

## **Towards a new vision for MT**

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The MT Summit series of conferences began nearly fifteen years ago, in 1987 at Hakone, Japan. Much has changed in the field of MT since then. Many of the methods, systems and techniques that are familiar to us today have emerged in the last fifteen years. For example, in the late 1980s there were no example-based MT systems, no statistics-based methods, there were no translation memories, there was no text alignment, there was no localization industry, there were scarcely any MT systems for personal computers; and, above all, there was no translation on the Internet, and the World Wide Web was just a gleam in the eyes of its creators. Systems were used only by large organisations, governmental bodies and a few multinationals. As they had been for decades, they were designed for mainframe computers, for expensive minicomputers and for workstations; it was assumed that all output had to be edited, whatever the eventual use. Personal computers (or microcomputers as they were usually known) were still new, low-powered and expensive, and MT software for them was rare and difficult to obtain.

The assumption then was still what it had been since the very beginning of MT, namely that the aim of MT development (even if distant) was automatic translation of high quality comparable to that of a human translator, and not requiring human revision before publication. The vision was essentially what Bar-Hillel in 1960 had called FAHQT (fully automatic high quality translation). It was still the vision of the pioneers before the ALPAC report in 1966. Systems were developed for use primarily on mainframe computers (or the smaller mini-computers) by multinational companies or government organizations for the production (dissemination) of good-quality publishable documents.

By the late 1980s, of course, it had long been recognized that publishable quality could be achieved only with human intervention, either the revision of MT output or the control of input documents (e.g. simplification and regularization of grammar and vocabulary). It was also being recognized that some good use could be made of less-than-perfect MT output (raw translations) for information gathering purposes (assimilation). However, this use was seen as a by-product, as a slightly less than respectable use of MT. In brief, it was believed that although FAHQT could not be realised it ought to remain the ultimate goal.

However, this (usually implicit) adherence to FAHQT as an ultimate goal has been damaging, with effects we still see today. It means that we have to apologise for the low quality of MT systems, and for the fact that quality has not significantly improved since the late 1980s (even since the 1970s). It means also that we have to counter many misconceptions: on the one hand, that MT seeks to replace human translators; and on the other, that MT research is inherently misguided, since automatic translation must be impossible.

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The impact of the Internet has been significant in recent years: an accelerating growth of real-time on-line translation, and the development of many systems

designed specifically for the translation of Web pages and of electronic mail. The demand for immediate translations will surely continue to grow rapidly, but at the same time users are also going to want better results. There is clearly an urgent need for translation systems developed specifically to deal with the kind of colloquial (often ill formed and badly spelled) messages found on the Internet. The old linguistics rule-based approaches are probably not equal to the task on their own, and corpus-based methods making use of the voluminous data available on the Internet itself are obviously appropriate. But as yet there has been little research on such systems.

At the same time, the Internet is also providing the means for more rapid delivery of quality translation to individuals and to small companies. A number of MT system vendors offer translation services, usually adding value by human post-editing. More will surely appear as the years go by. It is probable that the very existence of low-quality MT output from Internet systems and from commercial software will create a demand for *good* translations from people who have had no previous access to translation facilities.

Another profound impact of the Internet will concern the nature of the software itself. What users of Internet services are seeking is information in whatever language it may have been written or stored – translation is just one means to that end. Users will want a seamless integration of information retrieval, data and information extraction, and text summarization systems with translation. As this conference has demonstrated, research has begun in such areas as cross-lingual information retrieval, multilingual summarization, and so forth, and before many years there will, I am sure, be systems available on the market and the Internet.

In fact, it is probable that in future years there will be fewer *pure* MT systems (commercial, on-line, or otherwise) and many more computer-based tools and applications where automatic translation is just one component. As a first step, it will surely not be long before all word-processing software includes translation as an in-built option (it is already common in Japan.) Integrated language software will be the norm not only for the multinational companies but also available and accessible for anyone from their own computer (whether desktop, laptop, network-based, etc.) and from any device (television, mobile telephone, etc.) interfacing with computer networks. Again, it will not spell the end of the pure MT system completely, but be a demand-led expansion of the provision of translation software in some accessible and usable form for the future information society.

In the past there has often been tension between the translation profession and those who advocate and research computer-based translation tools. But now at the end of the twentieth century it is already apparent that MT and human translation can and will co-exist in relative harmony. Those skills which the human translator can contribute will always be in demand.

Where translation has to be of *publishable* quality, both human translation and MT have their roles. Machine translation is demonstrably cost-effective for large scale and/or rapid translation of (boring) technical documentation, (highly repetitive) software localization manuals, and many other situations where the costs of MT plus essential human preparation and revision or the costs of using computerized translation tools (workstations, etc.) are significantly less than those of traditional human translation with no computer aids. By contrast, the human translator is (and will remain) unrivalled for non-repetitive linguistically sophisticated texts (e.g. in literature and law), and even for one-off texts in specific highly-specialized technical subjects.

