A

Demographics
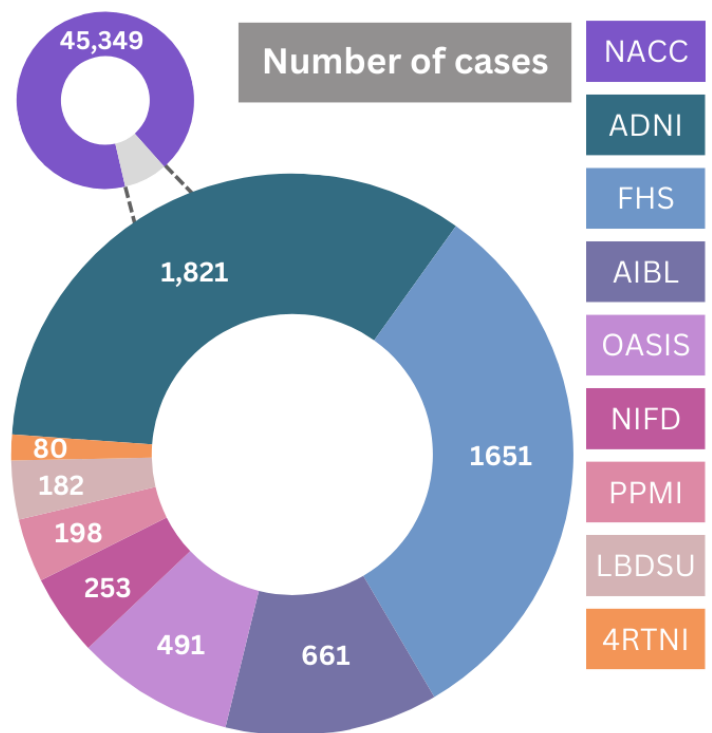*e.g. age, gender, race, primary language*

Health history
e.g. family history, medication, hypertension

Physical
e.g. height, weight, BMI, blood pressure

Neurological tests
e.g. Unified Parkinson's disease rating scale, geriatric depression scale, neuropsychiatric inventory questionnaire, neuropsychological battery
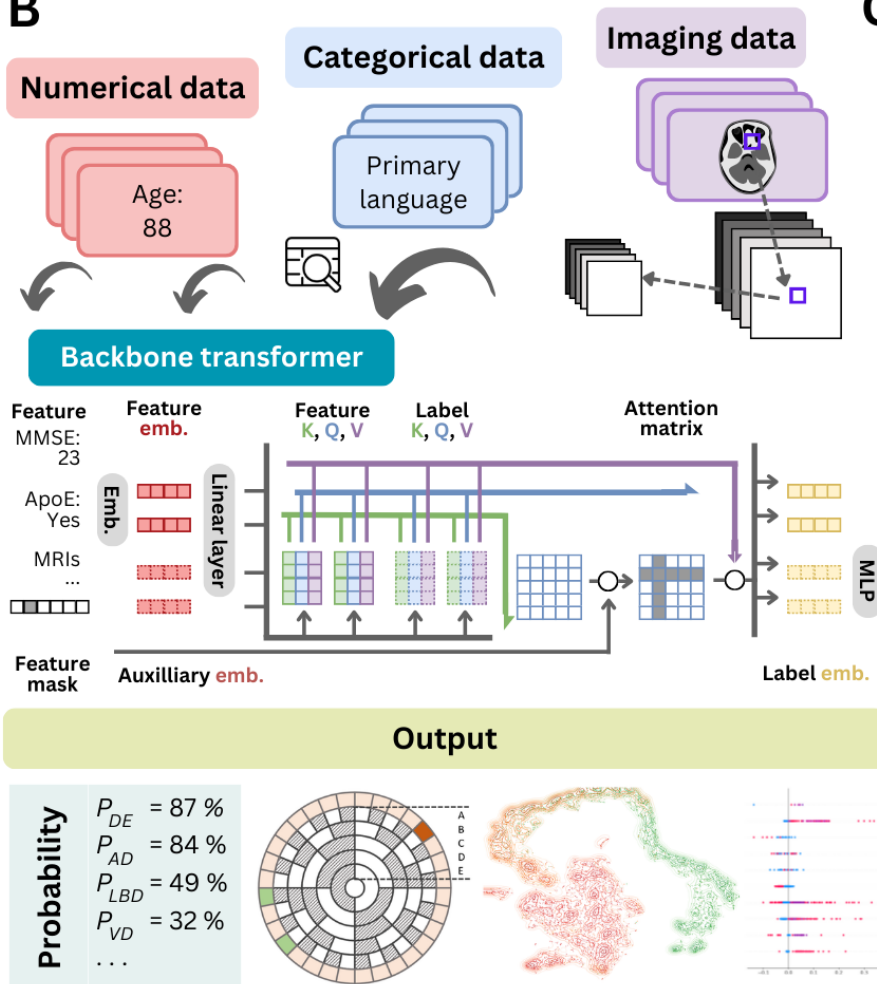
MRI scans
e.g. T1-, T2-, FLAIR, DWI, SWI

Number of cases

45,349

1,821

1651

661

491

253

198

182

80

- NACC
- ADNI
- FHS
- AIBL
- OASIS
- NIFD
- PPMI
- LBDSU
- 4RTNI

Training dataset
n = 38,319
NACC, AIBL, PPMI, NIFD, LBDSU, OASIS, 4RTNI

Testing dataset
n = 12,367
NACC*, ADNI, FHS

B

Numerical data

Age: 88

Categorical data

Primary language

Imaging data

Backbone transformer

| Feature | Feature emb. | Feature K, Q, V | Label K, Q, V | Attention matrix |

MMSE: 23

ApoE: Yes

MRIs ...

Emb.

Linear layer

MLP

Feature mask   Auxilliary emb.   **Label emb.**

Output

Probability

P_{DE} = 87 %
P_{AD} = 84 %
P_{LBD} = 49 %
P_{VD} = 32 %
. . .

C

Head-to-head comparison with clinical experts

Multimodal clinical data

vs

Confidence   Probability

Comparison with neuropathological evidence

Postmortem grades

vs

Score   Probability