

Utilizing Automated (Simultaneous) Translation for Internationalisation at German Universities

With the Lecture Translator (LT), the Karlsruhe Institute of Technology (KIT) is embracing the trend of speech recognition and translation within the tertiary education sector to improve internationalisation.

SETTING

In accordance with its umbrella strategy 2025, KIT primarily offers German-language Bachelor's and Master's degree programs at the Bachelor's and Master's level, in which English-language courses are integrated.

The aim is to provide targeted support for international students and to attract talented young people to Germany.

According to data from the HRK Compass, 90% of all study programs in Germany are offered in German. Human interpreters are too expensive for universities.

A large-scale conversion of the degree programs to the English language is currently not to be expected, would discriminate against German citizens, does not meet with general acceptance and requires additional qualification of the lecturers.

Machine translation can fill a gap, but makes significantly more errors than humans. But the alternative would be to have no translation at all.

STATE OF THE ART

Services in the context of automated speech recognition and machine translation are becoming increasingly common.

- The Lecture Translator fulfills the specific requirements in the context of a German university.
- The focus is on improving internationalization.
- The system offers the possibility of using a transcription of the lecture with simultaneous translation into several languages in a live session.
- The system has been set up and continuously optimized since 2012 and is used in KIT lectures as an automated simultaneous translation service.
- It is based on the research of the Interactive Systems Lab at KIT. The Lecture Translator at KIT is used to provide access to German-language courses for international students.

IMPLEMENTATION CHALLENGES

Spoken Language Translation

- Combines automatic speech recognition (ASR) and machine translation (MT).
- Needs to present translation result in an appropriate manner with low delay.
- Typical applications are simultaneous lecture translation, videos, meetings, conversations.

Thoughts on the Output Modality

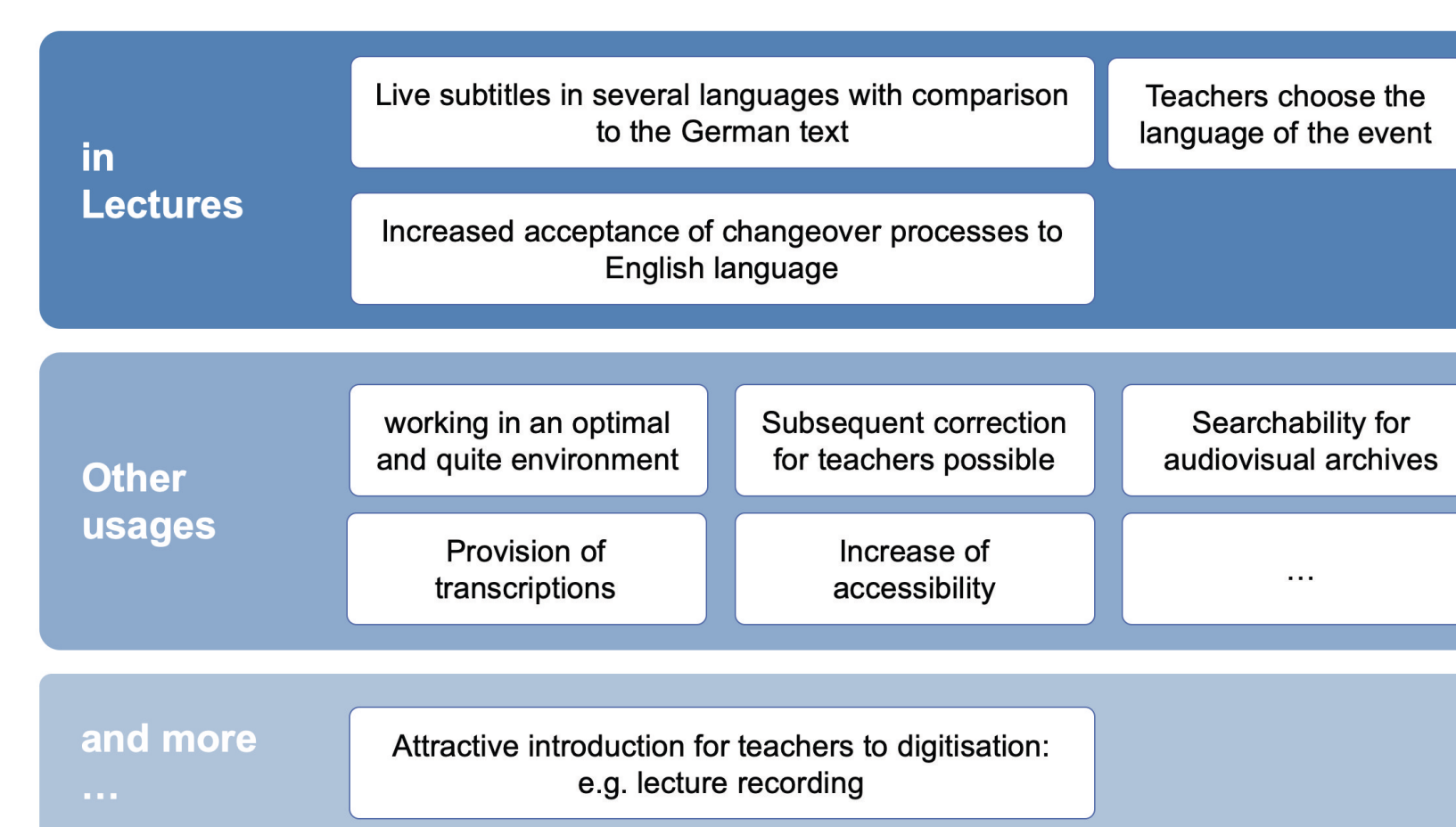
- Text instead of Speech Synthesis can be easily distributed through the WWW and used with mobile devices without special software.
- Following synthesized speech is tiresome and disturbs following the original speech. Text makes skipping back and forth in time possible and supports understanding the lecture.