For the translation of texts where the quality of output is much less important, machine translation is often an ideal solution. For example, to produce *rough* translations of scientific and technical documents that may be read by only one person who wants to merely find out the general content and information and is unconcerned whether everything is intelligible or not, and who is certainly not deterred by stylistic awkwardness or grammatical errors, MT will increasingly be the only answer. In general, human translators are not prepared (and may resent being asked) to produce such rough translations. The only alternative to MT is no translation at all.

However, as already mentioned, greater familiarity with *crummy* translations will inevitably stimulate demand for the kind of good quality translations which only human translators can satisfy.

For the one-to-one interchange of information, there will probably always be a role for the human translator, e.g. for the translation of business correspondence (particularly if the content is sensitive or legally binding). But for the translation of personal letters, MT systems are likely to be increasingly used; and, for electronic mail and for the extraction of information from Web pages and computer-based information services, MT is the only feasible solution.

As for spoken translation, there must surely always be a place for the human translator. There can be no prospect of automatic translation replacing the interpreter of diplomatic exchanges. While we can envisage MT of speech in highly constrained domains (e.g. telephone enquiries, banking transactions, computer input, instructions to machinery) it seems unlikely that spoken language translation will extend into open-ended dynamic situations of interpersonal communication.

Finally, MT systems are opening up new areas where human translation has never featured: the production of draft versions for authors writing in a foreign language, who need assistance in producing an original text; the real-time on-line translation of television subtitles; the translation of information from databases; and, no doubt, more such new applications will appear in the future as the global communication networks expand and as the realistic usability of MT (however poor in quality compared with human translation) becomes familiar to a wider public.

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In the context of these recent developments and what we may expect in the near future, the old FAHQT vision as the main ultimate goal of MT activity is no longer appropriate – a new vision (or image, or aspiration) is needed.

In itself, the name ‘*machine translation*’ is misleading. For some, the word machine suggests something old-fashioned: a steam-powered, or electrical device, not an electronic computer. More seriously, however, the word translation is misleading, since what is involved is not translation as commonly conceived; the word *translation* suggests human-level performance. For the general public, translation implies close translation (faithful to the content and style of the original), indistinguishable from native-language text produced by a good human translator. Anything less is open to ridicule and dismissed as ‘non-translation’.

This being so, we should not even claim to be doing translations. In fact, most MT vendors do now stress that their products are **aids**, producing texts that can be improved, and should be improved if they are to be disseminated or published. Nevertheless, it could be helpful if different terminology were available. But what?

I believe that we should stress the communicative function and the status of systems as aids or tools of bilingual or multilingual communication. As a cover term for current and future systems I suggest **cross-language** (or **translingual**) **communication aids**. The emphasis should be on research and development of tools

for communication between different languages, where there is a wide range of different needs and where there are different criteria for judging whether those needs have been met, where the aim is to develop tools and systems that are ‘**useful**’. The usefulness of a system or tool relates to its basic functions and to its aims.

What are the types of systems and aids available now and foreseeable in the near future?

1. *traditional* MT with batch processing where the output quality is improved either by controlling the input (pre-editing or controlled languages) and/or by post-editing (revision by human translators). The context is that of dissemination of (usually technical) documentation where good quality (‘close’) translation is the desired end product, and where human revision is economically acceptable. The MT output is **computer-produced draft translation**.

2. the now *traditional* use of **computer-based translation aids**, primarily by professional users, e.g. bilingual dictionaries, terminology management, translation memories, and in particular translator workstations.

3. aids for assimilating information/documents in other languages (**text assimilation aids** or ‘**gisting**’ aids). This is the traditional use of MT systems for intelligence/surveillance work, for document filtering, and now for scanning Web pages.

4. aids for producing texts in another language (**text production aids**). This is a more recent development. It is represented in particular by

- (a) systems (or aids) for the multilingual generation of technical documents,
- (b) the use of MT systems for drafts of documents in an imperfectly known language (e.g. Systran use by EC officials),
- (c) foreign language authoring software (e.g. to help Japanese authors to write English conference papers)

5. aids for transmitting the essences of messages (where the goal is not close translation of the original message but conveying the essential content): **message dissemination aids**. Examples are the translation of TV captions or subtitles, public announcements (train, bus, public events, etc.), police/security messages, ...

6. aids for **cross-language information access**, i.e. for accessing and retrieving data and information in other languages. This type embraces cross-language information retrieval, (cross-language) information extraction, (multi-language) summarization.

