The MUSA project is a joint effort of the following organizations...

INSTITUTE FOR LANGUAGE AND SPEECH PROCESSING

Institute for Language and Speech Processin (GR), http://www.ilsp.gr

ILSP is a research institute with activities in the fields of theoretical, applied and computational linguistics, natural language processing and engineering, computer assisted language learning, speech processing, synthesis and recognition.

ILSP is the Coordinator of MUSA, responsible for system specification, design and integration. ILSP integrates the Tr·AID translation memory and terminology extraction tools, and develops the constraint calculation module of the subtitling subsystem.

SYSTRAN Language Translation Technologies

SYSTRAN (FR) http://www.systransoft.com

SYSTRAN is the leader in the translation software market in many countries, particularly in France, Germany, the UK, Italy, Scandinavia, the USA, Japan and China. SYSTRAN technologies are accessible via the most important search engines on the web.

SYSTRAN integrates its Machine Translation Technology for translating subtitles from English into Greek and French.

CNTS UNIVERSITEIT ANTWERPEN

Centre for Dutch Language and Speech, University of Antwerp (BE), http://cnts.uia.ac.be/cnts

CNTS specialises in the application of statistical pattern recognition and machine learning techniques in language engineering especially text analysis, information extraction from text and text mining.

CNTS brings the full power of state-of-the-art text analysis tools in text condensation and subtitle generation from English transcripts.

PSPEECH KATHOLIEKE UNIVERSITEIT LEUVEN

Center for Processing Speech and Images, Katholieke Universiteit Leuven (BE), http://www.esat.kuleuven.ac.be/~spch

The K.U.Leuven/ESAT speech group has developed the ESAT large vocabulary continuous speech recognition system for English, Dutch and Greek as well as tools and methodologies related to speech processing.

ESAT provides Continuous Speech Recognition with large vocabularies for English, segmentation of audio streams, speaker turn detection and aligment of audio with existing transcripts.

Lumiere Cosmos Communications S.A.

Lumiere Cosmos Communications (GR), http://www.lumiere.gr

LCC is one of the leading companies in multilingual subtitling. LCC is responsible for translating and subtitling of several channels such as Discovery Channel, BBC, Animal Planet, Travel Channel, National Geographic (for the Greek Digital Platform), Filmnet, Filmsat, Supersport, GBC (for the Greek pay television), LTV and Alpha (for the Cypriot pay television)

LCC is the main user of MUSA. It plays the role of multilingual data provider and evaluator of the prototype. LCC has adapted the SubEasy environment, provided by its subsidiary

BBC

BBC World Service (UK), http://www.bbc.co.uk/worldservice

BBC is a world leader in programme production. It has pioneered communications in radio, television and online technologies. The BBC is expanding its broadcasting services in the UK to provide a full range of Television and Radio services in the digital multi-channel and multi-media world for its domestic and international audience.

BBC is the main user, content provider and evaluator of the MUSA prototype. It also assists in the subtitling process by making available and developing subtitling data.

Contact Information

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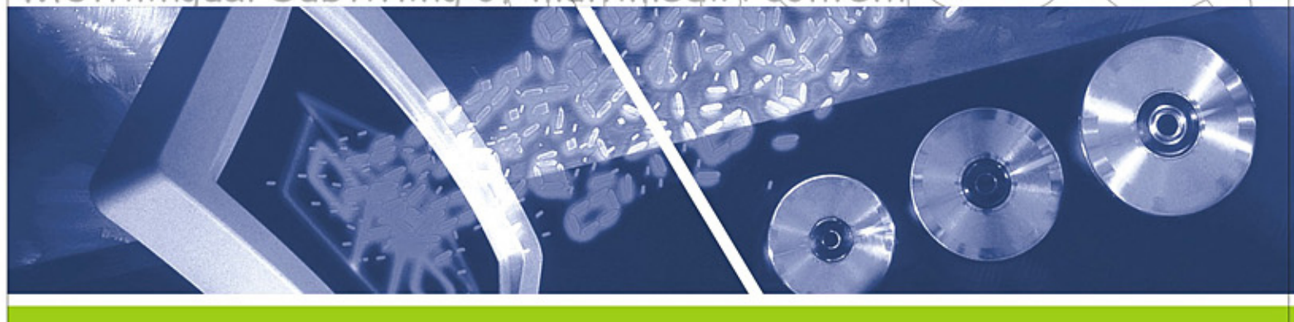
MUltilingual Subtitling of multimediA content



musa

MUltilingual Subtitling of multimediA content

Let's make MUSA simple...

What does MUSA do?

MUSA aims to provide the industry with a system that will automatically generate and translate subtitles of multimedia content such as videos and television programs both pre-recorded and live.

Will MUSA eliminate the need for human subtitlers?

