The Tactical Language and Culture Training System:
A Demonstration

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Abstract

In this demonstration we will present the Tactical Iraqi, one of the implementations of the Tactical Language and Culture Training System (TLTS). The system helps learners acquire basic communicative skills in foreign languages and cultures. Learners practice their communication skills in a simulated village, where they must develop rapport with the local people, who in turn will help them accomplish missions such as post-war reconstruction. Each learner is ac-companied by a virtual aide who can provide assistance and guidance if needed. The aide can also act as a virtual tutor as part of an intelligent tutoring system, giving the learners feedback on their performance. Learners communicate via a multimodal interface, which permits them to speak and choose gestures on behalf of their character in the game. The system employs video game technologies and design techniques, in order to motivate and engage learners.

Teaching Language, Culture and Task

The Tactical Language and Culture Training System (TLTS) rapidly teaches basic conversational and cultural skills in foreign languages. TLTS is based on the concept of tactical languages, which consist of teaching language, culture and gestures in the context in which they are used – that is, to accomplish specific tasks or missions. This task-based approach accelerates training and reduces costs by giving learners what they need to accomplish particular communicative tasks instead of teaching language broadly and deeply. It provides the vital aspects of building trust in communication, and builds learner's confidence.

More specifically, TLTS:

- Deemphasizes written language in favor of proficiency in basic spoken communication.
- Limits vocabulary to what is required for specific situations, gradually expanding it through a series of increasingly challenging situations.
- Introduces grammar with examples that learners can use on their missions, and only as needed to teach learners

how to generate and understand a sufficient variety of utterances to cope with novel situations.
- Introduces non-verbal gestures – both "dos" and "don'ts" – that are part of cultural norms of etiquette and politeness, helping learners better establish and maintain rapport with native speakers.

Technologies

TLTS is a complex system that combines a number of technologies:

- Automated speech recognition, customized to recognize and respond to common pronunciation mistakes made by language learners.
- Interactive animated simulations based on computer games that present learners with interactive, highly engaging, authentic social situations using computer-generated characters that behave with both speech and gesture.
- Intelligent agents power non-player characters that provide realistic interaction as well as foster improvement with personalized advice, assistance and feedback.
- Pedagogical software agents that track the learners' motivational, social and cognitive states and tailor the system's feedback accordingly.
- Natural language technology are used to construct language models that encode the phonetic, lexical, and syntactical structure if the target language.
- Content authoring tools to quickly and effectively create new modules and components for specific tasks or missions.

For a detailed discussion of these technologies and the system architecture, see [1]

System Components

A TLTS consists of three integrated modules.

The **Skill Builder** is a one-on-one tutoring environment that teaches learners task-oriented vocabularies, pronunciation, and culturally-specific behaviors, their meaning and uses. It uses speech recognition to recognize

and respond to common pronunciation mistakes, a virtual tutor to provide personalized feedback and assistance that improves and accelerates the learning process, and progress reports to let learners review their mastered skills. Lessons contain test materials that allow the system to track the learner's progress as well as give the learner feedback as to their current proficiency level

The **Mission Game** (below) is a visually engaging simulation based on computer games where learners participate in authentic social situations by speaking and choosing appropriate gestures in direct interactions with autonomous, animated characters that represent colleagues and native speakers. Each computer-generated character has its own goals, private beliefs, mental models of other characters, and evolving relationships with and attitudes towards other characters (including the learner). A virtual aide character who is a member of the learner's mission team uses a model of the learner to suggest what to say next when the learner asks for help or has difficulty progressing.

The **Arcade Game** is an interactive, fun learning environment that provides repetitive practice that is so crucial in language learning. Using an arcade game puzzle, learners practice specialized vocabulary related to key tasks, such as understanding and giving directions. Each game level can be played both in a listening mode, where learners follow instructions given in the target language, and in a speaking mode, where players give commands to an on-screen character which then carries them out.

In addition to these main modules, the system has embedded performance assessment tools which constantly track and evaluate the learner's performance and a web-based tool that offers grammar information, including English translations, an overview of the structure and components of a sentence, and notes pertaining to grammar and syntax.

The System in Use

The TLTS system works on a personal computer with a headset used for voice input (see below). The system is self-paced. While we provide guidance to learners of pre-defined strategies to achieve specific learning goals, they are free to choose were to go next based on their own preferences. Typically, users will spend some time going through lessons in the Skill Builder and move to the Mission Game to apply those skills. The Arcade Game is used to train specific vocabularies or as a mechanism to entertain and relax between lessons/missions.

Results

We have developed so far three versions of the TLTS system: for Levantine Arabic, Iraqi Arabic and Pashto. The most complete of these is Tactical Iraqi, whose content is sufficient for more than 100 hours of instruction. The current versions are tailored to military applications; we are developing a civilian version as well. The system has been deployed to a number of military installations, including many U.S. Marine Corps and U.S. Army units in a wide range of locations.

We have iteratively tested and evaluated these systems to assess their usability, learner experience, effectiveness of the underlying technologies, and learning outcomes. Our evaluations show that the interactivity and learner feedback are crucial to the learning experience. Users have judged it as being comparable in value to one-on-one tutoring sessions with language instructors, showing the system's significant potential value. A particularly encouraging result has been the use of the system not only as a language trainer but also as a cultural familiarization tool.

For more information on the system's current status (including videos), see http://tacticallanguage.com

References

[1] W. L. Johnson, C. Beal, A. Fowles-Winkler, U. Lauper, S. Marsella, S. Narayanan, D. Papachristou, A. Valente and H. Vilhjálmsson. *Tactical Language Training System: An Interim Report.* Submitted to: International Journal of Artificial Intelligence in Education.

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