

Multimodal Small Language Models For Early ADRD Screening Using Speech And Text

P1-001

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- Key Takeaway1:** Describe how small language models can be applied to classify dementia-related cognitive status using speech and text data.
- Key Takeaway2:** Evaluate the role of reasoning-oriented modeling in improving interpretability and clinical trustworthiness of AI-based cognitive screening tools.
- Key Takeaway3:** Explain the advantages and limitations of deploying small language models for early ADRD screening in resource-limited and community settings.

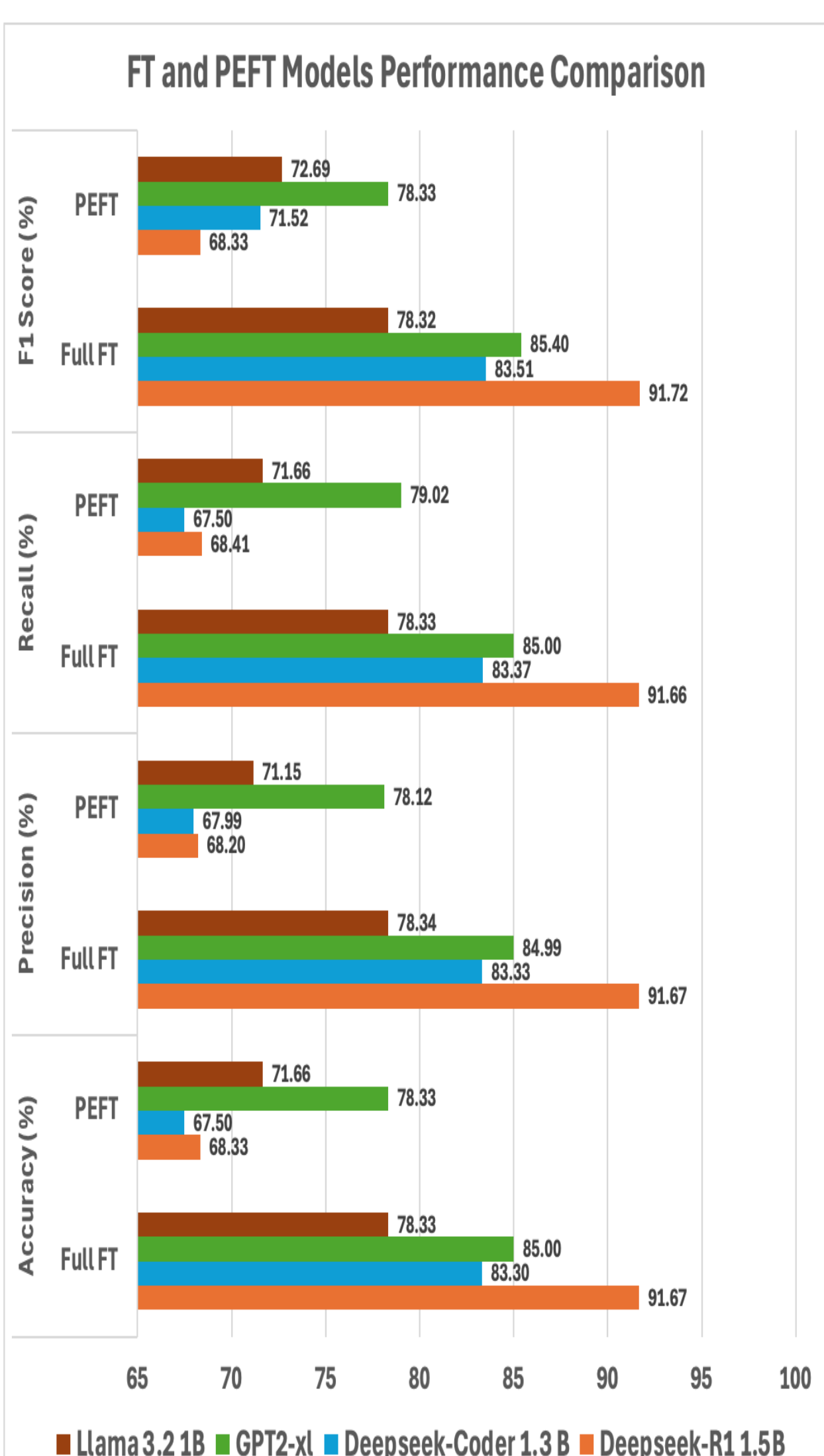
INTRODUCTION

- Alzheimer's disease and related dementias (ADRD) affect millions of older adults worldwide[1].
- Changes in language and speech are among the earliest observable signs of cognitive decline[2].
- Traditional screening approaches often require clinical expertise and substantial resources.
- Small Language Models (SLMs) provide[3]:
 - Lower computational requirements
 - Reduced deployment costs
 - Improved privacy preservation
 - Potential for local/on-device inference
- The role of multimodal SLMs (speech + text) for ADRD screening remains underexplored.

METHODS



RESULTS



CONCLUSIONS

We presented that open-source SLMs[4] fine-tuned on a clinically grounded transcript corpus can achieve promising, preliminary performance for binary AD classification while operating entirely on local hardware. The best-performing model (DeepSeek-R1, 1.5B, FFT) achieved 91.7% accuracy and F1 score and outperformed a compact LLM baseline under the evaluated conditions. These findings support the feasibility of locally deployed SLMs for ADRD-related speech classification and highlight the potential of smaller, open-source models for privacy-conscious clinical AI applications.

REFERENCES

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