TRANSCRIBING THE FILIPINO LANGUAGE THROUGH A COMPUTER: A PRELIMINARY STUDY*

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Introduction

The transcription computer has not yet been invented. It is envisioned to directly transcribe a speech, especially an extemporaneous one, an interview, or a paper delivered in a conference such that as soon as the speaker is through with the delivery, the computer is also through with the transcription. All that the secretariat or the interviewer needs to do is connect the microphone to the computer. In cases of taped interviews or speeches, one need only replay them in the tape deck of the computer and the computer does the transcription work.

No fourth generation computer can do this transcription job. It is believed that this function can be done by the fifth generation computer and much research is going on along this field.[1]

Since a transcription computer is a machine, it is still limited by the kind of program and data fed into it. The "sense" of a spoken word or the meaning of an utterance may still be beyond its interpretative capability. Attempts to make a breakthrough in this area of research seem formidable.[2] Theoretically speaking, the computer cannot "decide" whether to use "so," "sow," or "sew," whose pronunciations are the same, in the utterance "They sow the field." Although English is claimed to be eighty per cent phonetic,[3] its orthographic irregularities render impossible a one-to-one correspondence between the speaker's spoken word and the computer-transcribed word. It thus appears that a highly phonetic language can be the solution to this problem. In short, the transcription computer requires a perfectly logical and rational language.

Should this transcription machine be invented, then the arduous task of transcribing in longhand the tapes or shorthand notes of interviews and conferences will be a thing of the past.

The National Language

The Filipino language is a perfect or near-perfect phonetic language. It has five vowels (a, e, i, o, and u) and twenty-six consonants (b, c, ch, d, f, g, h, j, k, l, ll, m, n, n, ng, p, q, r, rr, s, t, v, w, x, y, and z).[4] The Institute of National Language has not specified whether the eleven adopted letters from the Spanish and English alphabets (c, ch, f, j, ll, n, q, v, rr, x, and z) should be used in ordinary spelling or only in proper names. Alfonso Santiago and Norma Tiangco argued that only twenty-six letters should compose the Filipino alphabet since the digraphs ch, ng, ll, and rr can be written with these letters. Santiago and Tiangco, however, do not imply that these digraphs and the borrowed individual English and Spanish letters should be used in ordinary spelling, except in cases where the foreign word does not have its counterpart in the Filipino lexicon such as "spaghetti," "pizza pie," "coach," "habeas corpus," and the like.[5]

Notice that the above considerations do not take into account the problem of whether or not a computer could rationally transcribe a spoken word despite the irregularity of spellings. The trouble with the digraphs is that the computer will not know when to use "tt," "zz," "ch," etc. since these are duplicates of the letters t, z, and in the case of "ch," the digraph ts.

To make the Filipino language logical and rational, certain changes should be made in the Filipino alphabet.

First, the pepet sound should be added to the vowels (9) since there are native languages and dialects, such as Maranao, which have pepet sounds.

Second, the consonants should be reduced to seventeen since the letters c, j, n, x, q, ch, ll, and rr can be replaced by other letters. C in spelling will be replaced by k or s; j by ds; n by ny; x by ks, gz, s, or h; q (qu) by k; ch by ts, s, sy, or k; ll by ly or y; and rr by r, except perhaps in proper names and to some extent in proper adjectives.[6] The following are examples: c-k (carga-karga), c-s (ciudad-siyudad), j-ds (lodge /loj/-lads, jar-dsar), n-ny (canon-kanyon), x-ks (examen-iksamen), x-gz (examine-igzamin), x-s (texto-testo), x-h (raxa-raha), q (qu) k (maquina-makina), ch-ts (chinelas-tsinelas), ch-s (chinelas-sinelas), ch-k (cholera-kolera), ch-sy (machine-masyin), ll-y (caballo-kabayo), ll-ly (billar-bilyar), and rr-r (carrera-karera).[7]

The retention of f, v, and z is due to their distinct sounds and spellings and to the fact that they are common in many native languages and dialects.[8]

Syllabic Combinations

Instead of using word combinations to form sentences, it is much simpler to use syllabic combinations to form words and sentences.

There are nine vowel-consonant (V-C) patterns in the Filipino language: V, CV, VC, CVC, VCC, CCV, CCVC, CVCC, and CCVCC. Bahasa Malaysia has eleven since it includes CCCV as in "stra-ta" and CCCVC as in "struk-tur" ("structure").[9] but these words are spelled in Filipino as "istrata" (VC-CCV-CV) and "istraktyur" (VC-CCVC-CCVC). There are syllabic patterns in some foreign languages that may be assimilated in Filipino, but these are minimal. Some of these are "angst" (in Filipino "ankst," i.e., VCCCC) and "alps" (VCCC).

The nine syllabic patterns will generate some 565,494 syllables. They will be more than adequate for the computer to use in transcribing Filipino utterances. "Pupunta ako sa Maynila," e.g., is a combination of the following: "CV-CVC-CV CV CVC-CV-CV."

The number of syllabic patterns and combinations are distributed as follows:

Syllable Patterns	Number of Combinations[10]
V	6
CV	102
VC	102
CVC	1,734
CCV	1,734
VCC	1,734
CCVC	29,478
CVCC	29,478
CCVCC	501,126
TOTAL	565,494

Analysis of the Syllabic Combinations

All the V and CV combinations (108 syllables) can be fed into the computer since they have distinct sounds. For the purpose of illustration, let me present the CV combinations (102).