Speech Translation is Difficult

- Speech is ambiguous and variable.
- Homophones in speech recognition: "How much wood would a woodchuck chuck if a woodchuck would chuck wood?"
- Homonyms in translation: "The bench at the river bank was donated by the local bank."
- Signal variations: Accent, dialect, voice, noise, microphone, room
- Language peculiarities like different word order, composita, inflections and congruence.
- Specialized vocabulary: technical terms normally not in the standard vocabulary, technical terms with special meanings, equations.

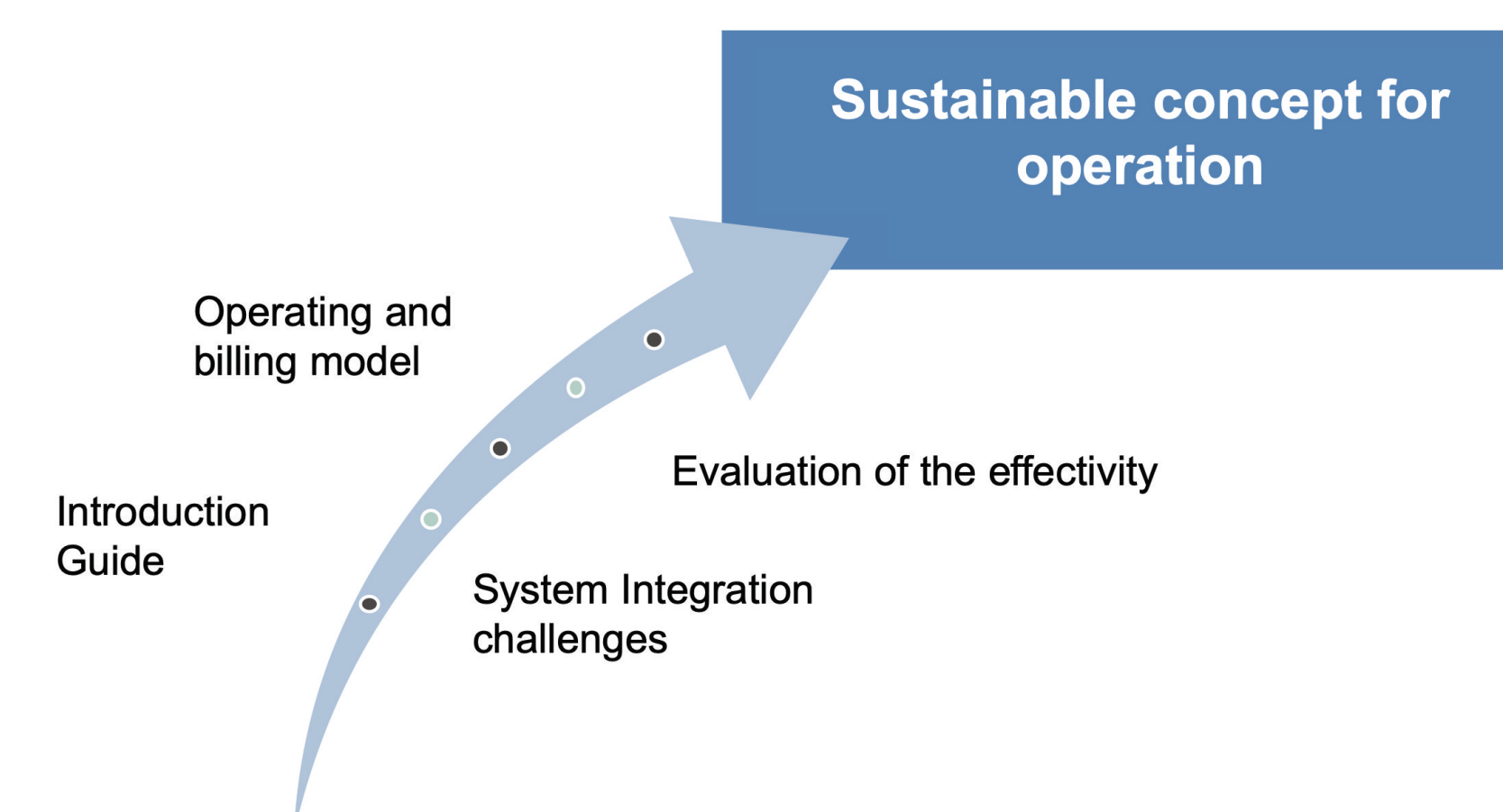
MANY BENEFITS

A particular advantage of the system operated by KIT over alternatives from the private sector is the consideration of data protection aspects and the specific trainability and adaptation of the service (vocabulary, language model, language style) to the respective domains of the lectures in order to increase the quality of the translation.



INNOVATION PROCESS

The goal is to transform the KIT experiences and knowledge into a regular operation in the German university landscape.



