

COMPUTER TRANSLATION : A DIFFERENT APPROACH

In recent years a number of nations have spent literally millions of dollars on automatic machine translation projects. Now that almost all of these projects have been abandoned it may seem gratuitous to describe them as naive and illconsidered but, at least in retrospect, it is difficult not to feel that they reflect a failure to appreciate the difficulty of the task, that they were undertaken partly at least simply because the computer was available, and that they represent yet another typical misuse of its very considerable capacities. But that dream is now almost dead and we are perhaps ready for a more realistic approach to this problem. With this in mind we here offer a very general description of a program developed in 1973⁽¹⁾ and known as PROTRAN for *PRO*visional *TRAN*slation. It attempts much less but has the considerable merit of actually attaining its goal which is simply that of assisting the translator in his very difficult task. Our work was done with quite primitive equipment but obviously can be carried out even more easily using more up to date hardware.

This program was first used to translate Ib Ostenfeld, *Søren Kierkegaards Psykologi* from Danish into English. The original, running to only 79 pages, was first published by Rhodos in Copenhagen in 1972 and the translation is expected to appear as the first volume of a new

Kierkegaard monograph series. The present report employs examples from this application throughout. Figure 1 shows five sample lines from the original text and Figure 2 the computer version of the same. Figure 3 gives a short excerpt from the dictionary while Figure 4 provides an example of the final computer printout. Figure 5 shows the finished translation of these same lines.

The first step in this very simple method was to keypunch the text as it appears in the original but, as shown in Figure 1, with line numbers and without carry over hyphenation. Some of the conventions employed, for example, for some punctuation and for special Danish vowels, are quite arbitrary and hence of little interest but some at least can be deduced by comparing Figures 1 and 2. It is however perhaps worth noting that capitalization is indicated at the end of the word with an asterisk (or other such character) to simplify the problem of alphabetization.

The second step was to have the computer produce an alphabetized list of all word-types in the text together with their frequencies. This was output on hard copy for checking and on punch cards in preparation for the next step. The words were punched on the card left-justified beginning in column 1 and the frequencies right-justified beginning in column 27 as shown in the left part of Figure 3.

The next step was to create a Danish-to-English dictionary for the computer. This involved identifying and ordering the various probable English translations of these words and punching them on the appropriate card beginning in columns 30, 45, and 60, where necessary

with more than one word in a field. In making these decisions we kept in mind the character and style of the work and the fact that it was a psychiatric study. Thus, for example, we decided that "af" was more likely to be used in the sense of "of" than of "out of", that "saa" would usually be used in the sense of "so" rather than "saw", "there", or "that", etc., and ordered and punched these words accordingly. Of course, the order or, for that matter, the translations themselves could easily be changed for, say, a text in geography where other senses of these words are likely to be most common. For a small project such as the one we are describing this is perhaps most easily done by repunching the relevant cards but for work is part of a continuing project such changes could perhaps be done as part of the program.

The fourth step was to have the computer produce its final printout which spaces out the Danish words and prints their alternative translations directly under each as shown in Figure 4. Finally, of course, the last step is to go through the printout selecting or, more probably, creating the best possible translation. Sometimes this involves rejecting all the suggested words but there are relatively few cases in which the meaning of the original cannot be immediately grasped simply by scanning these substitutions.

It is obvious that the computer printout itself yields only a literal and completely wooden translation and that our method does not cope with such difficult problems as idioms, figures of speech, etc. But it is equally obvious that, accepted for what it is, it has a number of important advantages. The reader will no doubt see some of

these for himself but we note others which may not be so obvious.

Even the user who has only a rudimentary knowledge of the original language can use this method to gain a first-hand impression of the contents of a work and, if it proves interesting, to make a rough or provisional translation. Certainly it will enable such a person to gain a good understanding of the text without the necessity of constant and repeated recourse to the dictionary. Despite this, it has actually proven an excellent way of learning vocabulary and, as Figure 5 shows, can help such a person to produce an entirely acceptable finished translation.

But it can also be useful even for those who are relatively familiar with both the original and target languages. By presenting all probable translations of each word at one and the same time it enables such a person to see all the possibilities and discover the intended sense much more quickly and accurately than he could without such assistance. Further, it can help him to maintain consistency in his finished work. Of course, the same word should not always be translated in the same way but the printout reminds the translator of his own "specified" or "standard" translations and thus helps him to see whether one of these or some other word is most appropriate. Indeed, given this method, it is a simple matter to index any number of words in the original and thus be able to check and compare all instances of their translation. Thus the method is a tool which can bring a new level of consistency and self-consciousness to the art of translation.

Finally, this method has one other advantage which can be indicated yet more simply. All the computer operations in the original project described above were completed on a total budget of less than fifty dollars.

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NOTES

- (1) This work was done at the University of Edinburgh where Bondesen was working in the Department of Linguistics and McKinnon was an Honorary Fellow in the Institute for Advanced Studies in the Humanities. The actual programming was done by Neil Hamilton-Smith of the Edinburgh Regional Computing Centre.

Disse faa Bemærkninger om Kierkegaards Stil skulde med tilstrækkelige Argumenter have overbevist om, at Forfatterskabet ikke paa noget Tidspunkt røber Tegn paa, at han producerede i nogen sygelig Sindsforfatning, end mindre at han producerede som han gjorde paa Grund af en saadan Forfatning. Vi maa redde Kierkegaards Forfatning.

