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CAN MULTILINGUALISM BE SIMULATED?

Abstract:

The term “multilingualism” is often used to mark one of the human social and existential behavioral conditions produced especially by experiences of migration and displacement, but also by special intensities of education. To the extent that it stands in contrast with “monolingualism” as marking the state-managed sovereignty of a nationalized standard, or written dialect, “multilingualism” is also often used to mark the violation of de jure or de facto state-managed codes for public (and certain forms of private) communication, including those employed in and for the regulation of both labor and education. If “multilingualism” is in some ways thus often imagined as a litmus test for what we might call the humanity of a state exercising its monopolies of both knowledge and force, it might be worth considering the question of whether multilingualism can be simulated, as the spoken and written production of the state-managed code itself can now be simulated by software. For the fact is that multilingualism has long been simulated, in this way, in and as the unintended and unwanted mark of failure in efforts to computerize human communication. Such “simulated” multilingualism ought to be understood as a product not of the complexity of human social life as such, but rather of interesting breakdowns in the use of computers to manage that complexity, particularly the complexity of linguistic confusion.

Keywords:

simulation ♦ machine translation (MT) ♦ Delavenay ♦ computational linguistics
♦ artificial intelligence (AI)

I.

Considering the history of culture (in the broadest sense) alongside the history of a culture *of* culture, or ideas about culture, it is clear that like anything else worth thinking about, what we call “multilingualism” appears as a given on one plane of recorded history, and as a question, a problem (or solution to a problem), and a “problematic,” on another. This essay concerns the history of one attempt to produce a solution to multilingualism understood as a problem, in the history of the idea of machine translation (hereafter “MT”). It is in machine translation as both “modernology,” in the optimistic quest for limitless scientific and technological progress, and an occasion for such modernology’s disappointment or discontents, that I am interested.

I propose to consider the question “Can multilingualism be simulated?” Today, the term “multilingualism” is often used to mark one of the human social and existential behavioral conditions produced especially by experiences of migration and displacement, but also by special intensities of education. To the extent that it stands in contrast with “monolingualism” as marking the state-managed sovereignty of a nationalized standard or written dialect, “multilingualism” is also often used to mark the violation of de jure or de facto state-managed codes for public (and certain forms of private) communication, including those employed in and for the regulation of both labor and education. If “multilingualism” is in some ways thus often imagined as a litmus test for what we might call the humanity of a state exercising its monopolies of both knowledge and force, it might be worth considering the question of whether multilingualism can be simulated, as the spoken and written production of the state-managed code itself can now be simulated by software. For the fact is that multilingualism has long been simulated, in this way, in and as the unintended and unwanted mark of failure in efforts to computerize human communication. Such “simulated” multilingualism, as I will term it, ought to be understood as a product not of the complexity of human social life as such, but rather of interesting breakdowns in the use of computers to manage that complexity, particularly the complexity of linguistic confusion.

II.

Die CONVINCINGE CRITIQUE des CLASSICALen IDEA-OF-PROBABILITY IS eine der REMARKABLEen WORKS des AUTHORs. Er HAS BOTHen LAWE der GREATen NUMBERen ein DOUBLEes TO SHOWen: (1) wie sie IN seinem SYSTEM TO INTERPRETEn ARE, (2) THAT sie THROUGH THISE INTERPRETATION NOT den CHARACTER von NOT-TRIVIALen DEMONSTRABLE PROPOSITIONen LOSEen. CORRESPONDS der EMPLOYEDen TROUBLE? I AM NOT SAFE, THAT es dem AUTHOR SUCCEDED IS, den FIRSTen POINT so IN CLEARNESS TO SETen, THAT ALSO der UNEDUCATED READER WITH dem DESIRABLEen DEGREE-OF-EXACTNESS INFORMS wird ... (Yngve 1955, 211)

The preceding text is the product of an experimental “mechanical translation,” from German into English, of a scholarly review of a book on a topic in mathematics. It was reproduced in an essay by Victor Yngve included in a volume entitled *Machine Translation of Languages: Fourteen Essays*, published in 1955 and containing revised versions of papers presented at the first international conference on machine translation convened at the Massachusetts Institute of Technology in 1952. Much of what we now know as computational linguistics and artificial intelligence has its origins in early work on machine translation, and we might say that in many ways, much of that early work was driven by the profoundly cultural power of speculation, in the imagination of fully automated natural language processing and production, sufficiently accurate to pass the so-called “Turing test” by persuasively simulating the discourse of a human being in a particular national grapholect, or standardized written dialect.

