

Do You Speak English?

By National Institute of Justice (NIJ) Office of Science and Technology (OST) Staff

Many often take for granted that the individuals with whom they communicate on a daily basis speak English. In our correctional system, however, this may not be a reality.

The criminal justice system, and the corrections community in particular, are facing new language-communication barrier challenges every day. We are inclined to believe that our incarcerated population speaks either English or Spanish. Yet, today's inmates are more likely to speak a multitude of languages. In addition to those speaking numerous dialects of Latino Spanish — Mexican, Caribbean, Central-American, etc. — Chinese, Russian, Korean, Vietnamese and the indigenous languages of North and Central America, East India and Africa also are spoken.

Although the U.S. prison population of Hispanics, overall, has fluctuated between 14.3 percent and 15.7 percent during the past decade, some states have far exceeded these national statistics, according 1998 figures from the Bureau of Justice Statistics (BJS). Fifty-three percent of New Mexico's inmates are Hispanic, while New York is second in the nation, with 32.6 percent Hispanic inmates. Arizona, California, Colorado, Connecticut, Texas and the federal system each house Hispanic inmate populations of more than 25 percent. In Hawaii, Asian-Americans make up 44.5 percent of its prison population. Native-Americans represent .7 percent of our total population of about 2 million, yet they comprised 3.8 percent of our incarcerated population in 1990.

The ethnic backgrounds of inmates seem to be changing in waves from the initial growth in the Hispanic population to Korean, Vietnamese and more recently, Russians, reflecting new trends in immigration. Because of the growing number of illegal immigrants, entire jails are being filled with non-English speaking inmates. One such jail is the Mira Loma Facility in

California, which houses inmates who are fighting Immigration and Naturalization Service deportation. We are faced today with a multilingual problem in our correctional facilities that goes beyond just meeting the communication needs of English- and Spanish-speaking inmates.

The criminal justice community has begun to address these language barriers. In some cases, correctional officers who speak a second language are hired. In other instances, focused second-language training programs are developed for existing staff to learn one of the common languages in their facilities. Most of these training programs are aimed at the predominant second language in the facility — usually Spanish. Thus, as the waves of inmates speaking other foreign languages arrive, the more unusual languages, such as Mandarin Chinese or Russian, still are not well-served.

New Technology Tools to the Rescue

Emerging NIJ-supported language-translation technology, which is being researched and developed, may be able to help address these challenges. Spoken language translation automatically translates words and phrases in one language to computer-generated speech and/or text in another language by using text-to-speech translation, speech-to-speech translation or digital audio playback synthesis technology. These technologies are valuable in the timely exchange of information with foreign-language-speaking individuals in the corrections community. NIJ is continuing to support the research and development of language translation technology and its demonstration in the criminal justice community.

Some of the current language translation systems that are being developed and demonstrated can translate spoken English into computer-audible

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ances, the systems may play back selected recorded phrases using fluent speakers of languages, including Spanish, Vietnamese and Cantonese.

Correctional Uses for Language Translation

Language translation technology can be used in all facets of the corrections and criminal justice communities, including federal, state and military correctional facilities and prisons; county jails and detention centers; probation and parole agencies; and community corrections and halfway houses.

Automatic language translation technology can be used in several correctional applications, including:

- **Booking Inmates.** Language translators can be used at the time of booking. If a peer who speaks the detained individual's language or an interpreter is not available, the language translator tool can provide a limited set of commonly used terms to facilitate the booking.
- **Advising of Rights.** Language translators currently under development will allow the law enforcement and corrections communities to create predefined phrases in a variety of languages to fully inform individuals of their rights.
- **Direct Communication With Inmates.** Language translators can be used to communicate with an inmate when an interpreter is not available or the safety of the interpreter is in question. A portable translator device can be taken into a cell to facilitate communications in adverse situations.
- **Screening and Emergency Treatment.** Language translation technology can be pro-

grammed with key medical language phrases that can help in medical screening and emergency medical situations. Portable translators easily can be carried to community hospitals where human language translators may not be available to assist in communication between inmates and hospital staff.

- **Incident Control to Issue Commands.** Language translation technology could be used in large indoor or outdoor spaces to communicate with inmates during critical incidents, providing the same audible instructions in multiple languages.
- **Front Desk and Lobby Instructions.** Language translation technology can be used to better communicate with non-English-speaking visitors in the correctional facility. This application can include standard facility process and procedure phrases that address the interaction of the visitor and the inmate.

Language Translation Technology Research

OST funds research and development of language translation technology. Projects currently being developed include: the Voice Response Translator device (VRT), a speech-to-forms translator for school security officials, and the Quick Reaction Spoken Language Translator (QRSLT).

VRT and Field Demonstrations

VRT is being developed under an OST grant by Integrated Wave Technologies Inc. VRT is a body-worn device that will enable an English-speaking officer to communicate better with people who have difficulty with or cannot comprehend English. VRT issues an audible phrase in a language chosen by the device operator. The operator selects a language and a phrase by speaking an English command prompt into VRT.

