

The Tactical Language Training System

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Abstract

The Tactical Language Training System (TLTS) provides rapid training in a foreign language and culture through AI-enhanced story driven gaming, task-oriented spoken language instruction and intelligent tutoring. Trainees learn skills necessary to carry out a civil affairs mission, where they must enter a town, establish contact with local people, meet the local leader and arrange for postwar reconstruction. Trainees carry out the mission by speaking with AI characters in a simulated world, using a microphone and dialing gestures with the mouse. An AI aide accompanies them through the environment, providing assistance when needed and giving feedback afterwards. A set of interactive exercises prepares the learners for their missions, focusing on spoken language and nonverbal communication. An AI tutor gives feedback during those exercises, including on pronunciation. The tutor bases its motivational tactics on those employed by human teachers. Both Levantine Arabic and Iraqi Arabic modules have been developed so far.

Description

The Tactical Language Training System is designed to help people rapidly acquire basic spoken conversation skills, particularly in languages that few foreigners learn because they are considered to be very difficult. The language courses delivered using the TLTS have a strong task-based focus; they give people enough knowledge of language and culture to enable them to carry out particular tasks in a foreign country, such as introducing yourself, obtaining directions, and arranging meetings with local officials. The current curricula address the needs of military personnel engaged in civil affairs missions; however the same method could be applied to any course that focuses on the skills needed to cope with specific situations. Two training courses have been developed so far: Tactical Levantine Arabic, for the Arabic dialect spoken in the Levant, and Tactical Iraqi, for Iraqi Arabic Dialect.

The TLTS includes the following main components (Johnson et al., 2004a). The Mission Practice Environment (Figure 1) is an interactive story-based 3D game where learners practice carrying out the mission.



Figure1: A trainee greets a local man by saying “as-salaamu aleykum” (greeting) into a microphone and dialing a “respectful” gesture.

Here the player’s character, in the center, is introducing himself to a Iraqi man in a street side café, so that he can ask him who the local leader is and where he might be found. The player is accompanied by an aide character (standing behind the player), who can offer suggestions of what to do if the player gets stuck. The Mission Skill Builder is a set of interactive exercises focused on the target skills and tasks, in which learners practice saying words and phrases, and engaging in simple conversations. An AI tutor evaluates the learner’s speech and gives feedback on errors, while providing encouragement and attempting to overcome learner negative affectivity (Johnson et al, 2004b). A speech-enabled arcade game gives learners further practice in speaking words and phrases. Finally, there is an adaptive hypertext glossary that shows the vocabulary in each lesson, the grammatical structure of the phrases being learned, and explains the rules of grammar that apply to each utterance.

The TLTS incorporates a number of design and implementation features that are innovative and are likely to be of interest to the AI and game development community:

Multimodal interaction. The player engages in natural spoken interaction with game characters through automatic speech recognition. Chosen gesture also plays an important role in the interaction.

Social reasoning. The characters in the game are autonomous agents that have a “theory of mind” and engage in social reasoning to achieve their goals (such as seeking certain answers before they can trust someone) (Marsella and Pynadath, 2004).

Advanced modding. TLTS is a *mod* (term for a modification to an existing game) for the Unreal Tournament 2003 game, using the GameBots interface (<http://www.planetunreal.com/gamebots/>) to communicate with the bulk of the system (including character AI) written in Python (see Figure 2).

Intelligent tutoring. The intelligent tutor employs motivational tactics, designed to address motivational problems and counteract negative affectivity as well as tracking and modeling learner ability. These are modeled on the techniques employed by expert language teachers.

Serious game development. The TLTS is an example of game design and development for the serious purpose of teaching potentially life saving skills. While pure entertainment is good and necessary in its own right, it is important to understand how the entertainment industry is supporting serious efforts as well.

Multi-disciplinary authoring. It typically takes people with various backgrounds to create games, but the TLTS has added even more backgrounds to the mix, including teachers, language experts, military experts and curriculum developers. We are developing a set of content authoring tools (with Micro Analysis and Design), which are specifically designed to support collaborative authoring by such multidisciplinary teams.

The TLTS has been evaluated multiple times with representative learners, through an iterative formative evaluation process (Johnson and Beal, 2005). The evaluations provide evidence that the game format

motivates learners who otherwise would be reluctant to study a difficult language such as Arabic. Multiple military training centers have volunteers to serve as test sites in March 2005, comprising 100 or more subjects.

Credits

Research/Direction: W. Lewis Johnson, Carole Beal, Ulf Hermjakob, Kate LaBore Stacy Marsella, Nick Mote, Shrikanth Narayanan, Abhinav Sethy, Mei Si, Andre Valente, Hannes Vilhjalmsjon, Shumin Wu. **Programming:** Andrew N Marshall, Chirag Merchant, Ben Moore, Prasan Samtani. **Art:** Alfred Au, Michael Bedernik, John Brock, Teresa Dey, David Tre Ford, Jamison Moore, Brett Rutland. **Content:** Esam Alwagait, Yasin Al-Khalesi, Tania Baban, Maurice Boueri, Nadim Daher, Stephen H. Franke, Fadi Kandarian, Philippe Khoury, Youssef Nouhi. This project is part of the DARWARS Training Superiority Program of the Defense Advanced Research Projects Agency.

