

Automated Connected Speech Classification In Prodromal Behavioural Variant Frontotemporal Dementia

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Retraining LLMs on Dutch speech transcripts aids in early diagnosis of genetic FTD				
INTRODUCTION	METHODS	RESULTS	CONCLUSIONS	REFERENCES
•Speech contains clinically meaningful and informative patterns that can aid in early detection of frontotemporal dementia (FTD) •The prodromal phase of FTD forms a critical window for upcoming clinical trials •During this phase, mutation carriers can exhibit early subtle changes in language •Yet, conventional neuropsychological assessments lack the sensitivity and specificity needed to detect these, thus highlighting the need for complementary diagnostic tools	Speech sample transcripts were collected after 1 min from:  Image generated by ChatGPT © a) individuals with behavioural variant FTD (bvFTD; $n=32$) b) prodromal FTD ($n=40$) c) healthy controls ($n=76$) •We conducted multiclass and binary classification tasks •Model performance was evaluated using accuracy, balanced accuracy, specificity, sensitivity, and F1-score across 100 training epochs and five different random seeds with an 80/20 train-test split	In binary classification: a) identifying bvFTD yielded excellent sensitivity (0.99 ± 0.03) and high specificity (0.83 ± 0.08) b) for prodromal FTD, deep learning models showed high sensitivity (0.79 ± 0.09) and excellent specificity (0.97 ± 0.01) c) distinguishing prodromal FTD from bvFTD patients resulted in excellent sensitivity (0.95 ± 0.11) and high specificity (0.81 ± 0.21) •Multiclass performance exceeded binary classification performance	•Dutch & English pretrained deep learning models can reliably differentiate between prodromal and symptomatic FTD, highlighting their potential for early diagnosis •Strong performance of the smallest model in bvFTD classification suggests that computationally efficient models could be viable for real-world applications •Future work should explore the presymptomatic phase of FTD, perform longitudinal analyses to better understand disease progression, and apply multimodality to improve early classification	Vandenborre, D., Visch-Brink, E., van Dun, K., Verhoeven, J., Mariën, P. (2018). Oral and written picture description in individuals with aphasia. <i>Int J Lang Comm Dis.</i> 53(2), 294-307. Géraudie, A., & Montembeault, M. (2025). Language in behavioral variant frontotemporal dementia. <i>The Oxford Handbook of Communication Disorders in Neurodegenerative Diseases</i>, 296. CONTACT  Olaiya A. Aro PhD student Alzheimer centrum Erasmus MC University Medical Center, Rotterdam, The Netherlands o.aro@erasmusmc.nl 