

Final Project Proposal

Background

The 20th century saw a wide variety of insightful, well-structured research projects investigating human learning. Previously held beliefs about learning at a young age were completely disproven. New conceptual models were developed, and the implications of these models were tested empirically. Language learning, in particular, has received extensive attention. Human learning theorists following Vygotskian principles place an understandable emphasis on language learning, and since it seems that not only is language one of the first mediational tools developed but also a clearly privileged domain, many researchers have developed methods to study its development. Growing from these auspicious roots, language learning has developed into its own field of study with journals and conferences devoted to everything from phonetic development to artificial intelligence and language learning. In studying recent synopses and syntheses of this research, it is evident that in order to develop conversational skill, learners must be able to practice the language on valued tasks with well-structured feedback.

Approach

The optimal solution is to provide the language learners with people who can converse with them, scaffold their learning, and provide timely, well-structured feedback. Unfortunately, there are not enough people who can fill that role, and the learners do not have sufficient resources to pay for such a service even if there were. While a computer program probably cannot do as well as a human tutor in this case, it can help. Researchers at Carnegie Mellon University and the University of Memphis have demonstrated that computer tutors can assist students quite well in math, science, and reading. I will apply this same idea to language learning. Using automatic speech recognition, computer speech synthesis, and an artificially intelligent conversational agent coupled with simple meta-linguistic feedback from natural language analysis, I will provide a computer program to provide a conversational partner for language learners.

Course Connections

This project relies heavily on the human learning theories already introduced in the course. In order to design software that will assist learners well, it must be solidly grounded in language and human learning research. In addition, the program will likely incorporate ideas from persuasion to ensure learner engagement and positive impact. Although the topics have not yet been covered in the course, it is likely that drama and activity theory will likely influence the design of the program. If all goes well, I will have a prototype sufficiently well constructed to evaluate its effectiveness in the field, which will require ethnomethodology.

Learning Expectations

I expect to learn a great deal about applying theories of human learning to a specific program design. I also expect to learn how well or poorly these theories work within the confines of software. I expect to learn how to engage learners with a computer agent as well as how to design the agent to provide the best possible conversational partner.

Success Definition and Assessment

The major metric of success is a working system that recognizes speech and can carry on a conversation. Beyond this, there are many qualitative measures of success (e.g. does the agent maintain the illusion of intelligence over the course of thirty minutes of practice? is the program interesting to use? does the system engage the learner? does the speech recognition correctly recognize enough to provide the agent the correct keywords?). There are also quantitative measures of success (e.g. does the system help people learn better than no practice? better than systems like Pimsleur? better than classroom exercises? better than a human tutor?), but testing these may be beyond the reason in the course of a semester. Additionally, such field studies are contingent upon timely review and approval by the Committee for the Protection of Human Subjects.