Plainly, the process that produced this text has no hope of doing *that*. Yet in the period 1949 to 1966, especially in the United States and the UK, both enthusiasts and skeptics described fully automated high-quality machine translation in positively mythic terms, as a “holy grail”: a phrase used frequently in the literature of the period, marking the ideal of entirely computerized translation, of sufficient quality in both correctness and style, as to require no human

preparation of the source text and no human editing of the target output. This dream—it really is a dream, even today—had its own acronym in the literature: FAHQT, or Fully Automated High Quality Translation.

Yngve's essay was entitled "Syntax and the Problem of Multiple Meaning," and it's a good example of work on MT balancing speculative optimism with pragmatism and a sense of humor in dealing with obstacles. For various reasons, including real hardware limitations, much of the earliest work on MT had focused on crude word-by-word dictionary translation, and Yngve's essay performs a mediation of conflict between the theoretical and "perfectionist" MIT approach, for example, devoted to the long-term goal of FAHQT, and the empirical and operational approach of Erwin Reifler's research group at the University of Washington, which merely sought to produce usable translations (see Reifler 1955 and Reifler 1967). Yngve began by observing what he called the "remarkable fact that most of the languages of interest for mechanical translation divide a section of discourse, such as a sentence, into about as many words as English does." "Furthermore," he continued, "words of various languages can be found that have substantially the same meaning as certain English words." For this reason, he suggested, "word-for-word translations are surprisingly good – tantalizingly good"; and we might as well take them as an acceptable first step (208).

Noting, however, that any given input word may have several meanings in the output language (208), Yngve admitted that polysemy, especially "conspicuous" to the translator, is an issue in "nearly every spoken or written utterance" in so far as meaning in natural language is profoundly dependent on context. This, he explained, had led him to think of context as a kind of repository for "information necessary for the resolution of the multiple-meaning problem," to be extracted from that repository. Hypothesizing that the sentence was the proper unit of analysis, since it is likely to contain "enough information to resolve most of the multiple-meaning problems" (209), Yngve described an experiment in the "partial translation" of a book review in German into English (Yngve 210), conducted manually using index cards to build up a dictionary of

German-English word equivalents. Rather than concealing the “grammatical meaning” of the German original with an imperfect translation, Yngve explained, this partial translation left German word order and grammatical particles (including inflectional word endings) intact, in the output:

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(211)

Yngve observed that “people who knew a little German grammar, after they had recovered from their mirth, demonstrated that they were able to understand quite well and fairly rapidly what was being said,” while those who knew no German at all “were able to grasp only the subject matter from the translated stems,” and not much else. This, he concluded, suggested that a viable solution to the translation of “grammatical meaning” is needed. Meanwhile, because, as he put it, “slight knowledge of the input language helps the reader a great deal,” it was desirable for those who would need to read MT output to obtain basic grammatical and syntactic knowledge in the source language, through a “brief introductory course” (212).

Yngve thus points quite directly to the irreplaceability of language acquisition, even (or especially) in working with MT implementations. As something that threatened to place strong limits on researchers’ claims, this issue served as something of a third rail or electrified fence for MT research, forming an almost entirely “absent presence,” so to speak, in the professional discourse—at least until it was addressed explicitly in the infamous Automatic Language Processing Advisory Committee (ALPAC) report of 1966, which directly produced the nearly complete collapse of research funding for MT (see ALPAC). Nevertheless—and however it may have been tempered by such realism—Yngve’s confidence in solutions to the problem of “grammatical meaning” and the “multiple-meaning problem” reflects well the technocratic optimism of the time.

III.

