Leveraging Data to Validate the Efficacy of AAC Interventions

HUMPHREY CURTIS, Department of Informatics, King's College London, UK

Augmentative and alternative communication (AAC) devices are external devices and tools – used to support communication for people with complex communication needs (CCNs). Modern AAC devices leverage advanced computer technologies for both input (e.g., eye gaze) and output (e.g., speech synthesis). With increasingly data and AI techniques used to build new features and improve the usability of high-tech AAC devices. However, data driven techniques *must* also be used to validate the efficacy of AAC interventions for the patient in real world settings. Potentially, collected data and analytics on user experience with AAC devices could be harnessed to verify the medical efficacy of AAC interventions and shed new insights. Meaning that advanced AAC technologies are suitably human-centered, provide fulfilling communication outcomes for the patient and reducing AAC servicing demands for global healthcare systems.

CCS Concepts: • **Computer systems organization** → **Embedded systems**; *Redundancy*; Robotics; • **Networks** → Network reliability.

Additional Key Words and Phrases: datasets, neural networks, gaze detection, text tagging

ACM Reference Format:
Humphrey Curtis. 2023. Leveraging Data to Validate the Efficacy of AAC Interventions. In *CHI Conference on Human Factors in Computing (CHI'23), April 23–28, Hamburg, Germany*. ACM, New York, NY, USA, 2 pages. https://doi.org/10.1145/nnnnnnn.nnnnnnn

Data-driven features for high-tech AAC devices are advocated as an increasingly viable solution for improving the users communication and quality of life. For instance, research has used data, machine learning and artificial intelligence (AI) techniques to improve inputs to AAC devices (e.g., eye-gaze input), better customise devices, leverage environmental context, personalise devices speech output (e.g., better prosody) and increase conversational rates (e.g., using large language models). In spite of these promising advances, AI and data-driven features have equally been found to suffer from inaccuracy and most AI-models are not trained with data collected from communities with disabilities. Consequently Obiorah et al., rightly note of the potential for AI-driven AAC features to be very detrimental for patients – with increased automation adversely working against increased social participation [1]. Indeed, AAC devices should *certainly* not compromise end-users feelings of autonomy and rather augment human capabilities. Addressing these tensions, we must also use and collect data to *validate* that advanced AAC technologies are human-centered – supporting rewarding and fulfilling communication interactions for the end-user in real-world contexts. Consequently, further research must consider how we might leverage data logging to quantitatively *validate that the AAC device is addressing the needs of its vulnerable user group*. Potentially, AAC could actively encourage end-users to feedback their satisfaction regarding new advanced device features. Whilst, user logs and raw data collected from the users AAC device could be harnessed to understand patterns of usage, support clinicians awareness of the users evolving needs, reduce AAC service demands for healthcare systems and determine the medical efficacy of AAC interventions. Presently, clinicians such as speech and language therapists sacrifice much time servicing and programming AAC devices for greater customisation and perform tests to assess the AAC-users overall speech and language development. However, data logged from AAC usage in real-world contexts could be used to streamline these critical processes. Certainly, there is potential to collect insightful data from end-users real-world interactions with AAC devices. Yet, at all times, data collection will have to respect users and patients rights to data privacy and confidentiality.

REFERENCES

[1] Mmachi God'sglory Obiorah, Anne Marie Marie Piper, and Michael Horn. 2021. Designing AACs for people with aphasia dining in restaurants. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*. 1–14.