AUTOMATIC DETECTION OF ALZHEIMER'S FROM SPEECH USING SPATIAL NEGLECT MARKERS

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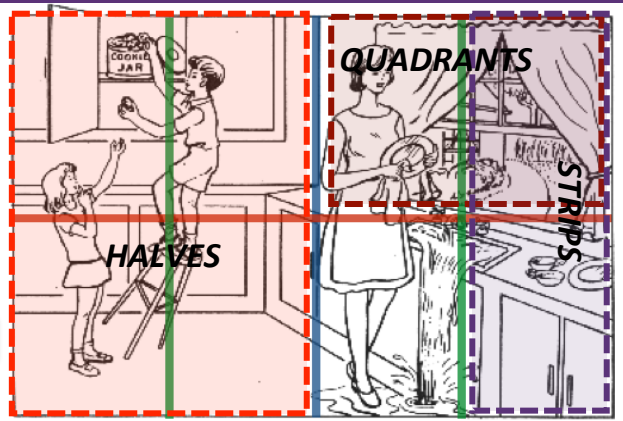
INTRODUCTION

- Machine learning can distinguish patients with Alzheimer's disease (AD) versus healthy controls using transcripts of descriptions of the "Cookie Theft" picture
- We evaluated the diagnostic utility in adding markers of spatial neglect to our previous baseline algorithm.

METHODS

- Corpus: DementiaBank dataset[1]
  - 499 interviews (257 AD, 242 control)
- Baseline algorithm: 353 lexical and acoustic markers
- Three approaches to dividing the Cookie Theft image: *halves, strips and quadrants*, using four measures:
  (1) Number of info-units (I-U) mentioned,
  (2) ratio of I-U to all words,
  (3) ratio of unique I-U to all possible I-U in region,
  (4) ratio of unique I-U to total mentioned I-U
- Included quadratic interaction terms between regions
- 10-fold cross-validation with correlation-based feature selection preprocessing
- Trained logistic regression model using each spatial approach, then compared against baseline



FEATURE TYPES
Parts of speech/context-free grammar (59)
Vocabulary richness/ syntactic complexity (32)
Psycholinguistic/Repetitiveness (10)
Spatial neglect (40)
Info Units (40)
Acoustic (172)

RESULTS

	PPV (95% CI)	NPV (95% CI)
Baseline	.83 (.79 – .87)	.81 (.74 - .88)
Halves	.84 (.80 - .86)	.81 (.74 - .88)
Strips	.84 (.77 - .91)	.82 (.76 - .88)
Quadrants	.81 (.74 - .87)	.81 (.75 - .87)

CONCLUSION

- Adding hemispatial neglect markers created a trend towards improved predictive value of the algorithm and warrants further study
- Application of this approach for more localized neurodegenerative processes may have more improved predictive values
- Future directions will include assessment of patients with subjective cognitive impairment and integration of clinical information

[1] *Becker J et al. Arch Neurol 1994;51:585-94.*

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