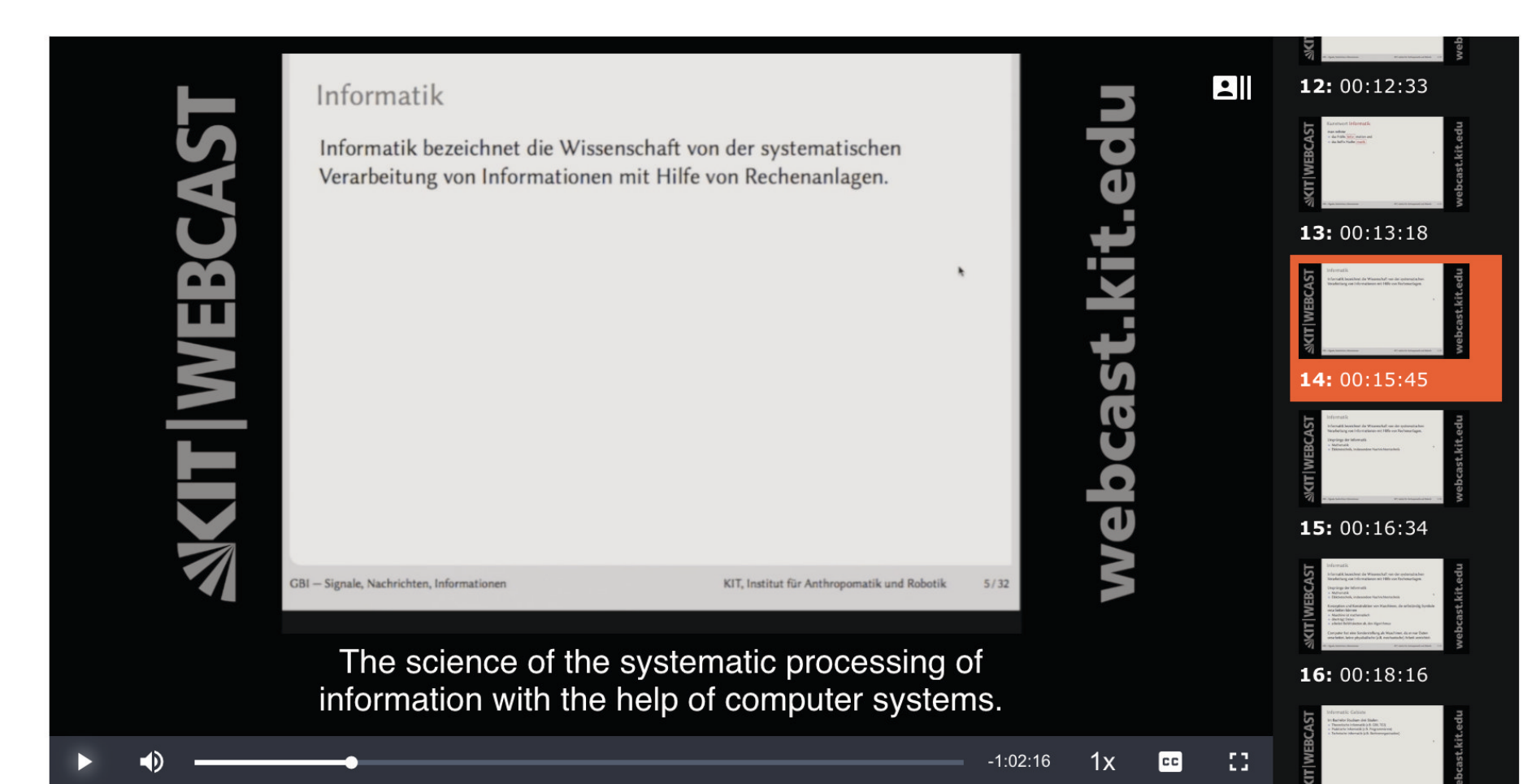
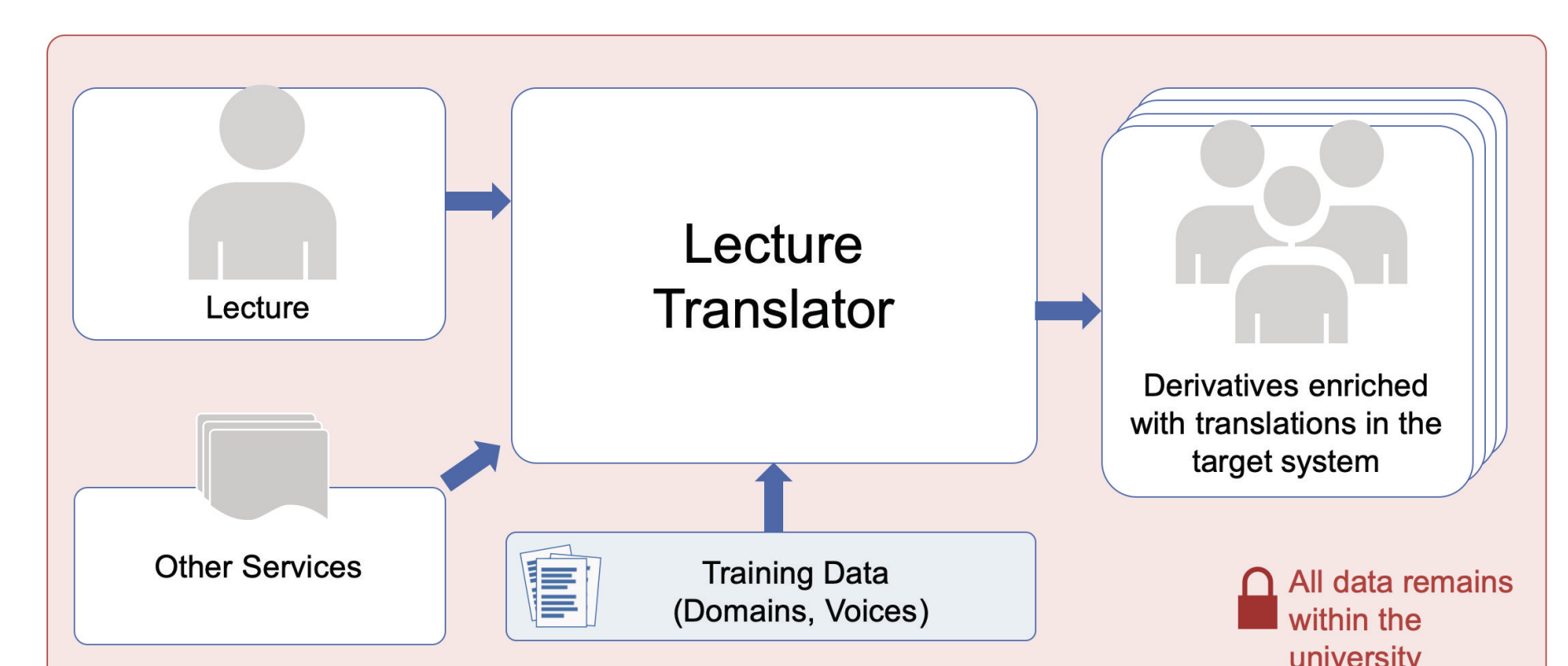
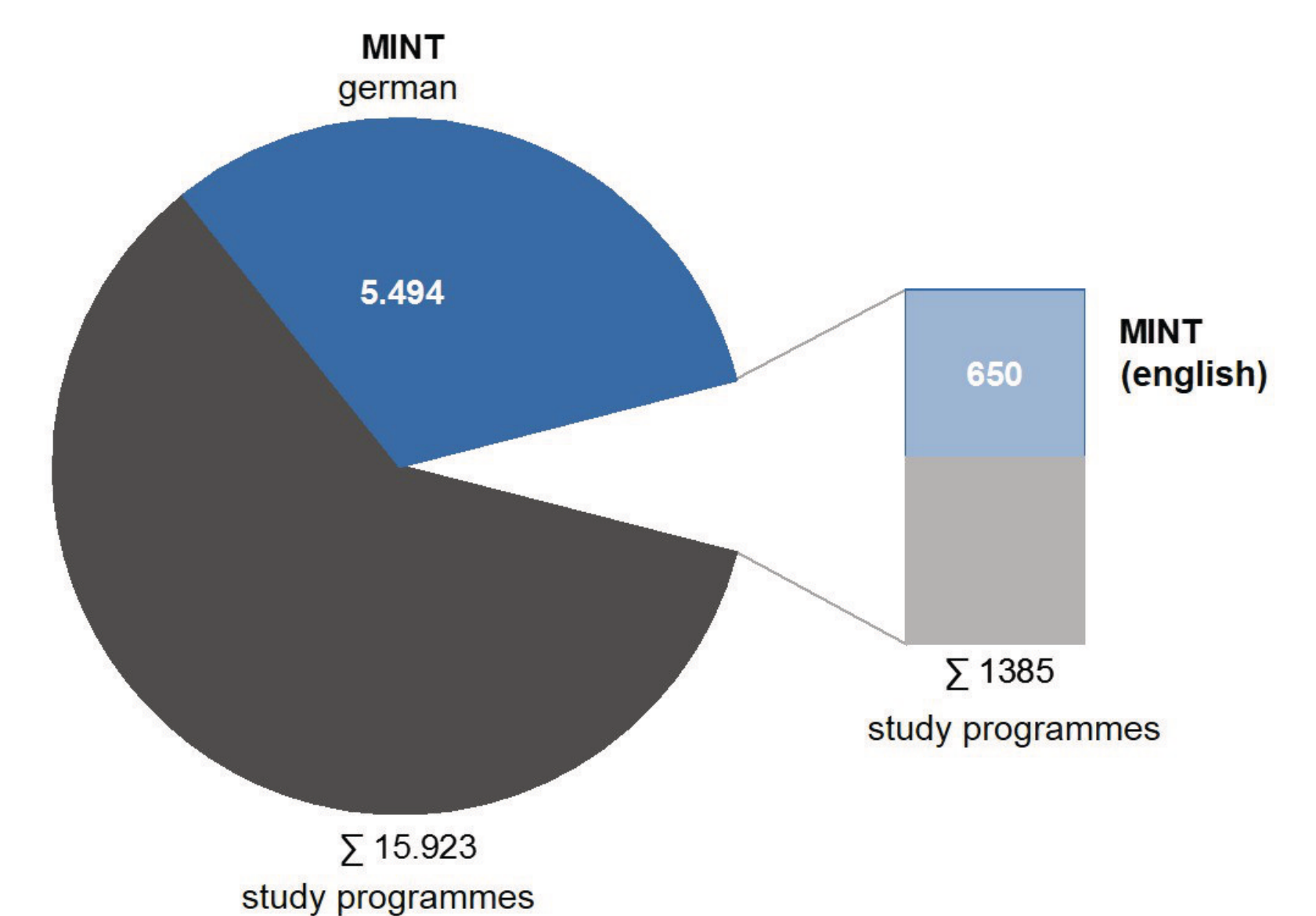
The continuous optimization process is closely linked to the endeavor to use the Lecture Translator more and more in lectures and seminars. The aim is to develop a guideline for the introduction at universities as well as an operating and billing model for service provision. This is intended to open up this IT infrastructure for machine speech recognition and translation to the entire university landscape in Germany.

