engineering Group (GIB), E. T. S. Telecommunications Engineers, University of Valladolid, Spain
e-mail: aaron.maturana@gib.tel.uva.es

CURRENT STATE OF THE ART

Alzheimer's Disease (AD)

Progressive neurodegenerative disorder

- Cognitive impairment
- Behavioural disorders
- Memory loss
- Attention deficit
- Abstract reasoning loss...

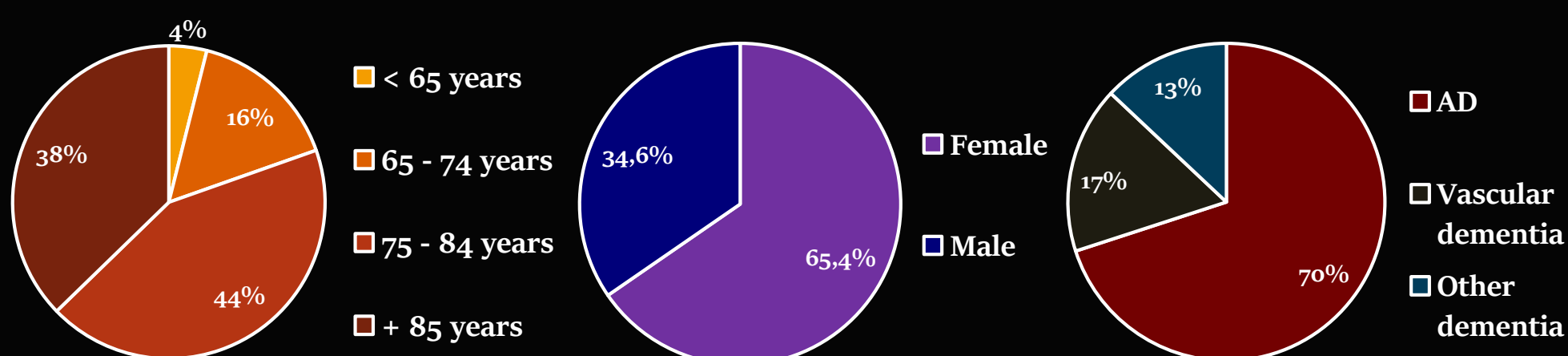


Disease main risk factors

- Age (rises exponentially)
- Genetics
- Environment and habits



Disease prevalence



Problem

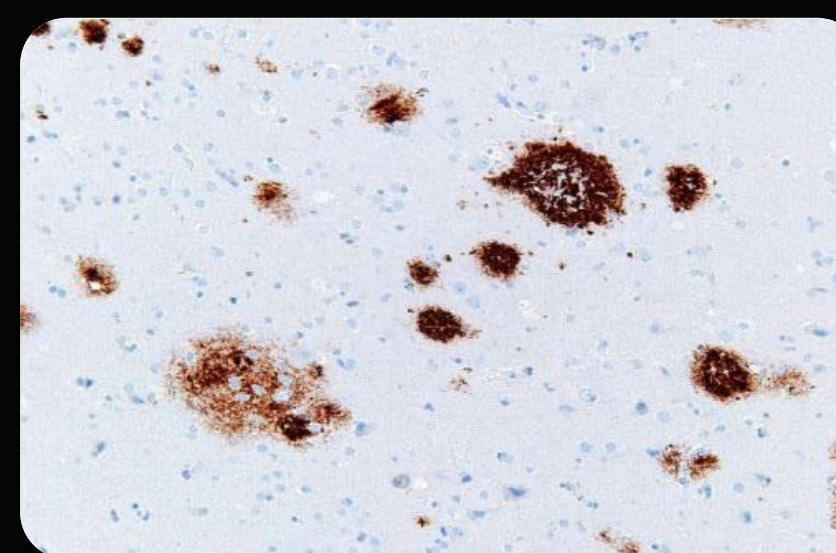
Complex and subjective diagnosis

- Medical history
- Physical exam and diagnostic tests
- Mental status and mood testing
- Neurological exams



Definite AD diagnosis

A β plaques



Tau protein tangles



Via necropsy (*post mortem*)

Objective

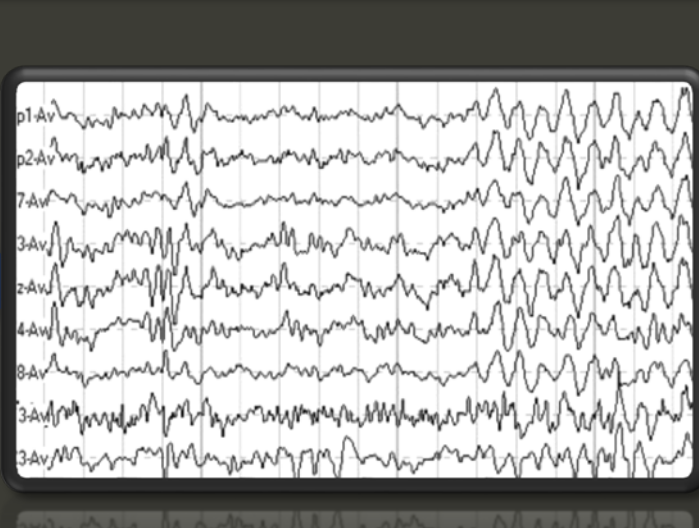
Simplify and improve AD diagnosis mainly at the early stages

METHODS

Brain activity



EEG recording



Genetics

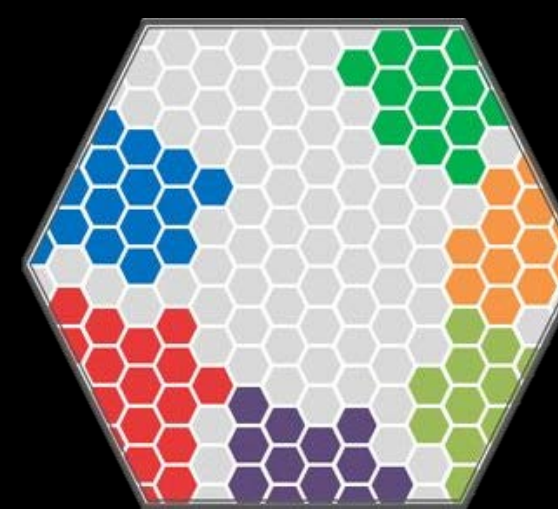


Genome sequencing



CORRELATION ANALYSIS

Clustering analysis

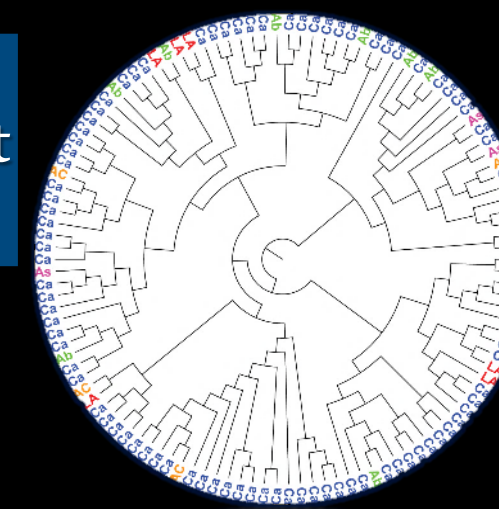


UPGMA Algorithms

Single, complete and average linkage algorithms

Phylogenetic analysis

Neighbor-net



SIGNIFICANCE

Comparison with clinical data

Early diagnosis

Effective treatments