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Title: The Language Translation Interface and automated language translation tools for the ADO

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The Language Translation Interface and automated language translation tools for the Australian Defence Organisation

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Abstract

We describe the Language Translation Interface (LTI), a tool developed at DSTO which provides an easy-to-use interface to perform translation between languages. The LTI allows users to rapidly access a number of automated translation systems, either locally or over a network. It provides a uniform method for entering and pre-editing input to all the various systems, and for retrieving and editing output translations. One of the main advantages is the ability to view a number of output translations for each input segment and to choose and edit the most suitable. The LTI was designed to be used in a range of situations in which rapid translation is required, and it can be used more specifically in coalition exercises and operations, in cases where communication across languages is necessary but where either human translators are not available or there is not enough time for human translation. Added functionalities such as language translation memories and an acronym manager can be used to ensure the quality of output, especially in the case of spoken input.

1. Introduction

In this paper, we report on one of the outcomes of a project undertaken within the Defence Science and Technology Organisation (DSTO). While the main goals of the overall project are "to research and develop speech and language technologies to improve operations", our project aims more specifically at "researching automatic language translation techniques and developing tools to utilize these techniques".[1] In particular, we aim at developing tools to facilitate communication, both spoken and written, across languages.

Language Translation for the ADO

Some examples of possible uses of language translation for the Australian Defence Organisation (ADO) include intelligence gathering, translation of e-mail messages and other documents during coalition operations and coalition exercises, translation of interviews in the field with non-English speakers, and cross-language spoken communication with coalition partners in theatre and operational headquarters.

[1] This research was undertaken by Jennifer Biggs, as the project component of her Graduate Diploma in Business Enterprises, via the Graduate Industry Linked Entrepreneurial Scheme (GILES) at the University of Adelaide. Jennifer Biggs is supervised at DSTO by Dr. Dominique Estival.

Currently, the Australian Defence Force School of Languages, ADFLANGS, provides language training to members of all services, who are then deployed as required. This might not be sufficient in case of high tempo operations, when the volume of documents to be translated might exceed the capabilities of the available human translators; nor in cases when there is a need for immediate or rapid translation of large volumes of text, e.g. for background intelligence gathering.

Machine Translation (MT) has long been used both by military and civilian organisations to provide rough translations for the purpose of intelligence gathering [1]. More recently, hand-held speech-to-speech translators have been developed and deployed in the field by the US (the "Phraselator" [2]). In our case, we are not concerned with building new MT systems, or with designing new platforms, but with allowing translators or people who need translations to access the tools they require as quickly and as easily as possible.

2. Automated Translation Tools for the ADO

Our main goal is to provide ADO personnel with translation tools appropriate to the tasks for which they find a need for rapid translation when no human translator is readily available. An overriding issue for us is the constraint that for the time being, neither the ADO nor the DSTO can realistically envisage to develop their own machine translation systems, at least not during this project. Therefore we are limited to using existing systems, whether COTS or freely available. Thus, our focus is on developing easy access to existing translation engines and our main concern has been to make that access transparent to the users.

The Language Translation Interface

This approach resulted in an easy-to-use interface in which we hide from the users the specific details of the translation tools they are accessing. The LTI is meant to be used as the sole interface to as many translation engines and linguistic resources as can be made available to members of the ADO, and the users themselves are not required to be trained translators. We therefore make transparent to the users how to enter input into those tools and how to manipulate the output (see Figure 1, section 3.1). On the other hand, we also provide a mechanism for users to add new systems and tools as they become available (see Figure 2, section 3.2).

Machine translation or human-in-the loop.

In addition to being an interface to automated translation tools, the LTI has also been designed in such a way that the same interface can be used by a human translator to input a translation manually if there are no automated tools for a particular language pair. This allows consistency of the output in case of multiple translations, and facilitates document management.

3. Current Implementation of the LTI

The LTI provides a single interface to access the whole range of options for automated translation methods: full MT, Machine-Aided Translation (MAT) and Translation Memory (TM) services. In the first instance, the LTI has been implemented to access online MT engines provided in HTML format over TCP/IP. The LTI can also be used to access MT applications that have been installed locally, allowing the system to be run on a secure network. Users can also choose to access translation servers, either over the net or within a secure network.

