



Automated speech and language markers for neuropsychiatric disorders

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ISCTM 2026 – Lewis A. Opler Prize

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Highlights

ARTICLE OPEN

 Check for updates

Natural language processing methods are sensitive to sub-clinical linguistic differences in schizophrenia spectrum

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www.nature.com/dpn

ARTICLE

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Schizophrenia Bulletin vol. 49 suppl. 2 pp. S93–S103, 2023
<https://doi.org/10.1093/schbul/sbac145>

Sunny X.
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SUPPLEMENT ARTICLE

Late
Spec

Research Paper

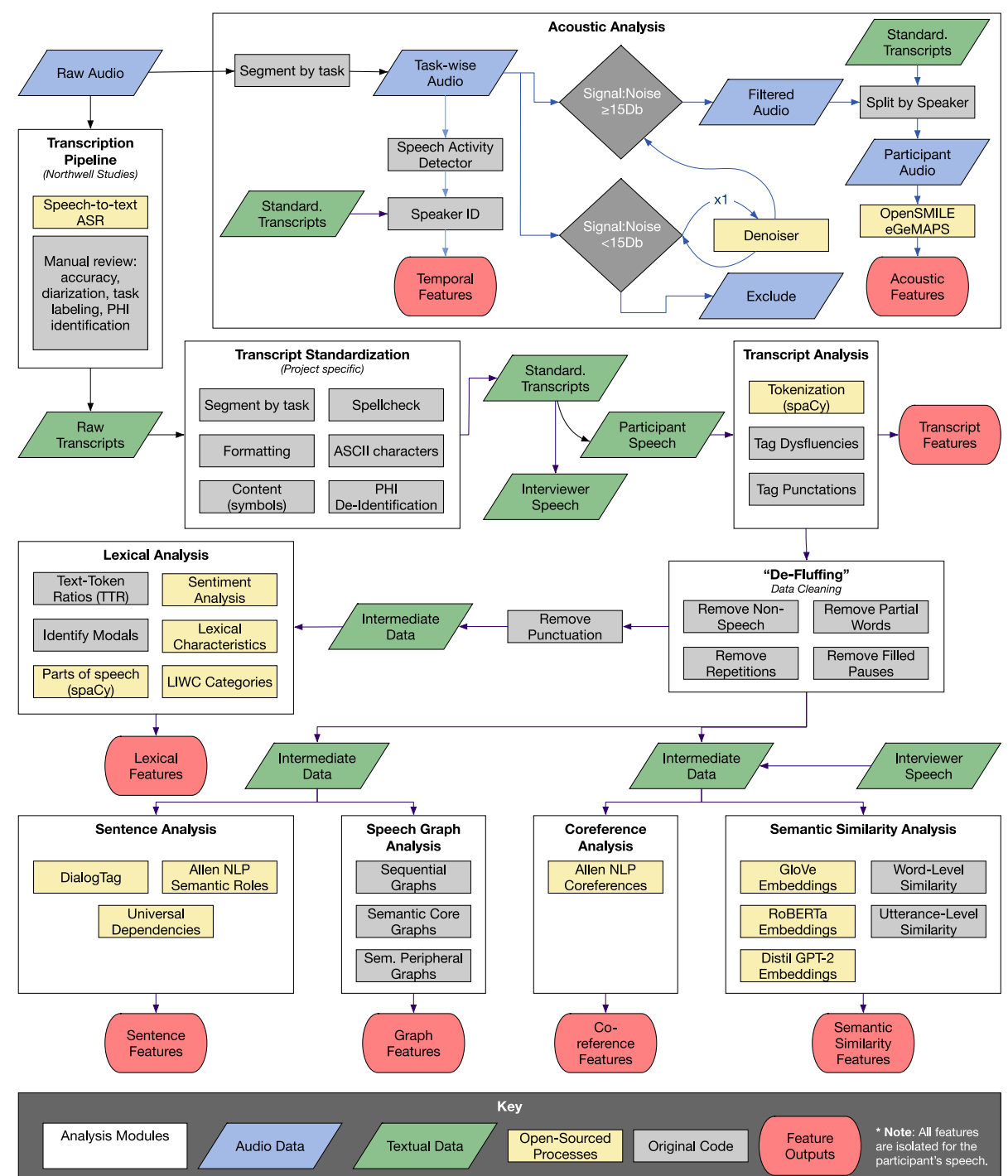
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Characterizing and detecting delirium with clinical and computational measures of speech and language disturbance

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Grace Serpe, BA; Valeria Gromova, BS; Sarah Berretta, BA; Majnu John, PhD;
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Modular, Comprehensive, Automated Pipeline

- Audio recordings:
 - **Temporal Features** – e.g., speaking tempo, pauses, latency.
 - **Acoustic Features** – e.g., fundamental frequency, MFCC's, amplitude.
- Textual transcripts:
 - **Transcript features** – counts of transcribed and tagged elements. E.g., word count, filled pauses, punctuation.
 - **Lexical features** – single token- and word-level features. E.g., sentiment, age of acquisition, parts of speech, LIWC categories.
 - **Sentence features** – sentence-level analyses. E.g., dialogue act classification, universal dependency structure, semantic roles.
 - **Graph features** – discourse-level speech graph analyses. E.g., structural graphs and semantic speech graphs relating action-predication relationships vs. peripheral semantic relationships.
 - **Coreference features** – discourse-level coreference analysis. E.g., quantity and organization of coreferences in the discourse.
 - **Semantic similarity features** – discourse-level semantic similarity analyses based on word- and utterance-level embeddings derived from language models. Embeddings are currently derived from GloVe, RoBERTa, and GPT-2.



Ongoing Projects

- ▶ R21: Identifying diagnostic biomarkers for Delirium and predicting cognitive Outcomes in hospitalized older adults using automated Speech Analysis (IDOSA)
- ▶ R01: Vital Signs for Psychosis: Personalized Longitudinal Markers of Psychosis Severity Using Automated Speech and Language Analysis
- ▶ P01: Early-Phase Psychosis: Practice-Based Research to Improve Treatment Outcomes – Predicting psychosis exacerbations and disengagement from community early psychosis treatment
- ▶ Finetuning LLM for predicting thought disorder clinical ratings
- ▶ Hierarchical diagnosis in comorbid, cross-diagnostic sample
- ▶ Systematic comparison across static and contextual models for semantic similarity analysis
- ▶ Pipeline paper with demo data

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Thank you!



Our Team

