November 9, 2018

Ron Chang Lee, Ph.D.
leerc8@gmail.com

The Development of ESL Robot "Tutor"
— Practical Uses of AI in English Language Teaching

Development of ESL Robot "Tutor"

The ESL Robot project started in 2006 with a grant from the William and Flora Hewlett Foundation. The goal was to create a virtual English tutor using state-of-the-art chatbot technology from Pandorabots. Since its development, "Tutor", as the ESL Robot is now named, has served millions of English learners throughout the world, free of charge. As more user data is logged, Tutor's capabilities improve. While not yet human-like, students can chat with "Tutor" freely, asking any questions they like.

Tutor has won a number of awards over the past few years. Most recently, it won First Place in the 2018 Loebner Prize Selection Contest, and Second Place in the 2018 Loebner Prize Turing Test Contest. There are two reasons for Tutor's success. The first reason is that its creator is an English language teacher, who understands language teaching and has studied English language structure. It's important to know that "Tutor" is created by a person who knows how to teach. The other reason for its success is because of an innovation called the Final Patterns Script, which improves Natural Language Understanding. The Final Patterns Script is a script that any chatbot developer can use to shorten the time spent on developing a chatbot.

What "Tutor" Knows and What It Can Do

As a chatbot designed to help students learn English, "Tutor" needs to know a lot. It should be able to answer all kinds of questions ESL students have. After years of training, "Tutor" now has a good knowledge base. It can give students advice regarding language learning, such as how to remember new words, how to improve pronunciation, and how to write a good essay. It can also answer grammar questions. It knows almost all the grammatical terms, and can explain grammar rules such as when to double a consonant. It knows irregular verbs. Students can ask for the past form or past participle of any irregular verb.

One problem ESL students have is their spelling. They make spelling errors while typing. I've collected hundreds of spelling errors from my students, and programmed them into "Tutor". When students make such an error when they chat with "Tutor", "Tutor" will point out the error to the student and ask him or her to correct it. It can also help students understand the differences between American and British spelling.

"Tutor" can answer many general knowledge questions. You can ask him questions such as who invented what; who is the author of what book; who won Nobel Prize in which year; how many square feet are in an acre; what is the highest mountain, longest river, biggest animal, etc. It can tell you what is the official language of a country, what is the national flower of a country, what is the currency used in a country. It can also answer questions about the US government, history, constitution, the population of each city, capital of each state. To keep things interesting, "Tutor" can tell jokes, teach you proverbs, and ask you to solve a riddle.

"Tutor" also possesses some basic cognitive abilities. It has memory of specific conversations, can solve some logical problems, and perform certain calculations. It can count the number of words in a sentence, tell you how many letters are in a word, and provide the current time and date.

How to Use "Tutor" in Our Teaching

"Tutor" is a teaching assistant we can use to help us improve our teaching. We can ask our students to chat with "Tutor" every day for 15 minutes to improve their general language proficiency. Students can also improve their conversation skills by actually speaking to "Tutor". In fact, "Tutor" can also be used to help with targeted practice of a specific conversation you are teaching. In addition to reading and listening to the conversations, students can also practice conversations by assigning roles "A" or "B" to "Tutor" and acting out the dialogue. For example, students from a Citizenship class can simulate a citizenship interview. "Tutor" can act as the Immigration Officer and ask students potential interview questions.

All these resources are accessible through the website: https://www.eslfast.com/robot/. There is also a free APP available for download with many of these features.

The Final Patterns Script

"Tutor" can achieve such great results in chatbot competitions because it used the Final Patterns Script. As an English teacher, we know that English sentences have patterns; these patterns can be grouped according to the meaning they express. Because different patterns can express the same meaning, people can ask the same question in different ways.

It's hard for a chatbot developer to anticipate all the possible ways to ask a question. By grouping together patterns that express the same meaning, we can specify one most commonly used pattern as a Final Pattern. For example, we have a group of patterns such as "what sorts of ... ", "what sort of ... ", "what types of ...", "what type of ...", "what kinds of ...", "what kind of ...". All these patterns can be converted into a final pattern "what kind of ..." This way, the chatbot developer will only need to write an answer to the question using the final pattern. This is how Final Patterns approach improves Natural Language Understanding and shortens the time in creating a chatbot.

The success of a chatbot largely depends on how well the chatbot understands its users. The cost of using deep learning for chatbot creation is expensive. The Final Patterns Script enables chatbots to understand its users better using an affordable, alternative methodology.

The Limits and the Future

AI has its limits. One problem is that English learners make mistakes when they speak or write, making it hard for AI to understand them. By making use of simple technologies, such as Final Patterns Script, in our teaching, we can improve the performance of technology-assisted learning in a way that is highly economical. As language educators, we need to be creative in applying these types of new technologies to language instruction. That is why I am sponsoring a new TESOL Technology award to encourage new technology applications in English language teaching. It's an award for excellence in classroom technology, awarded annually to three ESL/EFL teachers. I hope all of you will be creative in using technology in your classrooms, and apply for this award.