

Peer Review

# Review of: "Smartphone-Based Behavioural Profiling for Distinguishing Dementia with Lewy Bodies from Alzheimer's Disease"

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This paper proposes a **smartphone-based system** that differentiates **Dementia with Lewy Bodies (DLB)** from **Alzheimer's Disease (AD)** using **behavioral biomarkers**:

**Eye movement data**

**Pareidolia test results**

**Speech inputs**

Using these non-invasive, low-cost methods, the study leverages **machine learning** to classify dementia types, achieving a **maximum accuracy of 92.3%**.

Below are the strengths of the paper:

Innovative & practical mobile-based approach.

High classification accuracy (92.3%) with minimal hardware.

Good feature selection & fusion strategy.

Clear demonstration that DLB has distinct visual-cognitive behavior compared to AD.

Below are the limitations of the paper:

Small sample size (N=26) raises generalizability concerns.

Limited demographic variability—unclear if it generalizes to diverse populations.

Some speech features seem underutilized; more advanced NLP (like BERT embeddings) could boost performance.

Does not include clinical diagnostic accuracy comparison (MRI, PET, etc.) for benchmarking.

This is a promising and **innovative study** that offers a **practical path for early, non-invasive dementia subtyping** using ubiquitous smartphone technology. Despite limitations in sample size, the results demonstrate strong potential for **clinical and at-home diagnostic tools**.

## **Declarations**

**Potential competing interests:** No potential competing interests to declare.