Furthermore continuous research and work is needed. The latest trend in Spoken Language Translation (SLT) is to use sequence-to-sequence components, or to even go directly from the source language audio to the target language text – all with the aim to improve performance and to reduce the error rate.

Although more language directions must be trained and integrated, e.g., to and from Chinese.

Feedback from other universities points to provide it as a software as a service (SaaS) by a KIT spin-off company (kites). With this, the system can be maintained as a market-ready product.

By establishing a Germany wide service via the appropriate institutions, sufficient volume for a sustainable service effort can be ensured – leading to a low cost service by leveraging on economies of scale.



German (de) Dieser Definition sind sich einig Informatik.
English (en) agreement computer science in a word in this definition.
 The science of the systematic processing of information with the help of computer systems. And this is why I like Automatic prefer because, therefore, is information. In the definition, but also handling with the help of computer systems and that sounds just strongly processed after automation, I have a machine. Something that is not as a human needs to process information somehow, otherwise the machine for me. It is an automatic, therefore Int I personally about the

Since 2012 used in selected Lecture Halls, currently integration into the regular infrastructure

Room	Capacity
Audimax	754
Chemie, Naturwissenschaft	318
Elektrotechnik, Informationstechnik	300
Geographie	208
Ingenieurwissenschaften (IWS)	208
IT-Systeme	158
Physik	158