No one registered that optimism better than Émile Delavenay, a scholar of D. H. Lawrence and head of UNESCO's Department of Documents and Publications, in a slim volume, self-translated from the French, entitled *An Introduction to Machine Translation* and published in 1960.¹ With machine translation, Delavenay argued in this work, we face not a new technology so much as "a new analysis of linguistic phenomena, particularly of discourse, with a technology of language, made possible by the application of electronics to the signs in which thought materializes in the form of language" (Delavenay 1960, 1). The atomic age was emphatically and uncontrovertibly an age of science, Delavenay reminded his readers, and "automatic translation corresponds to a real need of our time," allowing scientists access to scientific work in other languages made "available in real time" (3).

The atomic age was also a post-imperial age of nationalism, Delavenay noted, comprised of new nations eager to ground national cultures in vernacular languages and at the same time to assert their contributions to a "universal culture." Such nations, Delavenay predicted, would demand translation not only of science textbooks and literacy readers, but "the great works of world literature" as well (3). Nevertheless, given that, as Delavenay put it, linguists and literary scholars were "held in the leading strings of a historical and literary training which continues to direct the study of language towards the traces of the past rather than towards the possibilities of the future," it would need to be scientists leading the way, if any real progress were to be made (3). MT, Delavenay asserted, will focus on actually existing language behavior, rather than on the history of languages: "without wishing to offend the classicists, the problems requiring solution today are those of quantity and speed" (7).

Delavenay did explicitly distance himself from Warren Weaver's early imagination of translation as cryptanalysis (see Weaver, "Foreword" and Weaver, "Translation"), observing that the latter operates within the bounds of a given natural language common to both sender and receiver of a message, whereas "[t]ranslation from one language to another requires something else

altogether" (8). He was also careful to note that information theory would be useful to MT work, but that "the originality and individual nature of discourse" limits the application of statistical laws to documents composed in natural languages (9), and that computers themselves cannot *use* human languages, but only process data as unambiguous binary code values. Programming, he emphasized, occurs in "a world of strict conventions from which ambiguity or possibility of interpretation are excluded [...] Everything in this system is predetermined and inhuman" (16). Binary code, encoding input in the form of human-readable signs, is turned back into human-readable signs only at the end of the process; it is not a language in any case, and this process is a kind of "hieroglyphic conversion" (52). "[I]t is important to remind ourselves of this fundamental difference between human language and what has been called, by extension and by analogy, machine language" (23). Delavenay argued nevertheless that *some* human mental operations consisted of little more than mechanical tabulating operations, and that electronic computers could perform logical operations as well as arithmetic calculations, thus giving them the power to mimic a limited subset of human mental behavior and to do it with much greater speed and greater flexibility than a human being. This, he argued, represented the computer's great potential, not as a replacement for human cultural activity so much as its prosthetic supplement.

By 1960, MT research had gathered confidence, discarding its relatively modest early ambitions for limited word-by-word or "dictionary" translation for a new, comprehensive (and in some ways metaphysical) ideal of FAHQT, or what Delavenay called "completely automatic, grammatically correct translation" (32). Erwin Reifler, for example, abandoned his earlier argument that a human pre-editor would always be necessary to prepare text for MT (see Reifler 1955), and papers presented at the MIT conference of 1956 suggested that advances in computing would, as Delavenay put it, "shortly make it possible to extract from conventional writing, without complementary signalization, all essential grammatical information" (36).

The “philosopher’s stone of machine translation,” Delavenay noted, is the idea of an interlingua, imagined sometimes as determinable a posteriori from the analysis of existing languages, and at other times as conceivable a priori and programmatically, as part of a “universal translation programme applicable to all languages” (47). Soberly (if also presciently), Delavenay described “multilateral” (multilingual) programs for universal translation using an a priori interlingua as impracticable for the moment, suggesting that they would probably need to be built on a “bilateral” (bilingual) programs using a posteriori interlinguas (66). A chapter on syntax and morphology mentions Yngve, including the mixed German-English text that Yngve provided in “Syntax and the Problem of Multiple Meaning.” Apropos Yngve’s conclusions, Delavenay noted that there exist phrases in English, such as “the King of England’s Empire,” that would always be “enigmatic to the machine,” since they provide insufficient context for resolving polysemy (the empire of the King of England, or the King of the empire of England?). “In such cases,” Delavenay concluded, “a reviser must remain the only final resort” (79). However, given that it is slower to change than lexis, syntax presented a problem “relatively limited in scope,” not at all unmanageable within the limits of 1960s-era data storage capacities (80). The same could not be said for vocabulary, the subject of a chapter entitled “Lexical Problems of Automatic Translation,” representing a more extensive if less complex challenge than that of syntax. As a “fossil” or “vestigial” unit of meaning originally an analytical expression, but no longer permitting of treatment as such, idiom “introduces an extra-linguistic element into language,” the cultural context of meaning. Cultural context, Delavenay opined confidently, presented no great problem where scientific prose was concerned – though both everyday language and literary prose represented another matter (89).

