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Recent developments in practical machine translation

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A brief survey of progress on operational systems with particular reference to practical use and developments. Aspects covered are word processing, text handling, types of user, comparative analysis of systems, cost and performance evaluations, and experience gained at various levels.

INTRODUCTION

Those of you who attended the 1981 conference Practical Experience of Machine Translation* may have been somewhat surprised to see how much could be said at the time by speakers who in many cases had only very limited experience of practical machine translation (MT). Many must have had their doubts about the usefulness of the systems presented, while others must have been more than just a little sceptical about the potential of MT as an aid to translators.

Today we are to take a new look at the state of the art. As can be seen from the programme, a great deal has happened in the last two years. New systems have been developed, older systems have been improved, more users have emerged and a substantial amount of additional experience has been gained.

Two years ago computers were still regarded by the

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* LAWSON, V. (ed.). Practical experience of machine translation. Proceedings of the third 'Translating and the Computer' conference, London, 5-6 November 1981. Amsterdam: North-Holland, 1982.

general public as rather frightening pieces of space-age equipment to be used by highly specialised experts for performing highly technical tasks. Today, with the explosion of personal computers, word processors, electronic games and fully automated banking systems, people have begun to recognise that machines can in fact perform a whole range of useful tasks which until recently required considerable human effort. Even translators - whose working methods are still generally very similar to those used over the centuries - are now starting to realise that computers can and will play an ever increasing role in their day-to-day work.

INCREASED USE

The growing interest in MT can be seen from a few rough statistics. For example, it would seem that over the past twelve months some 400,000 pages of translation have been run in the production environment - an astoundingly high figure if we consider that up to 600 translators working full-time would have been required to achieve the same level of output using conventional methods.

A total of eleven language pairs are now being offered by the major manufacturers and several more are under development. The most notable additions are perhaps the more exotic language combinations such as Japanese-English or English-Arabic.

PERIPHERAL DEVELOPMENTS

We have already seen how text processing and tele-communications networks can be used to streamline some of the more traditional aspects of translation processing. Acceptance of such aids by translators is to be welcomed, particularly as the processing of machine translation and its growing success are intimately linked to the translator's willingness to make use of word processing facilities. In this context, the editing of raw machine translations on-screen is not to be forgotten.

Perhaps the most important recent development on the practical MT front has indeed been the sophistication of peripherals used to streamline connections between trans-lation software and office systems.

The availability of word processors has led to the development of a variety of text-handling programs for preserving page presentation, enhancing the quality of printouts and ensuring reliable cataloguing and archiving of source and target texts. Simplified menu systems have been

developed for submitting documents and facilitating telecommunications for MT processing, often leading to dramatic improvements in rapidity and ease of operation.

As a result, several systems including ALPS, Logos, Smart and Weidner are now available in bureau service, and others are likely to follow. In addition, some manufacturers have made considerable progress in miniaturising hardware requirements. Most impressive here is the availability of the Weidner system on the IBM and ICL personal computers, but the Logos Corporation should also be congratulated on producing a software package available as an option on Wang office systems. Such developments would have appeared impossible a few years ago, when MT could only run successfully on large mainframe computers.

Such developments should be monitored carefully, as they will not only bring MT facilities to smaller firms and translation agencies but may well provide the means for individual translators to tune into MT through personal computer networks. In addition they will lead to increasing competition between MT suppliers, which will no doubt result in cheaper, more efficient service for the user.

PROGRESS ON VARIOUS SYSTEMS

While the quality of raw MT has steadily improved as systems and their dictionaries have expanded to meet the needs of an ever increasing number of users, there have been few really striking developments in the linguistic approaches to practical MT. By and large the older systems have continued to have the greatest success, but all manufacturers will of course say that their system is the best.

Spanam, based on the Russian-English Georgetown system of the sixties, has been successfully used for translating large volumes of text from Spanish into English and is now being expanded to cover English-Spanish.

Logos, originally developed for English-Vietnamese, is now producing encouraging results for German-English and is available as an option on Wang office systems.

The integrated Weidner system has now been installed at a number of locations and appears to be serving as a useful aid for an increasing number of language pairs.

ALPS, available in five language combinations from English, has achieved considerable success in at least one large translation agency and is now widely available in bureau service through Control Data.

Even the rather elementary Smart system, which unfortunately is not represented here today, has progressed enormously from the point of view of actual usership over the last two years. This system, which aims solely at clear

information transfer, has attracted dozens of new users in North America for its four language pairs (English into French, Spanish, German and Italian), including the Canadian Department of Employment and Immigration and the Caterpillar Corporation. Volumes of up to 900,000 words per month are now being handled with considerable user satisfaction. I am sure we shall hear a lot more about the success of this approach in the months to come.

While the TAUM Meteo system continues to be used by the Canadian government for around-the-clock translation of weather bulletins from English into French, the more ambitious Aviation project has now been completely abandoned owing to the discontinuation of funding. It is difficult to judge whether the system's disappointing performance was a result of the linguistic approach or of the basic software design. One important factor was certainly the cost of dictionary expansion, which was said to amount to as much as $40 per entry compared to less than $5 for most other systems.

On the other hand, two European systems, the French GETA and the German Susy, seem finally to be coming into some kind of practical use. I am told that the GETA system has successfully translated 30,000 words of Russian into French, while the Susy system is undergoing pilot tests at five organisations including the German Patent Office and the European Space Agency. Unfortunately, I have been unable to obtain any user reactions to these systems.

