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Aphasia: A disability affecting language production and comprehension, caused by stroke or other brain injuries.

Research Direction
Address predominant problems in current assistive communication technology:
- Lack of vocabulary depth and breadth
- Ineffective vocabulary organization, management and retrieval

Research Challenges
- Designing tools for a highly variable disability.
- Balancing adaptive and adaptable features to best benefit the user.
- Involving individuals with communication difficulties in participatory design research.
- Accommodating associated impairments.

VIVA: Multimodal visual vocabulary that tailors itself automatically and can be flexibly reconfigured by the user.

User Input
(Aphasic User, Caregivers, Speech-language Pathologists)

WordNet Association Measures
(Word proximity, dependency and evocation)

User Preference Module

Active Learning Module
(Adaptation rules based on usage frequency, user profile, composition context and word-association measures)

Mixed-Initiative Solution
- Adaptability: The user can add and remove words, group them in personalized categories (for example a “Favorites” folder), enhance words with images and sounds, and associate existing phrases and sentences with a concept.
- Adaptivity: Trained on word association measures (derived from corpus-based word co-occurrences), the statistics collected from the usage of the vocabulary and the user preferences, the vocabulary predicts links between words to make appropriate suggestions during sentence composition. Words relevant to the user’s profile or the context of the communication surface faster.

Vocabulary Framework Based on Semantic Memory
- A densely connected semantic network helps compensate for impaired access to the user’s “mental lexicon”.
- Amazon Mechanical Turk experiment delivers evocation ratings for 120,000 word pairs.
- Word pair association is rated on the scale of 0 to 100.
- Initial results show that 50% of ratings are reliable.

Next Steps
- Evaluate adaptivity with proxy data collected from elderly bloggers.
- Investigate customization patterns in the use of assistive communication tools.
- Gather qualitative and quantitative data from aphasic users and their support network.

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