TECHNICAL EVALUATION

The objective of this theoretical inquiry is to examine the controversial issue of a fully automatic high quality translation (FAHQT) in the light of the past and projected advances in linguistic theory and hardware/software capability. The principal purpose of this study is to determine whether the concept of FAHQT is justifiable as a long range R&D proposition. The study is also concerned with the intermediate range alternatives to FAHQT, i.e., machine translation forms that are adequate to the user's needs with or without post-editing. Machine aided translation, based on the automated dictionary look-up, is excluded from the study in consideration of the fact that this by-product of machine translation R&D is well within the current state-of-the-art.

In the context of FAHQT, "full automation" implies that the entire translation process is autonomous in the computer without pre-editing of the source language text and post-editing of the target language output. "High quality" seems to be undefinable in an absolute sense. In referring to machine translation of 100% quality, Bar-Hillel (1) introduced the following qualification.

> "When I talk about "100%", I obviously have in mind not some heavenly ideal of perfection, but the end product of an average human translator. I am aware that such translator will on occasion make mistakes and that even machines of a general low quality output will avoid some of these mistakes. I am naturally comparing averages only".

Thus viewed, even the concept of 100% quality is not equatable with the error-free performance in either form of translation. Understandably enough, participants and consultants failed to reach a unanimous agreement as to the definition of "high quality" in machine translation. This is reflected on p. 48, quote, "There is apparently no absolute standard. Rather, standards must be defined with reference to specific users and specific purposes". In the absence of absolute and universally valid quality criteria, the user of machine translation can be legitimately considered an ultimate judge of its quality. This viewpoint was first expressed by Reitwiesner and Weik (2) as early as in 1958.

According to Lamb (3), "all translation can be viewed as human translation since machine translation is nothing but another kind of human translation". It follows from this observation that the fundamental constraints on machine translation parallel those imposed on human translation. Assuming the well-known limits of translatability, this seems to imply that either form of translation is a priori constrained. In summarizing the problem of translation equivalence between SL (source language) and TL (target language),

Catford (4) draws the following conclusion.

> "The limits of translatability in total translation are,
> however, much more difficult to state. Indeed, translata-
> bility here appears, intuitively, to be a <u>cline</u> rather
> than a clear-cut dichotomy. SL texts and items are <u>more</u>
> or <u>less</u> translatable rather than absolutely <u>translatable</u>
> or <u>untranslatable</u>. In total translation, translation
> equivalence depends on the interchangeability of the SL
> and TL texts to (at least some of) the relevant features
> of situation-substance".

Ray (5) recognizes the fact that "every translation necessarily
involves some distortion of meaning". However, as is reflected
in his statements below, this deficiency is not only manageable,
but even unimportant in the practice of translation.

> "The translation operation is, like the limit operation,
> possible only under such conditions as "sufficiently" and
> "arbitrarily", that is, only by the exercise of some
> evaluative judgement, however little. Since distortion
> of meaning cannot be avoided, the problem becomes one of
> confining it to allowable measures of allowable kinds in
> allowable places along allowable directions".

> "..., while no two languages will match exactly in the total
> range of possible discourse, there are infinitely many
> specific limited ranges of discourse where the distortion of
> meaning can be legitimately dismissed as of no account".

The feasibility of FAHQT must be, therefore, considered within
the limits of translatability, i.e., taking into account the
constraints on the total-translation. Since the concept of
high quality is untenable in the absolute sense, the question of
<u>what</u> is feasible in the context of FAHQT is quite probably more
meaningful. It would be patently unreasonable in this stage of
R&D to postulate machine translation requirements beyond the
limits of translatability imposed on human translation.

Machine translation research, based on puristic notions and
oriented toward a global solution, was once compared to a search
for the Holy Grail. This all-or-nothing attitude has probably
caused as much damage to the progress of machine translation
research as the early announcements of quick and easy solutions.
Perfectionists in this area have generally tended to ignore the
injunction by Lecerf (6) that "entreprendre la mise au point
d'ensembles de traduction automatique, c'est avant tout accepter
<u>la contrainte du reel</u>".

According to Ljudskanov (7),

> "The widespread so-called 100 percent approach, along with
> the belief that MT presupposes the presence of a complete
> mathematical model of language in general and of the
> specific languages in particular, in practice amounts to
> equating the nature and extent of the knowledge of language
> in general, which is necessary from the point of view of
> theoretical linguistics, with the extent of knowledge
> necessary for the achievement of translation from one
> language into another. This approach also amounts to
> equating the description of communication in general with
> that of the translation process; it ignores the specific
> characteristics of the process as mentioned above and the
> general linguistic problems of the theory of translation
> (both HT and MT) in the general problem area of mathematical
> linguistics".