Again in regard to the recent upgrading of second generation systems to the production environment, Siemens has decided to finance extensive German-English development of the METAL system put together by the University of Texas Linguistics Research Center in Austin. I understand that Siemens has already achieved considerable progress and that they feel METAL will provide more acceptable results than Logos, which the company had once been involved in developing. It will be interesting to see how the system performs in a fully operational environment.

As regards Systran, considerable progress has been made on the Japanese-English and English-Japanese systems, which are now available for use from the Systran Japan Corporation. Two new pairs, English-German and French-German, have been developed by the European Commission and will soon be used in production work. Systran Institut, Germany, has been devoting considerable efforts to the English-Arabic and German-English systems, which may well attract customers in the coming months.

Apart from the European Commission's own application, about which we will be hearing more today, Systran has also seen several new users since the 1981 conference, some of them with quite formidable volumes of material for MT

processing. In Europe, the Commission's French-English and English-French Systran systems are now being used by Karlsruhe Nuclear Research Centre (Kernforschungszentrum Karlsruhe) for nuclear documentation, and in France by SNIAS (Societé Nationale de l'Industrie Aérospatiale) for the aviation sector and by CNRS (National Scientific Research Centre) for the translation of a wide variety of documentary databases. The US Air Force has installed Systran French-English for information scanning and Wang Laboratories is using English-French and English-German for translating maintenance manuals. Finally, the Xerox Corporation, which has been using Systran exclusively for translating its own maintenance manuals into a variety of target languages, has now opened up a bureau service for the North American market.

PROBLEMS FOR NEW USERS

A number of problems still face the majority of new users. Not all systems are available for general use, and those that are often require a considerable amount of additional development before they can be brought into effective operation for a new application. By and large manufacturers still tend to oversell their systems, stating for example that MT will quadruple the average translator's normal production, make for consistent terminology and provide an efficient means of producing camera-ready copy.

These claims are to some extent justified. Many users of MT would be prepared to admit to such levels of success but only for certain language pairs and only after having undertaken extensive development work - particularly with regard to terminology - and after learning by trial and error which documents are suitable for MT and which translators or technical editors are ready and able to correct raw MT output.

COMPARATIVE ASSESSMENTS

Another interesting phenomenon is the degree to which present and potential users have begun to compare the results of machine translation by running the same texts through different MT systems or through different versions of the same system. This is now possible since several systems offer the same language pairs. English-French, for instance, is available (in alphabetical order) on ALPS, Smart, Systran, TAUM, TITUS and Weidner, while German-English is available on Logos, METAL, TITUS, and on two versions of Systran.

Unfortunately, the results of such comparisons are

generally based on a number of subjective factors, the most usual being previous experience in the use or development of a system. Translators who have used batch systems such as Logos, Smart or Systran will find it difficult to adapt to the more interactive approach required for ALPS or Weidner. Similarly, if a user has, over the months or years, taken pains to eliminate errors of syntax or terminology from a given system, he will naturally not like to see the same errors reappearing in output from another system. What he might not realise, of course, is that users of the other system would react in the same way to output from his system.

What all this shows is that there is a definite tendency for system developers to base enhancements on the needs of existing users, with little or no concern for as yet unidentified new users. A system, or more correctly, a system's language pair, which has been used primarily for translating computer manuals - and may have indeed been developed for this application - will seldom perform well for the translation of financial or administrative texts which have quite different syntax, terminology and format.

CHOOSING A SYSTEM

Is there then any objective means of judging the cost, quality, suitability and general performance of a system for a new user? Factors which obviously deserve consideration here are:

- the availability of systems for the language pairs in question;
- the cost of installing the system or using it on a rental or bureau basis;
- the present performance of the system for a given subject field;
- the ease and cost of further developing the system to cater for specific needs; and
- the willingness or ability of staff to maintain and use the system in practice.

Last but not least, it is important to establish what level of final quality is required, as MT can often produce good rough translations with only a limited amount of post-editing. Perhaps the best way to obtain this type of information is by consulting existing users in the same or similar fields, in order to assess how much effort they needed to invest before the system could be used successfully in production. Not to be underestimated here are the ease, extent and cost of additional dictionary and general development work

required to adapt a system to a level of quality sufficiently high for post-editors to be able to work more quickly than by traditional methods. Another important consideration is the amount of special training or experience required for handling the human side of the process, particularly in regard to text entry and post-editing.

But all in all, given the fact that computer costs are rapidly decreasing while human costs are steadily rising, the single most important factor to be considered is the extent to which users - particularly translators - have been prepared to adapt to the new approach for routine production work. If translators are prepared to admit that post-editing has resulted in time savings, then the overall benefits will be even higher, as MT can be linked to office systems and communications networks offering sharp reductions in document handling, typing and publication times.

CONCLUDING REMARKS

I am confident that many of these issues will be raised in the papers to be presented today and in the ensuing discussions. After all, what really counts in machine translation is not so much the level of quality achievable by adopting the latest results of linguistics or informatics research, but the extent of the assistance MT can give to practising translators.

The past two years have certainly seen a great deal of practical progress in the use of machine translation, and I am sure that today's exchange of ideas will be of benefit to existing and potential users alike. While a measure of healthy competition between manufacturers and even between users is to be expected, at this stage in the game we all have much to learn from the views of anyone who has had hands-on experience of MT and is able to report on its progress and shortcomings.

With the benefit of today's discussions, I very much hope we shall all be able to meet once again in two or three years' time and report still more success in the use of practical MT and its contribution to multilingual communications at all levels.

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