

The Interactive Systems Labs (ISL)

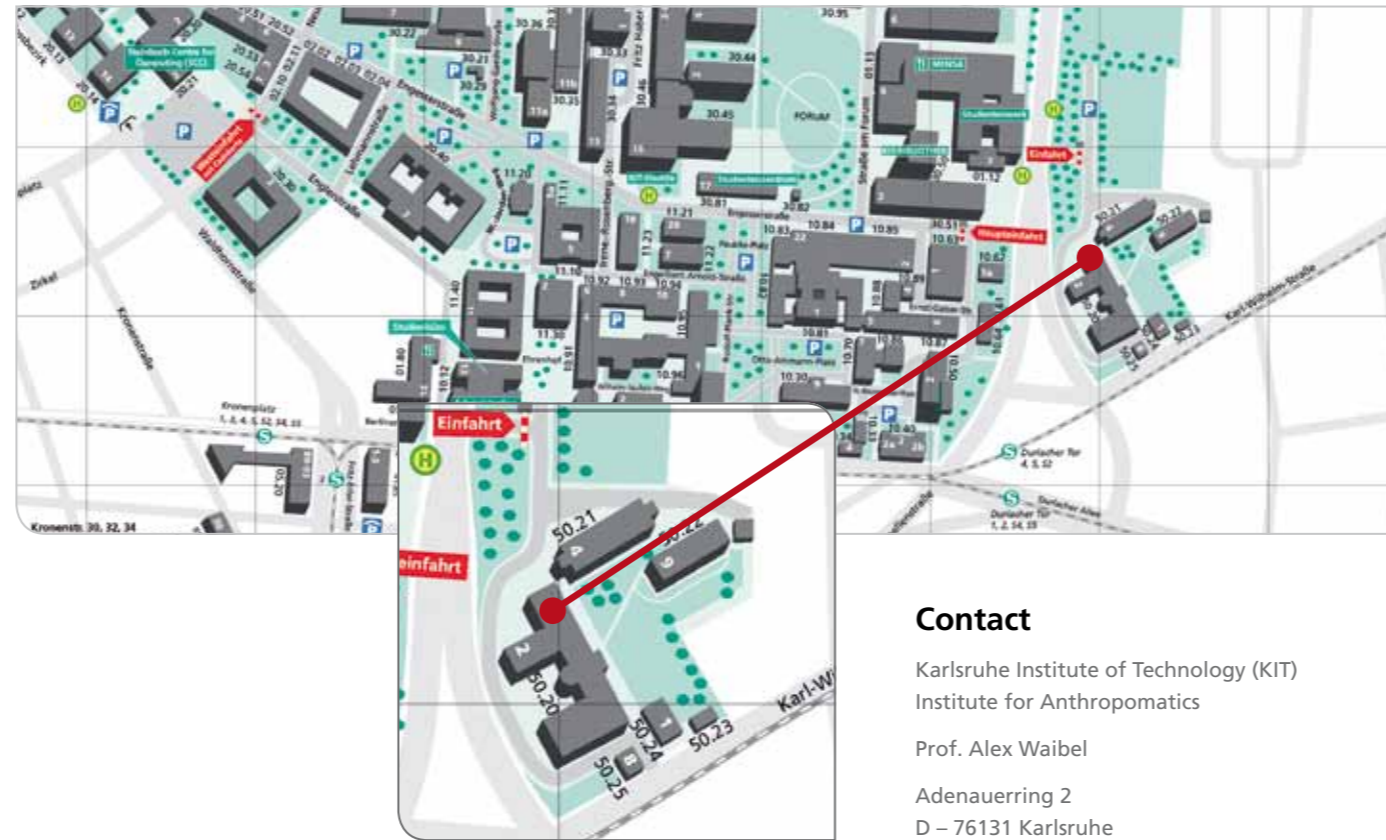
The ISL focuses on developing user interfaces that improve human-machine and human-to-human communication. The ISL has been one of the leading laboratories active in speech and language research, computer vision approaches for machine interfaces and has pioneered many speech translation technologies.

The laboratories are affiliated with the computer science department at the Karlsruhe Institute of Technology (KIT), Germany, and has sister laboratories at the School of Computer Science at Carnegie Mellon in Pittsburgh and Silicon Valley, USA. ISL is part of IMMI, a joint venture in Paris, France, a leading laboratory devoted to multimedia and multilingual information processing.

Our laboratory is founding member of the international center for Advanced Communication Technologies (interACT), which is a joint center between eight of the leading research institutions in the US, Europe and Asia:

- Carnegie Mellon University, Pittsburgh and Silicon Valley, CA, USA
- Karlsruhe Institute of Technology, Karlsruhe, Germany
- Hong Kong University of Science and Technology
- Waseda University, Tokyo, Japan
- Italian Institute of Technology, Genova, Italy
- National Institute of Information and Communications Technology, Tokyo, Japan
- University of Southern California, Los Angeles, USA
- Nara Institute of Science and Technology, Nara, Japan

Head of the Interactive Systems Labs and director of interACT is Prof. Alex Waibel.