> "....it can be asserted that the current critical state of
> MT research throughout the world, although much has happened
> that legitimately causes well-grounded anxieties and doubts
> as to its possibilities, is due to a certain degree to the
> maximalistic tendencies, however laudable they may be in
> themselves, of the global strategy. By giving due considera-
> tion to the particular characteristics of the translation
> process and of its study, as well as to the differentiation
> of the aims of mathematical linguistics from the theory of
> MT and of the fields of competence and performance from
> each other, research in this field would be channeled in a
> direction both more realistic for our time and more closely
> in accord with the facts".

The report highlights on p.4 an important, but often ignored,
difference between scientific and technical translations and
translations of literary and religious texts, in spite of its
importance from the viewpoint of machine translation requirements.

> "Even articles and monographs dealing with machine translation
> have failed to be adequately explicit about the special
> problems of translating technical and scientific materials
> by computer. Instead, they have confused the problem by
> comparing machine translation with the long-practiced human
> translation, by equating the problems of translating
> scientific materials with those involved in translating
> literary materials, and by using the same evaluation
> criteria for the results".

It is now a commonplace that the style of writing is of paramount
importance in literary translation, whereas the accuracy con-
stitutes the most important quality criterion in scientific and
technical translations. According to Gingold (8),

> "It is not the translator's job to abstract, paraphrase, or
> improve upon the author's statements. He cannot be expected
> to convert an article that is poorly organized and badly
> written in the original language into a masterpiece of English
> scientific writing. In technical translation, he must always
> be willing to sacrifice style on the altar of accuracy".

Savory (9) has expressed a similar opinion in his statement that
"the translation of scientific work is an ideal example of
translation of a writing in which the subject matter is wholly on
the ascendant and the style is scarcely considered".

The report further emphasizes the crucial importance of timeliness
in production of scientific and technical translations. According to
the statement on p. 5, "...timeliness is of increasing importance
to users of scientific translations. Even in a relatively unhurried
field like linguistics, few articles retain their importance over a
long period. Statements have been made repeatedly about the
obsolescence of publications issued a few years earlier. The
insistence among technical specialists and scientists for speedy
translation contrasts markedly with the length of time permitted
for completing literary translations". The requirement of timeliness
was stressed elsewhere by Gingold (10), quote, "The delay between
the appearance of the original journal and its English translation,
which may be a year or more, is also a disadvantage, particularly
to industry, where time is usually of great importance".

The principal findings of the study, as related to its objectives,
can be summarized as follows.

Computer hardware is no longer considered a crucial problem in
machine translation. "Remarkable improvements, especially in
rapid-access storage devices, have largely eliminated the problems
caused by inadequate computers. Lexical items can now be retrieved
as rapidly as were the major syntactic rules a decade ago. And
with further improvements of storage devices in process, computers
no longer pose major problems in machine translation". (p. 12).
Developmental prospects in this area are very bright indeed,
particularly with the advent of holographic memories. The impact
of such memories on both linguistic and computational aspects of
machine translation R&D is discussed in detail by Stachowitz in
one of his contributions to the report ("Requirements for Machine
Translation: Problems, Solutions, Prospects", pp 409-532). This
contribution is considered significant because it provides a
complete blueprint for a realistic implementation of a large-scale
machine translation system.

Equally encouraging is the appreciation of advances in computer
software. "Programming has evolved as rapidly as have computers...
A key factor here was the enrichment of programming language data
types which made possible efficient representation and manipulation
of linguistic structures". (p. 13).

The report reflects a unanimous agreement of participants and
consultants that "the essential remaining problem is language"
(pp 14-15). It is, therefore, not surprising that linguistics
has received much more attention in the study than computer
hardware and software. Recommendations presented on pp 49-51
are exclusively oriented toward linguistic research in the
context of machine translation.

The report points out that there is "no conflict between specialists
in descriptive linguistics, linguistic theory and machine transla-
tion... As descriptive linguists improve their understanding of
language, and the models by which to express that understanding,
machine translation specialists will update their procedures and
models".(p. 24). However, the report also reflects a difference
of opinions between machine translation experts and linguists as
regards the nature, orientation and scope of linguistic research
involved in machine translation. It is further worth noting that
some linguists participating in this study have not acknowledged
Ljudskanov's caveat about "maximalistic tendencies of the global
strategy".

The reader is referred to Conclusions (pp 45-48) and Recommendations
(pp 49-51), summarizing the results achieved in performance of this
study. Recommendation of support for research in machine transla-
tion is based on the fact that "quality translations can be
achieved in the near future. This recommendation agrees strikingly
with conclusions reached in a study carried out in the Soviet
Union". (p. 49). Galilei's challenge ("Eppur si muove!"), aptly
chosen as a motto in the Introduction to (11) by Kulagina and
Mel'chuk, would be equally appropriate as an expression of views
and sentiments embodied in the main part of this report.

ZBIGNIEW L. PANKOWICZ
Technical Evaluator

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