Fig. 1. Sample Lines (ll. 20-25, p. 26) of Original Danish Text

20 DISSE* FAA BEMÆRKNINGER* OM KIERKEGAARDS* STIL* SKULDE
 21 MED TILSTRÆKKELIGE ARGUMENTER* HAVE OVERBEVIST OM, AT FORFATTERSKABET*
 22 IKKE PAA NOGET TIDSPUNKT* RØBER TEGN* PAA, AT
 23 HAN PRODUCEREDE I NOGEN SYGELIG SINDSFORFATNING*. END
 24 MINDRE AT HAN PRODUCEREDE SOM HAN GJORDE PAA GRUND* AF
 25 EN SAADAN FORFATNING*. VI* MAA REDDE KIERKEGAARDS* FORFATTERY*

FIG. 2 COMPUTER VERSION OF SAMPLE LINE:

DIGTEREN*	1	*THE POET	
DIGTERISKE	3	POETICAL	
DIGTERS*	1	THE POET'S	
DIGTERSIND*	1	*THE MIND OF	THE POET
DIGTNING*	2	POETRY	
DILEMMA*	1	DILEMMA	
DIREKTE	1	DIRECT	
DIRIGERE	1	CONDUCT	
DIRIGERER	1	CONDUCT	
DISCRIMIN	1	DISCRIMINATION	
DISKONTINUERLIG	1	DISCONTINUOUS	
DISKONTINUERLIG	1	DISCONTINUOUS	
DISKONTINUITET*	1	DISCONTINUITY	
DISKUSSION*	3	DISCUSSION	
DISSE	20	THESE	

FIG. 3 EXCERPT FROM DANISH-TO-ENGLISH DICTIONARY

20	DISSE*	FAA	SEE RAJINDER*	OM	KIERREGARDS*	STIL*	SKULDE
20	THESE	GET	THE REMARKS	ABOUT OF		ATYLE	SHOULD
20		FE*		ON IN			
20				BY IF			
20							
21	VED	TELSTR. KPELIGE	ARGUMENTER*	HAVE	OVERHEVIST	OM	AT
21	WITM BY	SUFFICIENT	ARGUMENTS	HAVE	CONVINCED	ABOUT OF	TO
21	IN TOO	ENOUGH				ON IN	THAT
21						BY IF	
21							FORFATTERSKABET*
21							AUTHORSHIP
22	IKKE	FAA	NET	TIDSPUNKT*	RIBER	FAA	AT
22	NOT	ON OPIN.	NOPE	TIME	REVEALS	ON UPON	TO
22	NO	IN AT	A LITTLE	MOMENT	SIGN	IN AT	THAT
22		IN	BY			IN	
22							
23	HAR	PROJGEMME	I	NOGEN	SYGELIG	SINDSFORFATNING*	END
23	ME	PRODUCED	IN	IN SOME	SICKLY	STATE	THAN
23			AT	ON ANY	MORRID	OF MIND	
23				AT SOMEONE	UNHEALTHY		
23							
24	SINDRE	AT	HAR	PRODUCCERED	SOM	GEORGE	GRUND*
24	SMALLER	TO	ME	PRODUCED	WHO	DID	REASON
24		THAT			AS	IN AT	WITH
24						IN	OUT
24							OF BY FROM FOR
24							REASON
24							WITH
24							OUT
24							OF OFF
24							
25	EN	SAAKJ	FURFATNING*	VI*	WEDDE	KIERREGARDS*	FORFATTERSKABET*
25	A	SO	CONCUSSION	ME	SAVE	REPUTATION AS A	WRITER
25	AM	SUCH	CONSTITUTION		RESCUE		
25	ONE	IN THIS WAY					
25							

20	DISSE*	FAA	BEV. KKAJIDIGER*	OM	KIERKEGAARDS*	STIL*	SKULDE	
20	THESE	GET	THE REMARKS	ABOUT OF		STYLE	SHOULD	
20		FEW		ON IN				
20				BY IF				
21	VED	TILSTR. KPELIGE	ARGUMENTER*	HAVE	OVERBEVIST	OM	AT	FORFATTERSKABET*
21	WITH BY	SUFFICIENT	ARGUMENTS	HAVE	CONVINCED	ABOUT OF	TO	AUTHORSHIP
21	IN TOO	ENOUGH				ON IN	THAT	
21						BY IF		
22	IKKE	FAA	NOGET	TIDSPUNKT*	TEGN*	FAA	AT	
22	NOT	ON UPON	SOME	TIME	SIGN	ON UPON	TO	
22	NO	IN AT	A LITTLE	MOMENT		IN AT	THAT	
22		IN	ANY			IN		
22								
23	HAN	PRODUGEREDE	I	NOGEN	SYGELIG	SINDSFORFATNING*	END	
23	HE	PRODUCED	IN	SOME	SICKLY	STATE	THAN	
23			ON	ANY	MORRID	OF MIND		
23			AT	SOMEONE	UNHEALTHY			
23								
24	MINDE	AT	HAN	PRODUGEREDE	SOM	IPAA	GRUND*	
24	SMALLER	TO	HE	PRODUCED	WHOM	ON UPON	REASON	
24		THAT			AS	IN AT		
24						IN		
24						IN		
25	SA	SAADAN	FUMFATNING*	VI*	MAA	VEDDE	FORFATTERY*	
25	A	SO	CONDITION	ME	MAY	SAVE	REPUTATION AS A	
25	AN	SUCH	CONSTITUTION		MUST	RESCUE	WRITER	
25	ONE	IN THIS WAY			HAVE TO			
25								

Fig. 4. Final Printout of Sample Lines

The arguments contained in these few remarks on Kierkegaard's style should have convinced the reader that his literary production shows no signs that he wrote from an unhealthy state of mind and, even less, that he wrote because of such a state. We must free Kierkegaard's reputation as a writer ...

Fig. 5. Finished Translation of Sample Lines.