3.1. The Translation form

In its current implementation, the LTI offers a number of functions, some of which are illustrated in Figure 1. Figure 1 shows a screenshot of the LTI Translation Form, with the Source Language panel containing the input text (in this example, an extract from a conference announcement), the Translation panel containing 2 translations obtained over the internet (here, from the *Transcend* and *AltaVista* translation engines), and the selected output in the Target panel at the bottom.

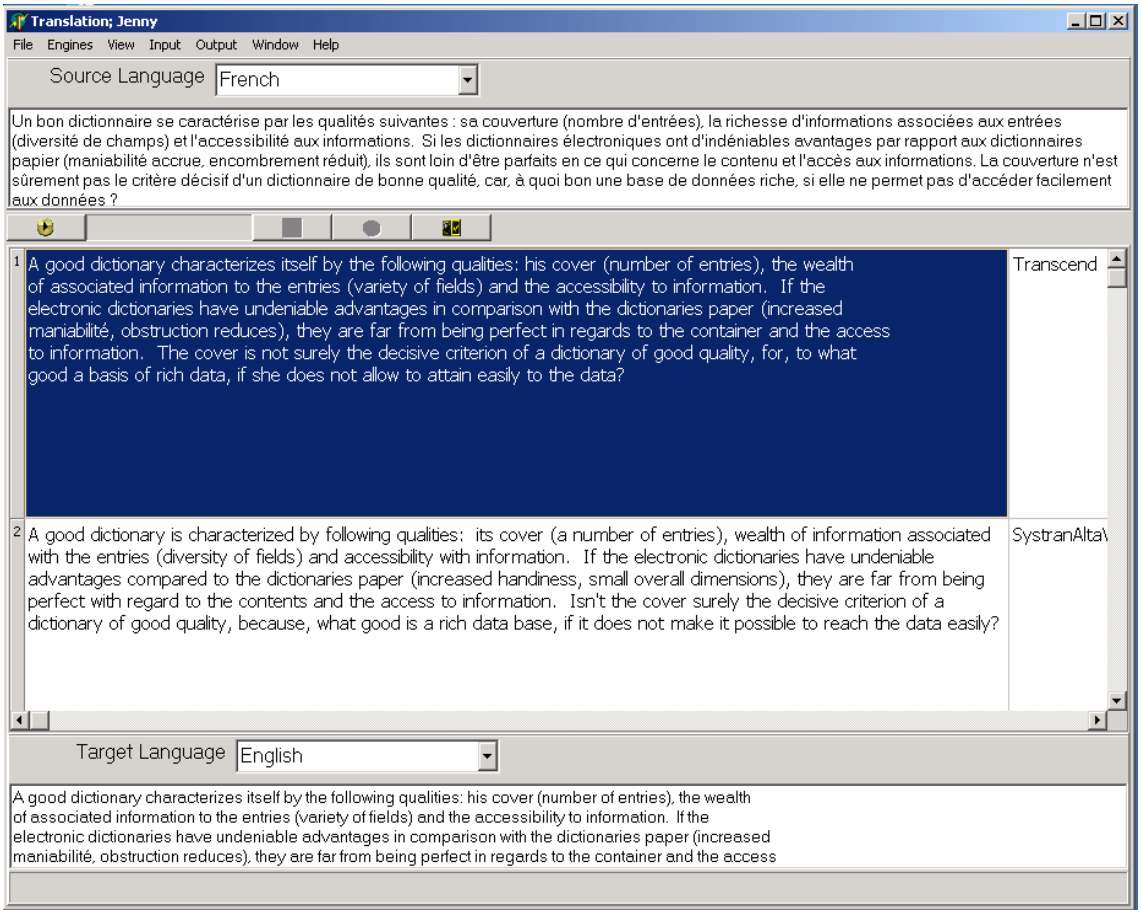

Figure 1: Screenshot of the Language Translation Interface

1. Entering the input

The input can be directly typed in or loaded from a text file, either batch or real-time. The LTI can be used to translate any documents, provided the input sent to the language translation utilities meets their requirements (e.g. plain text or specific character encoding schema). In particular, constraints on size of the input are only dictated by the translation engine themselves, and the LTI can accept documents of any size.

The input is either entered in the "Source Language" top panel in the GUI shown in Figure 1, or downloaded from the "File" menu.