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Karlsruhe Institute of Technology

Interactive Systems Labs

Improving Human Interaction with and through Machines

The Interactive Systems Labs, Institute for Anthropomatics, KIT





Core Areas and Projects

In 1991, the ISL introduced JANUS, the first speech translation system in Europe and the US, and demonstrated the feasibility of speaker-independent, continuous speech translation. In 1992, the ISL founded the international Consortium for Speech Translation Advanced Research (C-STAR), the earliest team effort on speech translation, together with partners in the US and Japan. C-STAR continues to host and manage the annual IWSLT workshops and evaluations.

In 1993, ISL presented the first spontaneous speech translation system, and, in 2005, the first real-time simultaneous speech translation system for talks from English to Spanish. ISL served as coordinating or founding partner in a number of European key speech translation projects including Verbmobil, Nespole, TC-STAR and the French-German collaborative R&D program Quaero. ISL is also leading efforts on multimodal interfaces for the Deutsche Forschungsgesellschaft, Sonderforschungsbereich Humanoid Robots, and served as the general scientific coordinator of CHIL, the largest Integrated Project on Multimodal Interfaces during Framework Program 6.

Presently, ISL is partner in the French-German INTERREG-project EVEIL-3D (start January 2012) and participates in the project BABEL sponsored by IARPA. ISL is coordinator of the Integrated Project, EU-BRIDGE, which started in February 2012. EU-BRIDGE is the largest funded project by the European Commission within Call 7 of Language Technologies.

ISL-Research

Automatic Speech Recognition (ASR)

Automatic Speech Recognition (ASR) is the science of automatically transforming spoken text into written form. Applications for this technology have been explored at ISL and are manifold, such as dictation software, speech translation systems, smart rooms, or human-robot communication.

The main applications for which we develop ASR systems at our laboratory are for the use in speech translation systems, such as the simultaneous lecture translation system. We conduct research in all areas relevant to ASR including acoustic pre-processing, signal processing and robust feature extraction, acoustic modeling, language modeling, search, and spoken term detection.

We offer several courses in ASR, and a laboratory course that teaches how to build an ASR system with our in-house speech recognition toolkit JRTK.

Janus Recognition Toolkit

The Janus Recognition Toolkit (JRTK) is a general-purpose speech recognition toolkit developed at the Interactive Systems Labs at Carnegie Mellon University and advanced at the ISL at Karlsruhe Institute of Technology. Commercial and research licenses are available from ISL.

It is useful for both research and application development and is part of the JANUS speech-to-speech translation system.

Machine Translation

At ISL we develop state-of-the-art phrase-based statistical machine translation systems that translate text or speech from one language into another. With our Statistical Translation Toolkit (STTK) we develop different MT systems in different languages, genres and topics. We further conduct research in all aspects of statistical machine translation including sentence alignment, translation model training, adaption and reordering.

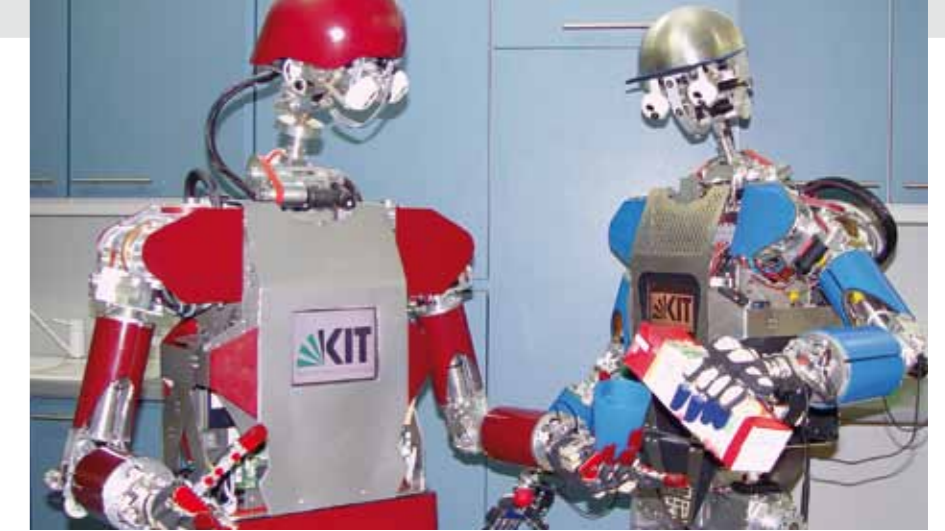
We offer a class in MT including a practical lab, and a seminar in which we discuss the specific aspects of spoken language translation.



The Lecture Translation System

Lectures are an effective and popular method for disseminating knowledge. Many of the myriads of lectures and talks held every day in lecture halls and seminar rooms all over the world do not reach their full potential audience due to language barriers. Because of high costs and a lack of interpreters, human simultaneous translations are not an option for most lectures. Here, technology in the form of spoken language translation can offer a solution.

The ISL's simultaneous lecture translation system is capable of automatically translating lectures and presenting the translation results as text via the World Wide Web. At KIT the system will be used to translate German lectures into English and further languages, so that international students can better follow their content, even if they are not fluent in German.



Multimodal Dialog Systems for Human-Machine-Interaction

Machines, humanoid robots, avatars and smart rooms need to interact naturally with humans. At ISL we develop spoken language understanding and dialog systems, to understand the commands and intentions of humans.

While speech plays a major role in this, humanoid systems also need to interpret and understand other modalities such as gestures, facial expressions, focus of attention and body pose of humans.

We develop multimodal dialog systems, that integrate different sensory inputs to interpret the environment and human intentions and interactions robustly and intelligently.