



Instant Two-way Translation Helps Soldiers in the Field

In a wartime situation, successful communications between soldiers and civilians can make the difference between a smooth encounter and a disaster. “A conversation at a military checkpoint is quite routine from the point of view of the English speaker,” says Sherri Condon, a principal artificial intelligence engineer. “But when you add the reaction of the other speaker into the mix, it can quickly go beyond any routine you might anticipate.”

Condon is the MITRE project lead supporting a project for the Defense Advanced Research Projects Agency (DARPA) to develop a real-time, two-way translation system for use by soldiers in the field, particularly in Iraq. Currently, translation requirements are handled by local interpreters and one-way, handheld devices that translate English into pre-recorded Arabic phrases.

Along with the National Institute of Standards and Technology (NIST), the MITRE team is helping DARPA come up with something better.

Beyond Stock Phrases

Known as Spoken Language Communication and Translation System for Tactical Use (TRANSTAC), the project is designed to create a two-way translation system that’s robust enough to move beyond stock phrases and allow English and Arabic speakers to communicate freely in a variety of situations. Although the project is currently focused on Iraqi Arabic, DARPA also hopes to reduce the time necessary to add new languages and dialects.

To enable two-way communication between speakers, TRANSTAC focuses on speech recognition and machine translation. To “train” the machine to recognize the target languages, two speakers role-play various common scenarios. The audio is then transcribed and translated to create parallel data, which allows the system to align the words and phrases in one language with those in the other. Once the system has processed enough parallel data, it can begin to probabilistically connect the speech it hears in one language to the matching data in the other.

“Soldiers were enthusiastic about having translation they could trust, since human interpreters can have their own agendas,” says Condon about the initial research phase. “Another reason is that there just aren’t enough translators; in many situations it’s this or nothing.”

Foremost Experts

Made up of some of the world’s foremost experts in computational linguistics, the MITRE team has focused on domain definition, data collection, and evaluation. Once the team helped DARPA identify appropriate contexts for using speech translation devices, Condon says they began figuring out how to incorporate dialogue scenarios so that the system would recognize as much of the language used in those contexts as possible.

Finally, MITRE collaborated with NIST on evaluating the project as it evolved. This involved laboratory and outdoor evaluation tests, again using role-playing scenarios with military personnel to see how TRANSTAC prototypes would work in the field.



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“We worked through ways to measure the success of the system in a way that could predict how it would perform in real soldiers’ hands,” Condon says.

Since beginning work with DARPA in 2002, MITRE has ceded much of the evaluation work to NIST and is concentrating on research. Examples include analyzing the types of errors that the translation systems make and improving automated evaluation metrics, which test the system without the need for human volunteers. Says Condon: “MITRE’s expertise in computational linguistics is almost unparalleled in terms of the number of expert researchers we have in this area.”

Their hard work may soon pay off. “These systems have been doing remarkably well,” she says. “The program manager is starting to look seriously at putting them out in the field.”

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—by *Tricia C. Bailey*

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