This is the first meaningful mention in *An Introduction to Machine Translation* of literature and literary language, on which Delavenay mused with profound ambivalence for most of the book’s remainder. On the one hand, as he saw it, there was some intractably “genuine polysemy” in human uses of language, with which even highly skilled human translators struggle, and we could not expect MT to do any better (90). On the other hand, polysemy *can* be modeled

probabilistically, which might certainly help MT implementations to learn to choose the most likely meaning (for example, by comparing the frequency of use of the French *temps* to mean “time” with the frequency of use of *temps* to mean “weather”) (94). Already, Delavenay insisted, we can dispense with post-editing MT output intended for use within a “restricted circle of interested specialists” who already share a common professional language (104). As MT advanced still further, translators would be able to shift labor to the preparation of input or revision of output for use *outside* such restricted circles, helping to disseminate science across individual fields of interest, linking across the division of scientific labor and facilitating creative thinking and “cross-fertilization of minds” (105). In the long term, building on Reifler’s work in comparative semantic studies, along with that of the Cambridge Language Research Unit (which had derived a numerical system from the hierarchical taxonomies of Roget’s thesaurus), for example, and working from the most precise natural sciences all the way down to the human sciences and the arts, it might be conceivable to expand computational lexis to encompass all those images and figures of speech that represent “traps set by non-Cartesian thought on the path of all translation which seeks to be exact and faithful” (99). Regardless of the extent of its success, such an undertaking, Delavenay noted, would by itself serve to correct the inspecificity of the human sciences, in which researchers too often “tend to confuse language the tool of their analysis, with language the object of their study, because the subject of their work has no material being other than in words” (100). Indeed, from here it is conceivable to undertake still “bolder enterprises,” integrating even literary prose into a “general logical classification of knowledge,” given that its difference from scientific prose is really a difference “not of kind, but of degree” (101). The end result might be a universal “atlas of meanings” for any given language, every bit as useful to literary researchers as to scientists (102).

Delavenay’s justifications for such an undertaking tended to oscillate between appeals to efficiency and threats of consequence for those left (or staying) behind. Just as electronics have freed us from the mechanical repetitive calculation tasks of accounting, he reasoned, the automation of translation will free professional translators for “more productive work than that of run-of-the-mill translation,”

while the specifically *literary* translator (often, Delavenay noted, a highly creative person) will, once freed of such drudgery as attends even his or her form of work, find new creative energies. Taken as a whole, literary research itself, Delavenay scolded in a tone worthy of the “digital humanities” evangelists of a half-century later, “cannot afford to neglect” the new methods of contextual and structural analysis of text offered by some of the linguistic research contributing to MT. “It is no longer a case of a work of laborious scholarship undertaken by one man at the beginning of a lifetime of patient work: there must be a new division of labor, with a hierarchy for the formulation of exact rules to be strictly applied by all [...] literary research will have to become collective, as scientific laboratory research already is” (113).

In the end, Delavenay considered, it was not too soon to imagine MT of literary prose, the translation of which serves as “a bridge between different cultures” (107). We can even imagine MT producing a *desirable partial* translation that for the sake of fidelity to the original’s “local color,” deliberately leaves some words untranslated in, for example, a French translation of a novel written in Hindi (107). Even when it came to “a question which has long lain in wait for us,” the question “Will the machine translate poetry?,” Delavenay pronounced that we should imagine “only one possible reply – why not?” (109). For the fact was that “from the Cartesian absolute of metalanguage to the mystic absolute of pure poetry, there are differences not of kind but only of degree” (110), and it was entirely conceivable that computers will one day compose poetry capable of producing “the fleeting thrill of human emotion” (112). We are currently freeing ourselves from our taboos on such possibilities, Delavenay concluded; “the rest is a matter of technique only” (116).

