Project Title: Natural Language Processing Principles for Improving Deaf Writing

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References: Language Transfer: A Foundation for Correcting the Written English of ASL Signers. Technical Report 91-19, Dept. of Computer and Information Sciences, University of Delaware, 1991.

Language Transfer in Deaf Writing: A Correction Methodology for an Instructional System. Technical Report 91-20, Dept. of Computer and Information Sciences, University of Delaware, 1991.

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Category: Sensory Aids - Hearing Impairment

Purpose

The goal of this project is to develop a computer tool to correct the written English of deaf writers. The envisioned program will accept a written document, analyze the document looking for errors, and provide corrective advice when an error is found. Essentially, the system will act as an English tutor that will help deaf individuals improve their English writing skills

Methodology

The design of this program is based on the belief that English should be viewed as a second language for many deaf people and that errors in the written English of deaf writers arise due to language transfer (LT) coupled with the individual's relative lack of exposure to English. We are designing this program so that it will take advantage of the writer's knowledge of American Sign Language (ASL) in identifying errors and suggesting corrections.

Linguists have found evidence of language transfer between spoken languages. Based on these findings, we believe it is reasonable to expect language transfer from ASL (a visual-gestural language) to English (a spoken language). Our work is driven by analysis of writing samples based on the research in language transfer. This analysis will lead to a taxonomy of errors.

The system itself will consist of two phases. In the first phase, the system will identify errors. To do this, it relies on a grammar of English which has been augmented with a set of error rules which capture the errors in our taxonomy. The second phase of processing will generate a correction.

Progress

The majority of the work to date has been devoted to analyzing writing samples from deaf individuals with an ASL background in order to develop the error taxonomy. In addition to this, we have implemented a prototype system that contains an extensive grammar of English which has been augmented with a number of error rules (both syntactic and semantic). The system can use these rules in order to identify a subset of the sentence level errors identified by the sample analysis.

Results

Of major and continuing focus in this project is the correction of errors that result from language transfer at the discourse level. It has been documented that much of the language instruction of the deaf has concentrated on the sentence level and thus deaf students may reach the point where their writing lacks discourse cohesion even though the individual sentences are grammatically correct. Therefore, the correction of discourse level errors should be particularly useful for many deaf writers. Our current work investigates models which can identify such discourse errors. In addition to this, work has begun on the correction phase of processing which must be tailored to the individual user.