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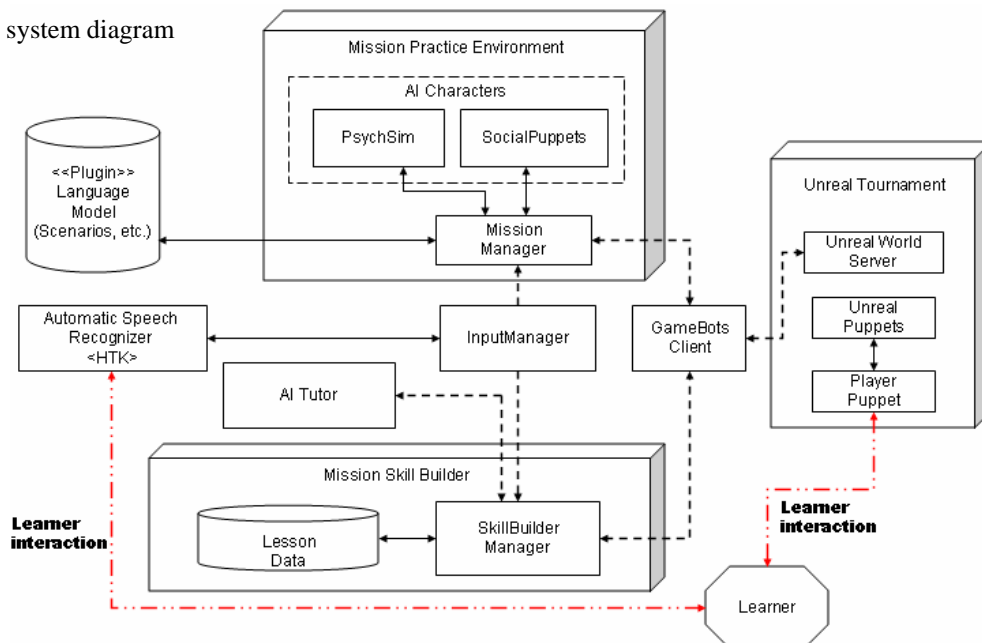
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Figure 2: TLTS system diagram



Printed from (visit for full size screen shots):
<http://www.isi.edu/~hannes/projects/tl/aiidedemo>

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Demo Setup

We will bring our own demo laptops (the system runs off a regular gaming laptop), at least one of which we will want to hook up to a projector or a plasma screen for the audience (we can bring our own projector if needed). We prefer a relatively quiet surroundings because we're using speech recognition (i.e. being next to blasting speakers can degrade performance some).

Demo Procedure

We intend to allow the audience to use the system and learn some Arabic. We will take them through a couple of excercises in the Mission Skill Builder, show them feedback from the AI tutoring agent, and then send them into the Mission Practice Environment, where they get to interact with AI characters in the game.

The following screen shots demonstrate a typical session with the system (with particular emphasis on the Mission Practice Environment):



Figure 1: An intelligent tutoring system takes you through task based language and culture lessons. During pronunciation exercises, the tutoring agent both encourages you and gives you specific feedback on how well you are doing (this screen is from the Levantine Version)



Figure 2: When you're ready to apply your new skills, you enter the game environment. You and your Civil Affairs team enter the fictional town of Wardiyya in Iraq. Your goal is to build trust with someone local and see if you can get directions to the person in charge.



Figure 3: A guest at a sidewalk cafe notices you, stands up and points his chin slightly in your direction as if to demonstrate his curiosity about your presence in town.



Figure 4: You approach and greet him respectfully by placing your right hand over your heart while saying "as-salaamu 9aleykum ". [by selecting the gesture with the mousewheel and speaking into a microphone]
Your aide stands right behind you, ready to help if you need translation or suggestions for what to say.



Figure 5: If at some point the other man at the table is not satisfied with how you are conducting yourself, he jumps up and challenges you with questions (a variation that only occurs if the learner is deemed ready for increased difficulty). You need to respond with appropriate speech and gesture to diffuse the situation or risk mission failure.



Figure 6: If you successfully build trust with the people in the cafe, you are able to find out that the name of the person in charge is Mr. Jassim and you get directions to his house. After following those directions, you arrive at Jassim's house.



Figure 7: At the house you are greeted by a man that turns out to be Mr. Jassim's relative. Again, if you successfully build trust with him through the use of respectful language and gesture, you receive directions to Mr. Jassim's current whereabouts.



Figure 8: Finally you arrive where Mr. Jassim is just coming out of a Mosque with his aides. You introduce yourself and your mission to him, and he is thrilled you are there to help with the reconstruction!

