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Automatic Simultaneous Translation Service for University Lectures

Bridging the language barrier with automatic simultaneous lecture translation systems

Spoken language translation: Combination of automatic speech recognition and machine translation

Description and Exploitable Knowledge

Academic lectures and technical talks often provide high quality content that is of value to audiences that have many different mother tongues. But many lectures often do not reach their full potential audience due to the limits imposed by the language barrier between lecturer and potentially interested listeners.

Lectures at Karlsruhe Institute of Technology are mainly taught in German. Therefore, foreign students that want to study at KIT need to learn German, and not only at a conversational level, but must be proficient enough to follow highly scientific and technical lectures carrying complex content. While foreign students often take a one-year preparatory course that teaches them German, experience shows that even after one year of studying, their German is not proficient enough to be able to follow German lectures and thus perform well.

Since the use of human interpreters for bridging the language barrier in lectures is too expensive, we want to solve this issue with the help of our automatic simultaneous lecture translation system. In this system we employ the technology of spoken language translation (SLT), which combines automatic speech recognition (ASR) and machine translation (MT) together with other auxiliary components to build a system that simultaneously translates continuous speech from German to English.

The system works with the help of a cloud based service infrastructure. The speech of the lecturer is recorded via a local client and sent to the service infrastructure. A service then manages the flow of the data through the ASR, MT, and other components. The final result is then made available as a website which continuously displays the result of the recognition and translation.

At the same time the system also offers the possibility to archive the lectures and make them later searchable via text queries.

Infrastructure

For the simultaneous translation of lectures, we have improved the infrastructure developed to be more flexible and robust. The service architecture still allows a server based recognition and translation of audio and text, but in combination with a well-defined and light weighted API.
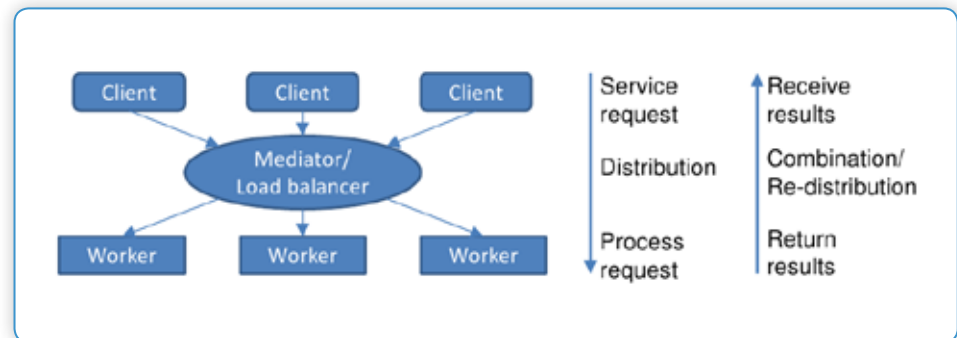
Schematic overview of the service architecture

The service architecture enables a connection-based communication with multiple service requests at the same time. A client connects to the mediator and the mediator connects the output media stream of the client with one or multiple workers in order to accomplish a specific service request. Clients are modules that allow users to access and use the service architecture. Workers represent different core components such as speech recognition, translation, speech synthesis, but also language ID, segmentation or the presentation of the results.

Application Sectors
Universities, Higher Education, Organizers of Conferences

Technical Requirements
Fast Internet Connection for communication with the server based service infrastructure.

Terms of Availability
Can be inquired at the Karlsruhe Institute of Technology (Prof. Alex Waibel)

IPR Protection
Karlsruhe Institute of Technology (Germany)