2. Editing the input

The input can be edited, again in the "Source Language" panel. Pre-editing is especially useful (or even necessary) when the input is the output of a speech recognition system (ASR). This function also allows pre-editing of the text to meet particular requirements of the translation utilities, if any.

3. Accessing translation engines

The LTI provides a convenient way of accessing a range of translation systems and resources. The systems are accessed through the "Engines" menu, which shows the engines available for the language pair that has been selected.

4. Collating the results

An innovative feature of the LTI, and one of the most useful for the user, is that it provides access to several translation engines and that it collates the results these engines return for each input. The translation results are given in the middle panel in the GUI shown in Figure 1.

On the one hand, collating translation results gives users with some knowledge of the source language the possibility of obtaining the best available translation for a given input. On the other hand, considering the sometimes low quality of the output of MT systems, a collection of translation results might also be very useful to users with no knowledge of the source language, who may thus be better able to obtain an understanding of the input than with a single translation output.

5. Choosing the output

Any of the output translations can be selected, either automatically or manually at run-time. This allows either batch or real-time use, as well as the option of pre-selecting particular translation engines for particular language pairs.

6. Editing the output

The selected output can then be edited in the "Target Language" panel. This is of course often necessary with the output of MT systems, and would be required if the finished product is to be a polished document.

7. Saving the translation session

A record of the translation session is saved in HTML, Word or Translation Memory Exchange (TMX) format. The HTML or Word document format provides a unique type of output: an ordered list of the translations executed in a session, with time-stamps and user ID. Usually the output from a translation system is either a single sentence translation or the complete document. There is also the option of saving only the translations that were selected.

3.2 Adding new engines or modifying access to current engines

In the case of MT engines accessed over the web, websites tend to change periodically and the format in which the translation is returned may be different from what was expected when a system was first accessed. Thus, we found it necessary to provide a utility for users to specify the systems they want to use and to modify access to those systems, via Action lists. This facility is illustrated in Figure 2, with a screenshot of the Web Method Translation form which allows the user to make the appropriate modifications to the Action list which will be used to automate the web browser.