A postscript to *An Introduction to Machine Translation* noted that, at the 1959 UNESCO conference on information processing, Delavenay had prepared a French-to-English machine translation of a Foreword composed in French and intended for the English edition of the book, using an IBM 704 at IBM’s Paris headquarters, while an appendix provided facsimile text of the French input and English output, comparing it with a manual word-for-word Russian version and

an English MT of this Russian version performed by another IBM 704 at the Ramo-Wooldridge Corporation in Los Angeles.

IV.

In closing, I want to return to the text presented by Yngve with which I began, which is the prototype, in so many ways, of the kind of *residual* computational, rather than spontaneous social, multilingualism that MT makes possible, of which the English output of Delavenay's machine-translated preface serves as another example. In my *In Babel's Shadow: Multilingual Literatures, Monolingual States* (Lennon 2010), I proposed that we consider what might be at stake in comparing such texts with, for example, the following passage from Christine Brooke-Rose's 1968 novel *Between*:

Und since man spricht sehr little Deutsch unlike my clever sweet half born and bred on Pumpernickel, man denkt in eine kind of erronish Deutsch das springt zu life feel besser than echt Deutsch. Und even wenn mann thinks AUF Deutsch wann man in Deutschland lives, then acquires it a broken up quality, die hat der charm of my clever sweet, meine deutsche mädchen-goddess, the gestures and the actions all postponed while first die Dinge und die Personen kommen. As if languages loved each other behind their own façades, despite alles was man denkt darüber davon dazu. As if words fraternised silently beneath the syntax, finding each other funny and delicious in a Misch-Masch of tender fornication, inside the bombed out hallowed structures and the rigid steel glass modern edifices of the brain. (Brooke-Rose 1968, 446-7)

One of the things I found myself doing, in that book, was speculating about what is similar and what is different about these two different kinds of texts, beyond what is merely obvious. One – Yngve's, Delavenay's – is a prototype of the kind of incompletely translated output that an ordinary civilian, at least, will sometimes obtain from even the best freely available non-specialized machine translation engines today, even if of course it's no longer going to be quite so crude. As such, we might want to say that it marks a gap between the algorithmic computational processing and human uses of language, and that it

thus represents a kind of “simulated” multilingualism – a word I’m using both in the ordinary sense and also slightly mischievously, to mark the functional or operational monolingualism of natural language processing.

The other, of course, is an artifact of literary expression – more specifically, the literary expression of, say, a multilingual human self-possessing the privilege of a certain level of education. These two kinds of texts are entirely different in most ways, in terms of provenance and purpose: one is a representation of a kind of failure, in relation to the real goals of the work that produced it, while the other represents what many literary critics and scholars might want to call a virtuosic literary style. But I think that in the monolingual contexts they both address, we can say that both texts serve as something like incitements to multilingualism – or at least to language acquisition, even if both options are very narrowly circumscribed indeed, that is to say, collectively Western European and collectively hegemonic. This is why I have emphasized Yngve’s conclusion that those who need to read machine translation output should obtain basic knowledge of the source language, through, as he put it, a “brief introductory course.” Those willing to be honest about the state of the art in MT today will have to admit that in that particular respect, at least, very little has changed.²

Editors’ Note: A link to the talk upon which this essay is based, from April 14, 2012, is available [here](#).

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Notes

¹ Because Delavenay produced the English translation himself, supplementing it (as both noted and demonstrated below) with additional materials, page references here are exclusively to the English edition. The French original is included in the list of references.

² Of course, one can also choose to read Christine Brooke-Rose's narrator as invested in the translational dynamic equivalence or commensurability of languages, here, as much as in their difference ("As if languages loved each other behind their own façades, despite alles was man denkt darüber davon dazu").