7. Finally aids for supporting **cross-language interchange**. This may be written, e.g. email, informal correspondence, text messaging (hand-held mobiles, short message systems (SMS), etc. Or it may be spoken, e.g. telephone communication (in restricted contexts), hotel and travel booking, military ‘field’ translation, tourist phrase books, business negotiations, ... Future examples might include systems for post offices, airport facilities, travel information bureau, video conferencing, etc.

In most of these (except 1 and 2) the aim is *rough* (but not incorrect or incomprehensible) transmission of basic messages. Only in (1) and (2) is there a requirement for (reasonably *close*) translation and therefore a demand for continuing research and development towards improving MT output.

For the other systems or aids (3 to 7) *translation* is not the most appropriate generic term, rather we should refer to them as aids for cross-language or translanguing communication. It needs to be stressed that we are not developing systems that can achieve this on their own. They are aids for humans to use.

Communication aids (both mono- and bi-lingual) are tools for helping us to improve the effectiveness of our communication, not to replace us. Communication

aids are means not ends; just as human translation is a means and not an end in itself – a means for communicating beyond one language community. We must accept the essential *pragmatic* nature of language: communication takes place within a human community, and depends on context and social knowledge. No computer can emulate human communication, because it lacks human, biological, and societal understanding and experience. Communication rarely demands logical exactitude. It involves emotional appeal, persuasion, threats, entreaties, flattery, etc. which cannot be reduced to logic and reasoning.

With a focus on the development of *cross-language communication aids*, there will necessarily be a greater emphasis in future research on the pragmatics of translation and communication: genre, tenor (social, geographical, temporal provenance), register, mode, communicative stance, politeness, relative status of author and audience, explicitness vs. implicitness, situation dependence, etc. It requires closer attention to the rendition of *functional equivalence* rather than (or as well as) meaning equivalence (i.e. traditional *close* translation). In all these aspects, MT can learn much from studies of human translation processes, of translation in practice and of translation theory; and the beginnings of this is to be seen in the Verbmobil project.

Research needs to focus much more on the study of cross-cultural differences, and in particular cross-language differences in informal language (email, TV captions). The ideal for this type of translangual communication is the production of texts which do not appear to be translations at all, which are just like original texts, with no foreign overtones in language or content. The aim is not close translation but *functionally equivalent communication*.

At the same time, the traditional focus must not be neglected; there is and will continue to be an increasing need for good-quality translation systems (for dissemination). In brief, the future for our field is the development of two basic types of systems/aids:

(a) for producing drafts (or renditions) which can be edited to human-translation quality (computer-produced draft translation, computer-based translation aids, text production aids), in particular systems restricted to specific subject areas and document types.

(b) for producing texts that convey the essence of the original (message dissemination aids, text assimilation aids, cross-language information access, cross-language interchange)

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The principal criteria for assessing systems and aids are already and will be increasingly in the future their usefulness and usability. Systems will be judged not (primarily) by the *quality* of their translations, but by their *usefulness* in achieving the aims they are designed for: the production of drafts for good-quality translations, means for supporting document filtering, aids for communication in a specific context, tools for conveying the essence of messages in pragmatically appropriate manner, and so forth. And systems (and aids) will be assessed for their usability (ease of use), not in the abstract, but in the specific contexts and environments for which they are intended.

In the next decades, we can foresee growing activity in the area of MT and cross-language communication technology.

(a) A widening of the range of languages in areas where they are needed, e.g. most assimilation contexts (text assimilation, cross-language information access, cross-language interchange), but also in translation aids, and in text production aids

(b) A widening in the range of language styles and registers where they are needed (e.g. informal language of emails, letters, telephone interchanges)

(c) Developing translation components for other NLP applications, e.g. information retrieval, document filtering, summarization.

(d) Continuing efforts to improve quality where close translation is desired (e.g. in the development of subject-specific systems for document dissemination)

(e) Concentrating on areas where human translators are not rivals, i.e. real-time, on-line, rapid access, lower-quality.

These are not predictions, but aspirations. As Douglas Adams (author of the *Hitchhiker's Guide to the Galaxy*) has said – quoting someone else (unknown) – “The best way of predicting the future is to invent it.” If we do not want MT prejudices and misunderstandings to continue, then it is in our hands to ensure that in the future our aims and objectives are well understood. In my view, one way of doing this is to develop a new image (or vision) of what we are doing and why. If we do not want our research efforts and our products to become irrelevant or marginalized, then we must know what the users (in particular, the general public) want. As I have stressed here, it is my belief that most of them do not want automatic translators (or FAHQT systems) but aids for effective and appropriate cross-language communication.