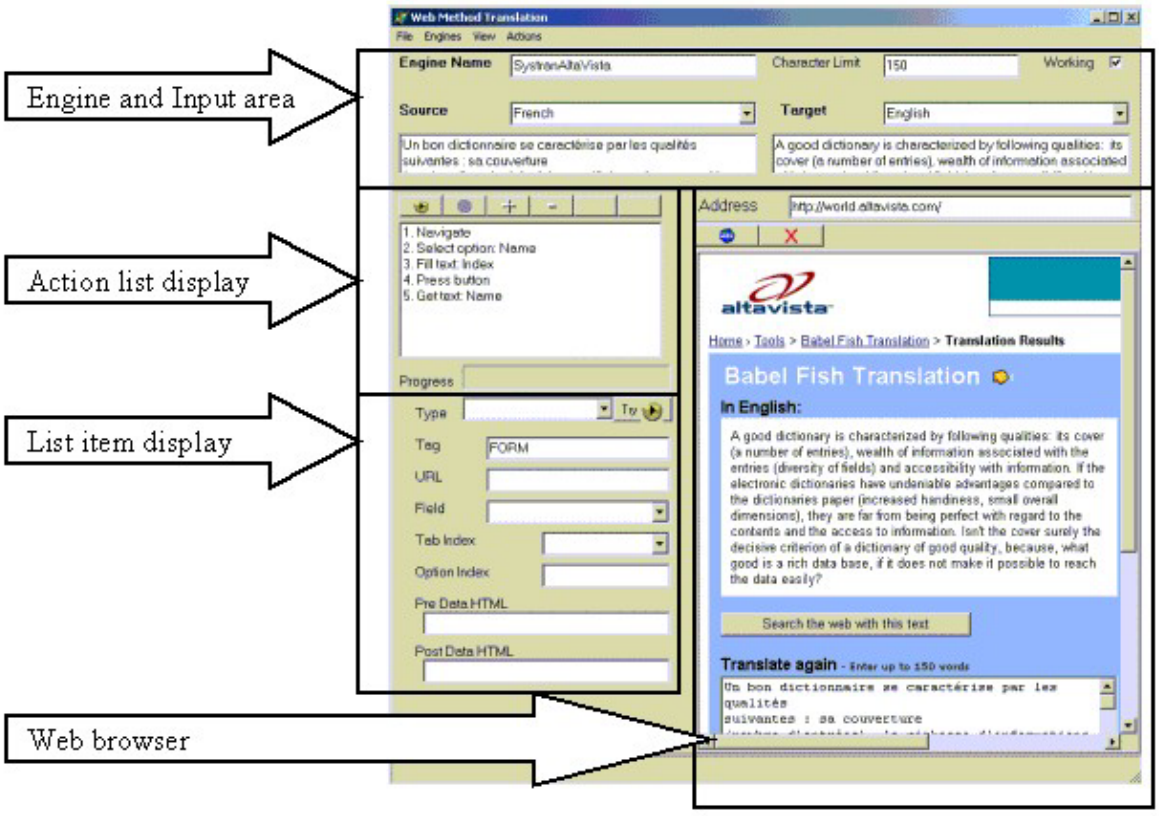

Figure 2: Screenshot of the Web Translation Form

4. Integration of the LTI with the Automatic Transcriber for Meetings (AuTM)

Further to this stand-alone use of the LTI, we wanted to ensure that it could be used in conjunction with other applications in which translation might be required. Since the LTI saves the output translation session in HTML, Word or TMX format, it is fairly straightforward to see how it can be used with standard document production tools by a single translator.

However, we also wanted to demonstrate that it could be used in a more collaborative type of environment, and this led us to attempt a more ambitious integration with another tool developed within our research group, the *Automatic speech-to-text Transcriber for Meetings and Interviews* (AuTM). Having achieved the integration of the LTI with AuTM now allows the possibility of conducting meetings across languages

AuTM is a client-server application operating over a TCP/IP network to record and transcribe meetings and interviews. Using a commercial ASR, AuTM automatically supplies both textual and audio records for up to eight meeting participants. The integration of the LTI with AuTM provides one or more of the participants in an AuTM meeting with the ability to use a different language, the transcription of their utterances being translated through the LTI and inserted in the transcript of the meeting.

The automated translation of an utterance may be entered automatically during the meeting transcription, or be offered to one of the meeting participants for editing. This allows the interface to be used as a support tool for an interpreter over a TCP/IP network. The output of the system consists in a meeting transcript in one or more languages. Each participant can receive a transcript containing all the translations, or can choose to receive a transcript in only one language. In either case, time-stamped audio files are also attached to the output.

This type of application, combining ASR and MT/MAT technology, suffers from the compounding of transcription and translation errors which is common to all speech-to-speech applications and there are obvious limitations to such a system.[2] However, we believe that it is of relevance to C2 in a coalition environment, in that it provides easy-to-use, almost real-time automated interpretation capabilities in a secure environment during coalition exercises or operations, allowing more rapid communication in case no interpreter is available. The use of translation memories (see below), which can be tailored to specific situations, would improve the quality of the translation output.

5. Conclusions and Future Work

We have developed and implemented a simple, easy-to-use tool for personnel who need translation done when there is no human translator available. The LTI provides a single interface for multiple translation engines (full MT, MAT, or Translation Memories) from the Web, or from servers or local applications on a secure network. It allows the users to view a number of translation results and to choose the most

[2] See for instance the Verbmobil project [3] and http://verbmobil.dfki.de/overview-us.html, and for C-STAR: http://www.c-star.org.

appropriate one. With its input and output editing panels, the same interface can be used by human translators to create manual translations.

Language Translation Memories

An important type of translation utilities consists of translation memories, either on a local network or over the net. For many languages of interest to the ADO, no machine translation systems or translation memories have been developed yet. The only way to address this issue is to use available translation memory systems to start building banks of translations that can then be used at a later point. We are now working on integrating existing translation memories and building our own banks of translations.

Acronym Manager

In addition to the building and integration of language translation memories which will improve the quality of the translation output, especially for spoken input, we are also integrating a military acronym manager, which will help manage the consistency of the translation in particular domains.

In conclusion, we believe that even though the current quality of available machine translation engines, whether full MT or MT, may not yet be adequate for document production, the automated batch translation of incoming documents (e.g., e-mail messages) can be used for rapid intelligence gathering and information processing during high tempo operations and that the LTI can provide a useful way to rapidly access translation tools in those situations. The LTI can also be interfaced with a number of applications and we have integrated it with a speech transcriber to allow meetings to be conducted in more than one language. This type of application would also prove useful in coalition exercises and operations.

Acknowledgements

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