Voice recognition technology is used by VRT to determine what phrase to emit in response to the

operator's spoken command prompt. VRT does not actually translate English to another language, it simply produces an audible phrase of the operator's choice in that language. The phrases are intended to elicit gestures and body language in the form of head nods, hand motions, etc., from people with whom the officer is interacting. Phrases are structured so the operator may direct the actions of people or ask them questions. Example phrases include: "If you speak Vietnamese, raise your hand" and "Give me your left hand for fingerprinting." Currently, VRT provides language support for more than 500 Vietnamese, Chinese (Cantonese) and Spanish phrases.

The unique features of VRT include its:

- **Portability.** VRT is the size of a pocket calculator and may be body-worn.
- **Clarity.** Phrases are prerecorded using fluent speakers, not machine-synthesized voices.
- **Flexibility.** VRT is fully programmable and permits users a total choice of languages, phrases and command structure.
- **Convenience.** The device offers hands-free operation.

VRT initially was tested by California's Oakland Police Department (OPD), which evaluated the relevancy of the initially developed phrases and the ergonomic aspects of the device's physical configuration. OPD also assessed citizen and community group reactions to VRT. OPD's initial testing led to refinement of the selected phrases and the reduction of the size of VRT.

OST currently is expanding VRT's evaluation with the Nashville Police Department in Tennessee and the Arlington County Police Department in Virginia. The current field demonstration will help to further refine the user interface and evaluate the set of phrases that can effectively be used.

LSI's Technology

Language Systems Inc. (LSI) of Woodland Hills, Calif., with support from NIJ, is developing a speech-to-forms translation capability for

military, law enforcement and correctional applications. This development is based on LSI's speech-to-speech technology, embodied in its SpeechTrans™ and CopTrans™ language translation software. SpeechTrans™ and CopTrans™ have roots in the QRSLT development.

CopTrans™, which provides two-way translation between English and a foreign language for criminal justice applications, will be LSI's first SpeechTrans™ product. Since the speech-to-forms development for NIJ is a logical extension of the speech-to-speech technology represented by SpeechTrans™ and CopTrans™, the former topic will be described first.

SpeechTrans™ provides rapid, accurate, mission-critical translations between English and one or more other languages. It is built around LSI's flexible, customized two-way language translation engine. It uses speaker-independent continuous speech recognition technology so that users will not need to train it to recognize each individual's voice, nor to pause between spoken words. Instead, each person simply activates the SpeechTrans™ system and speaks naturally to it. New software options are under development that include custom vocabularies and phrase lists, new pairs of languages that can be translated, and new grammar extensions, as well as the speech-to-forms development described below.

The unique features of SpeechTrans™ and CopTrans™ include:

- Two-way spoken translations;
- Quick response;
- Multiple pairs of languages under development (e.g., English/Spanish, English/Russian);
- User-expandable vocabulary and dialogues;
- Voice, keyboard or mouse menus;
- Recording of complete dialogue as an audio file;
- High-quality natural or synthetic speech output; and
- Choices of hardware product configurations.

CopTrans™ enables two users to converse, each using his or her own language. CopTrans™ recognizes both what is said and in what language and then translates each message into the

other language. Within the limits of its vocabulary and grammar, CopTrans™ permits two users without a common language to communicate in real time.

CopTrans™ can be used for office-based interviews, such as jail booking, as well as in patrol cars or other mobile units. CopTrans™ also can be used with a loudspeaker from a patrol car or other mobile units for relaying instructions in high-risk or hostage situations.

LSI's Speech-to-Forms Technology Development

As mentioned above, CopTrans™ records all utterances spoken into the microphone by both the law enforcement representative and the detainee in a dialogue interaction. Since the verbal content of such interactions in most cases must be recorded onto a form by criminal justice personnel, the next logical step in technology development is to do this automatically, thus, reducing the burden of paperwork. LSI's development for NIJ therefore involves automatically analyzing the content of the digitized audio record of a dialogue interaction between a criminal justice representative and a detainee, and transcribing the content, appropriately formatted, to an electronic form.

QRSLT

QRSLT is a multiteam Defense Advanced Research Projects Agency (DARPA) effort. The DARPA research

and development team includes LSI (project integration and multilingual natural language processing), Entropic Research Laboratories Inc. (speech recognition), Eloquent Technology Inc. (speech synthesis) and the Air Force Research Laboratory, which has acted as a technical agent for the effort.

QRSLT can provide the ability for a correctional officer to interact effectively with a person speaking a foreign language. This is a two-way voice translation, hand-held or body-mounted device designed to assist military or law enforcement personnel in interacting with non-English speakers.

Currently, QRSLT is designed to: accept spoken English, Spanish, Chinese or Korean input from a correctional officer; generate a computer-spoken translation and translate spoken input into Spanish, Chinese or English. The DARPA development of QRSLT is synergistic with the NIJ/OST funding of the voice response translator projects.

Future Language Translation Technology

Language translation technology is in its infancy — but NIJ/OST and the research and development community have demonstrated that it is feasible for application in law enforcement and correctional operations. As computer hardware grows more compact, more powerful and less expensive, extremely versatile spoken language translation systems will be available on

smaller platforms with a range of capabilities and a variety of languages appropriate to the complex requirements of law enforcement and correctional applications.

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