Theoretically, yes, but in real practice since the system is not able yet to provide a 100% accurate output, the need of subtitlers is still there to edit the final output. MUSA, however, should be considered as an excellent productivity tool that will reduce drastically the time needed today by subtitlers to produce their work.

Can MUSA be used for the deaf and hard of hearing?

Yes! The first two modules of MUSA can produce today subtitles in the original language with more than 90% accuracy.

How accurate is the output?

MUSA is still in its R&D phase, which means that it's still under development. MUSA is not yet ready for extensive commercial use. The accuracy of the output is at the level of today's accuracy of the technologies used. Taking into consideration today's state of the art a 60% to 80% accuracy can be expected.

Can the output be improved?

Yes! The output can be improved considerably if a transcript of the dialogue or narrative is provided along with the video. Also, the system can be customised to specific domains and types of programmes.

Can it work in other languages as well?

The architecture is there and can be used for other languages as well. However, additional development for the new languages will be needed.

Where can MUSA be used?

MUSA can find numerous applications. Television programs both live and pre-recorded, conferences and teleconferences, digital content creation, etc.

MUSA integrates Automatic Speech Recognition (ASR), Machine Translation (MT) and Natural Language Processing (NLP) technologies.

The following functional blocks are included:

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on the Web

Visit

http://sifnos.ilsp.gr/musa

to

- View demos of English, Greek and French subtitles generated by the MUSA prototype
- Download MUSA related publications
- Stay updated on MUSA technologies

Project Overview

In the unified framework of European mass communication, subtitling is provided increasingly by broadcasters to meet various needs of their viewers. However, video subtitling is far from trivial and is considered to be one of the most expensive and time-consuming tasks an interested company needs to perform, since it is mainly carried out manually by experts. Typically, a 1-hour program needs around 7-15 hours of effort by human subtitlers.

Moreover, in view of the expansion of digital television and the increasing capacity to manipulate audio-visual content, assisting tools that produce a first draft of subtitles in a multilingual setting become indispensable for the subtitling industry.

MUSA aims at the creation of a multimodal multilingual system that automatically converts audio streams into text transcriptions (or aligns the audio signal with already existing transcripts), generates subtitles from these transcriptions and then translates the subtitles in other languages. The system currently operates in English, French and Greek.

MUSA ARCHITECTURE

Input: BETA. VHS. DVD. video

Extraction of PCM, 16 bits/sample, 16kHz audio

AUTOMATIC SPEECH RECOGNITION
Speech/Non-Speech detection
Speaker turn detection
Alignment of audio with transcript

The KUL/ESAT ASR subsystem for the transcription of English audio streams into text, or the alignment of existing English transcripts with the audio signal.

Transcription (with timecodes)

<XML>

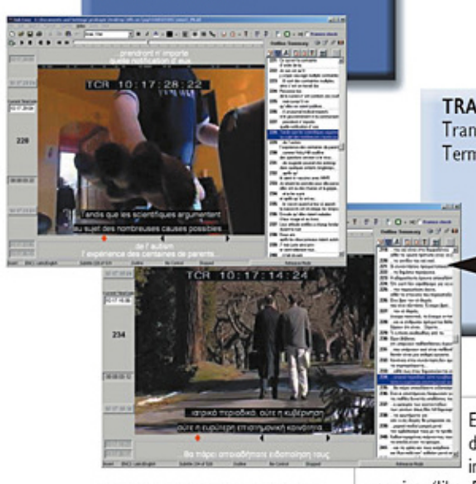
SUBTITLING
Constraint calculation and Compression using Paraphrases and Deletion Rules

A subtitle condensation subsystem producing subtitles from English audio transcriptions guided by the aim to provide maximum comprehension, while complying with linguistic parameters and spatio-temporal constraints that the subtitling industry has accepted as standards.

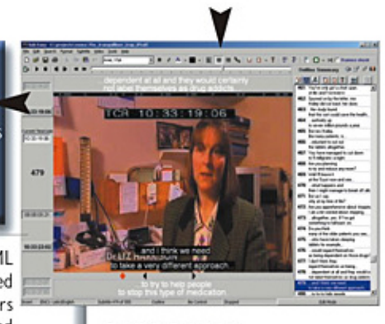
Using SubEasy, a specialized editing environment, subtitlers can reliably inspect and edit automatically produced subtitles.

TRANSLATION
Translation Memories + Machine Translation + Terminological Lexica

A translation subsystem that integrates the Tr·AID Translation Memory (TM) and SYSTRAN Machine Translation (MT) technologies. Multilingual linguistic resources such as parallel texts, terms, proper nouns and specialised lexica enrich both the TM and the MT engines.



French and Greek Subtitles



English Subtitles

English, Greek, and French subtitles are stored in XML documents, which can straightforwardly be converted into any of the open or proprietary formats that users require (like EBU STL). This way we ensure the openness and independence of the system while foreseeing compatibility with changing user practices.