CONFERENCE PRESENTATION

Multimodal AI for CTE-Related Risk Assessment

A Proof-of-Concept Study



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PROOF OF CONCEPT | Not a clinical diagnostic system

Why is CTE difficult to assess?

Repetitive head impacts › Overlapping symptoms › Post-mortem confirmation

CTE-RELATED SYMPTOMS

- Memory problems
- Thinking difficulties
- Mood changes
- Depression and anxiety
- Impulsive behaviour
- Behavioural changes

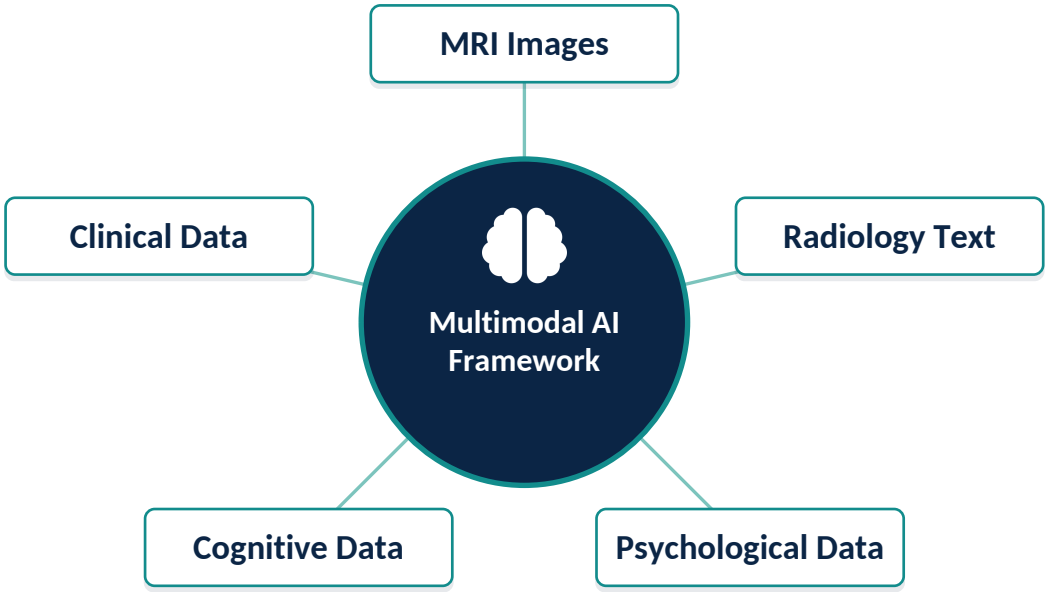
CONDITIONS WITH OVERLAPPING SYMPTOMS

- Alzheimer's disease
- Dementia
- Depression
- Other neurological conditions
- Other psychological conditions

Symptom overlap does not mean these conditions are the same or that symptoms alone can identify CTE.
CTE cannot be confirmed by this experimental AI framework.

What does our project aim to explore?

Integrating multiple health-related data sources to explore patterns.



EXPERIMENTAL OUTPUT

Proxy-risk assessment

- Low
- Moderate
- High

Project-defined categories, not official CTE stages

How was the research conducted?

DATASET SOURCES

- Alzheimer MRI
- Stroke
- Dementia
- Depression
- Radiology reports + extra data

Sources: Boston University research resources and Kaggle, as applicable to each dataset

MODEL WORKFLOW

1 Data Collection › 2 Data Preprocessing › 3 CNN + ML + NLP › 4 Multimodal Integration › 5 Experimental Classification

⚠ **Important dataset limitation:** None of the selected datasets contains confirmed CTE cases. This is a proof-of-concept study.

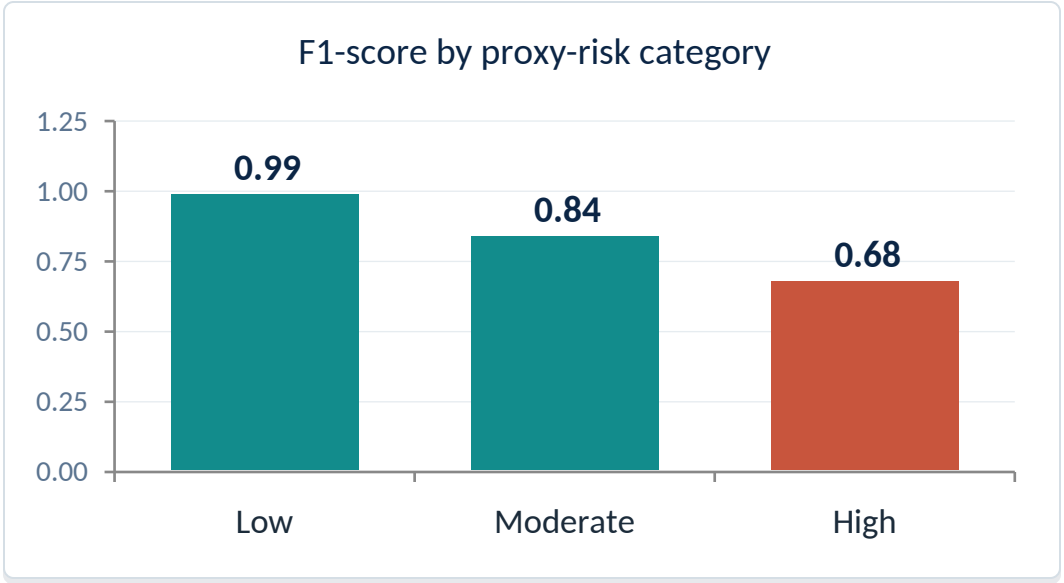
Experimental Model Performance

88.57%

TEST ACCURACY

83.60%

MACRO F1-SCORE



Results are from the selected experimental proxy dataset, not confirmed CTE cases.

Key Findings and Future Direction

Key findings

- Multimodal AI proof-of-concept developed
- 88.57% test accuracy
- 83.60% macro F1-score

Limitations

- No confirmed CTE data
- Proxy-risk labels only
- Patient-level matching limitations

Future direction

- Genuine CTE-related datasets
- Reliable multimodal pairing
- Clinical validation

Thank You!

Questions & Discussion