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BSI Standards Publication

Information technology — User interface — Face-to-face speech translation

Part 2: System architecture and functional components

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Ch. de Blandonnet 8 • CP 401
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Foreword

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Introduction

It is important to consider people with special requirements to ensure that they can gain the same benefits from ICT. One of those special requirements is to help people to avoid language barriers in global environments. Automatic speech translation systems have existed for a long time, but they have functional limitations as well as technical ones with regard to usability and accessibility. Annex A shows a history of face-to-face speech translation.

One reason for these limitations is the diversity of the languages currently used. It is difficult to support many languages by one or several speech translation systems. A flexible and interoperable standardized framework is needed to work with all different languages utilizing many speech translation systems already developed in many countries. Other considerations to make a natural and usable speech translation service possible include applying users' characteristics within the system, such as emotion, speech style, gender type and other attributes. To reflect those characteristics in the output speech translation, a standardized user interface is required to reflect the input and output data and transfer them to the user's device.

This document aims to enable face-to-face speech translation among people with different languages. The three technologies, i.e., speech recognition, language translation, and speech synthesis technologies, are mature enough to build a speech translation function. There are many face-to-face speech translation devices and/or services using mobile devices. However, the user needs to learn how to use the service and needs to use both hands to control the speech translation system. If the user wishes to use only one hand, which is usually the case, he or she cannot use the current speech translation systems and/or services. To overcome this usability issue, this document suggests a method that exactly follows the conversation among people with the same language. The method in this document is hands-free, and does not require any pre-training. In this sense, this method is the ultimate user interface of face-to-face speech translation and will open a world without language barriers.

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Part 2: System architecture and functional components

1 Scope

This document specifies the functional components of face-to-face speech translation designed to interoperate among multiple translation systems with different languages. It also specifies the speech translation features, general requirements and functionality, thus providing a framework to support a convenient speech translation service in face-to-face situations. This document is applicable to speech translation devices, servers and communication protocols among speech translation servers and clients in a high-level approach. This document also defines various system architectures in different environments. This document is not applicable to defining speech recognition engines, language translation engines and speech synthesis engines.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.2 Abbreviated terms

Utf-8 Unicode standard defined in IETF RFC 2279 (1998), UTF-8, a transformation format of ISO/IEC 10646

4 Overview of face-to-face speech translation

4.1 General

A face-to-face (F2F) speech translation system enables users of different languages in a face-to-face situation to communicate with each other in spoken languages by providing machine-generated translation results. A face-to-face speech translation system between a speaker and a listener shall have a speech recognition module, language translation module and a speech synthesizer (TTS: text to speech) as shown in Figure 1.

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