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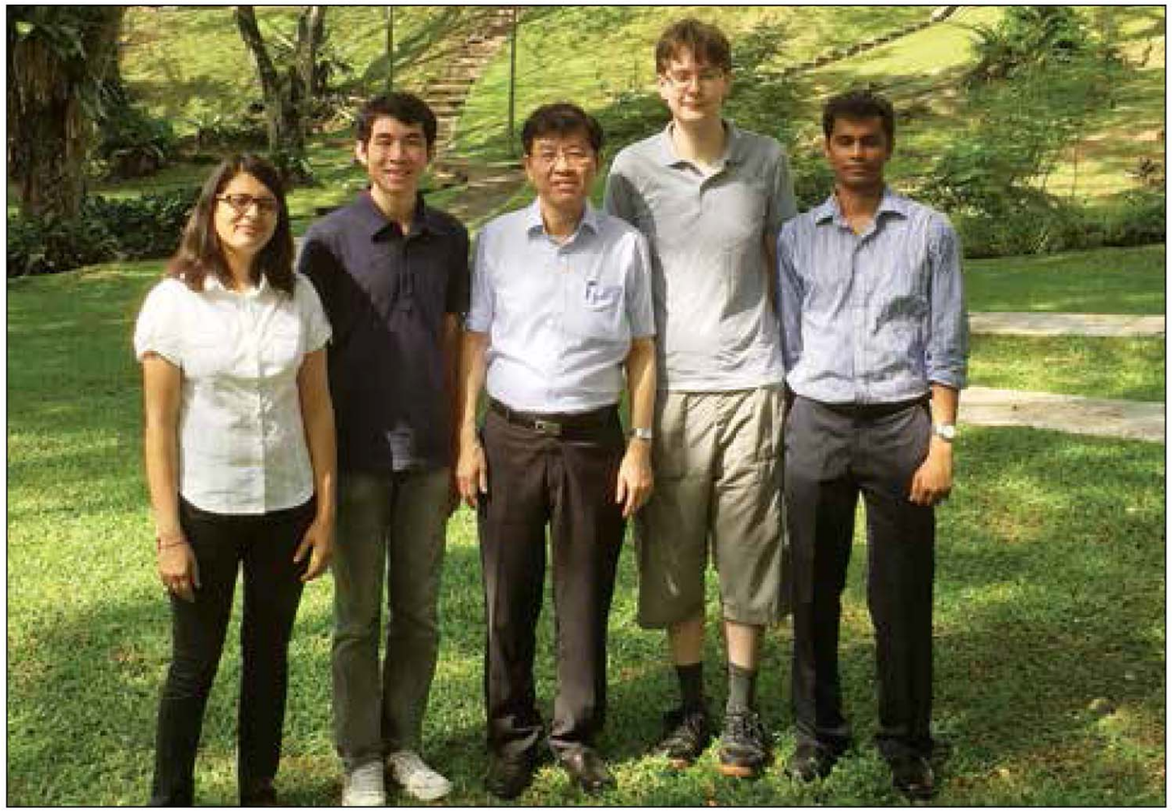
ARTIFICIAL INTELLIGENCE TOOLS FOR LANGUAGE LEARNERS

An ever-present, ever-patient English tutor

This commentary is part of a series in TODAY's Science section, in collaboration with the National University of Singapore School of Computing. The series explores a selection of computer science research projects carried out here and how they can improve people's lives.

NG HWEE TOU



Prof Ng Hwee Tou (centre) and his Natural Language Processing team have developed an automatic grammar checker to help English learners improve grammar at their own pace. PHOTO: NG HWEE TOU

Technology now touches and shapes all aspects of our lives, including how we teach and learn. While great advances have been made in computer-aided learning of mathematics and the sciences, the learning of non-quantitative subjects, such as languages, remains a challenge.

To deal with a non-quantitative subject like language, the computer needs to understand the meaning of words, which are often ambiguous.

Natural Language Processing (NLP) is the field of computer science that deals with the understanding and processing of human languages.

It is an integral part of artificial intelligence, since the ability to understand language is a hallmark of human intelligence.

One exciting application of NLP is the development of tools to help students learn and improve their English writing. English is used today by more than one billion people worldwide, and the market for English language learning products is expected to grow to US$3.1 billion (S$4.1 billion) by 2018.

My NLP research team at NUS has developed an automatic grammar checker for the English language that can help learners of English improve their grammar at their own pace. It serves as an ever-present and ever-patient English tutor.

Under continuous development and improvement since 2010, the grammar checker is built on cutting-edge NLP technology developed by the team. It automatically detects and corrects a subset of grammatical errors in English essays written by learners of English.

Unlike existing techniques that apply merely the rules of grammar, the NUS grammar checker achieves better performance by exploiting statistics from a huge and continually growing collection of fluently corrected sentences.

Student essays containing grammatical errors and hand-corrected by teachers, as well as well-written texts, are fed to the computer program, which learns to output the most probable correction.

Just as a person learns English by reading lots and lots of English texts, the NUS grammar checker learns what constitutes a good grammatical sentence from exposure to well-written texts to the order of billions of English words, as well as from the student essays that have been hand-corrected by English teachers.

Besides proposing corrections to grammatical errors, the grammar checker also shows how the incorrect word or phrase can be used correctly in sentences, and how the corrected word is used in similar sentences.

In 2012, the NUS NLP team was placed first among top research teams worldwide in an international performance evaluation exercise on grammatical error correction using the NLP technology the team developed for the grammar checker.

In a recent pilot user test with a group of more than 80 NUS students, an overwhelming majority said that they would recommend the grammar checker to their friends.

Encouraged by these results, the NLP team will be seeking to develop the system into a product for the education market.

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