Performance of a New Speech Translation Device in Translating Verbal Recommendations of Medication Action Plans for Patients with Diabetes

R. William Soller, Ph.D., Philip Chan, Pharm.D., and Amy Higa

Abstract

Background:

Language barriers are significant hurdles for chronic disease patients in achieving self-management goals of therapy, particularly in settings where practitioners have limited nonprimary language skills, and in-person translators may not always be available. S-MINDS© (Speaking Multilingual Interactive Natural Dialog System), a concept-based speech translation approach developed by Fluential Inc., can be applied to bridge the technologic gaps that limit the complexity and length of utterances that can be recognized and translated by devices and has the potential to broaden access to translation services in the clinical settings.

Methods:

The prototype translation system was evaluated prospectively for accuracy and patient satisfaction in underserved Spanish-speaking patients with diabetes and limited English proficiency and was compared with other commercial systems for robustness against degradation of translation due to ambient noise and speech patterns.

Results:

Accuracy related to translating the English–Spanish–English communication string from practitioner to device to patient to device to practitioner was high (97–100%). Patient satisfaction was high (means of 4.7–4.9 over four domains on a 5-point Likert scale). The device outperformed three other commercial speech translation systems in terms of accuracy during fast speech utterances, under quiet and noisy fluent speech conditions, and when challenged with various speech disfluencies (i.e., fillers, false starts, stutters, repairs, and long pauses).

Conclusions:

A concept-based English–Spanish speech translation system has been successfully developed in prototype form that can accept long utterances (up to 20 words) with limited to no degradation in accuracy. The functionality of the system is superior to leading commercial speech translation systems.

J Diabetes Sci Technol 2012;6(4):927-937

Author Affiliation: Center for Self-Care, School of Pharmacy, University of California, San Francisco, San Francisco, California

Corresponding Author: R. William Soller, Ph.D., University of California, San Francisco, School of Pharmacy, 521 Parnassus Ave., Box 0622, San Francisco, CA 94143-0622; email address *sollerrw@pharmacy.ucsf.edu*