CV	A	E	I	O	U	M
B	BA	BE	BI	BO	BU	B M
K	KA	KE	KI	KO	KU	K M
D	DA	DE	DI	DO	DU	D M
F	FA	FE	FI	FO	FU	F M
G	GA	GE	GI	GO	GU	G M
H	HA	HE	HI	HO	HU	H M
L	LA	LE	LI	LO	LU	L M

	MA	ME	MI	MO	MU	M	M
M	NA	NE	NI	NO	NU	N	M
N	PA	PE	PI	PO	PU	P	M
P	RA	RE	RI	RO	RU	R	M
R	SA	SE	SI	SO	SU	S	M
S	TA	TE	TI	TO	TU	T	M
T	VA	VE	VI	VO	VU	V	M
V	WA	WE	WI	WO	WU	W	M
W	YA	YE	YI	YO	YU	Y	M
Y	ZA	ZE	ZI	ZO	ZU	Z	M
Z							

The VC combinations (102) should exclude the syllables ending in H because "A" and "AH," e.g., have the same sound. The IY and ≅Y syllables should also be discarded since they will sound like the letters e and ə respectively. The pattern EY sounds like the a in "baseball" ("beysbol") and should be retained. There are, therefore, only ninety-four meaningful VC combinations.

Like the VC syllabic pattern, the CVC combinations (1,734) should also exclude syllables ending in H and those in IY and ≅Y. BAH, BEH, BIH, BOH, BUH, B≅H, BIY, and B≅Y should be rejected. The same case holds with syllables in the other consonants as in KAH . . . K≅Y, DAH . . . D≅Y, . . . , ZAH . . . Z≅Y. There would then be only 1,598 CVC combinations, that is to say, 17 x 6 x 17 = 1,734 − (8 x 17) = 1,598. Some examples are "da-mit," "kob-ra," and "pan-sit."

Regarding the CCV pattern (1,734), only 337 syllables are useful. The rest are very difficult to pronounce. The following double consonants (57) are productive in that they can be pronounced: BL, BR, BS, BW, BY, BZ, KL, KR, KS, KW, KY, KZ, DL, DR, DS, DW, DY, DZ, FL, FR, FS, FW, FY, FZ, GL, GR, GS, GW, GY, GZ, NG, NY, PL, PR, PS, PW, PY, PZ, SW, SY, TL, TR, TS, TW, TY, TZ, VL, VR, VS, VW, VY, VZ, ZL, ZR, ZW, and ZY. Only MGA is meaningful in the double consonant MG. The computation is 57 x 6 = 337 syllables. Examples of these are "bra," "ngi-pin," "tsa," and "dro-wing."

Many of the CCV syllables produced with the above double consonants may probably be questionable in that they are tongue-twisters and some of them border with contractions in Filipino. SYA, for instance, may be the contraction of "siya," although it is useful in 'Shah' ("Sya"). FYU is useful in "funeral" ("fyuneral"). An important problem is MGA because to be consistent with a logical and rational orthography, it should be spelled "manga." The computer will have difficulty on whether to use CCV or CV-CCV. With the spoken term "mangangaso," for example, the computer might transcribe it as "mangaso," which is an error. To be consistent, therefore, I will discard the CCV pattern for "mga" since it does not represent the sound pattern (CV-CCV) of the word. The same analysis holds with

"ng" and "nang." "Ng" in this case will be discarded. With the rejection of MGA, there will only be 336 significant syllables.

In the VCC combinations (1,734), 364 syllables are significant. The productive double consonants (65) are: BS, BZ, KS, KZ, DS, DZ, FS, FZ, GS, GZ, LB, LK, LD, LF, LM, LN, LP, LS, LT, LV, LZ, MS, MZ, NS, NT, NZ, PS, PT, PZ, RB, RK, RD, RF, RL, RM, RN, RP, RS, RT, RV, RZ, SK, SP, ST, TS, TZ, VS, VZ, WL, WS, WT, WZ, YB, YK, YD, YF, YL, YM, YN, YP, YR, YS, YT, YV, and YZ. However, the twenty-six IYB . . . IYZ and ≅YB . . . ≅YZ syllables are discarded since they would sound the same with those of IB . . . IZ and ≅B . . . ≅Z, respectively. The computation is 65 x 6 = 390 − 26 = 364.

Again, like the CCV pattern, many of the VCC syllables produced with the above double consonants may perhaps be questionable. But I must stress that the speaker may insert foreign terms in the course of his talk in Filipino, especially in interviews. He may say, "Nang dumating ako roon sa may anthill nakita ko sila." The word "anthill" will be rendered "anthil," or VCC-CVC. He may also say, "Oy, iyong aide ni kuwan nandiyan na." " aide" will be spelled eyd," or VCC. There is no limit to the number of foreign or coined terms that the speaker may inject in ordinary discourse. The computer will just immediately transcribe them. Some additional examples are "abs-trak," "eks-tra," and "instrak-tor."

Of the 29,478 CCVC combinations, only 4,136 syllables are valuable. The productive double consonants (44) are: BL, KL, DL, FL, GL, PL, TL, VL, ZL, BR, KR, DR, FR, GR, PR, TR, VR, ZR, DS, TS, BW, KW, DW, FW, GW, HW, PW, SW, TW, VW, ZW, BY, KY, DY, FY, GY, HY, PY, SY, TY, VY, ZY, BZ, and TZ.

Like the CVC combinations, syllables ending in H (44 x 6 = 264), IY (44), and ≅Y (44) should be excluded from the CCVC pattern. The computation is 44 x 17 x 6 = 4,488 − (264 + 88) = 4,136 syllables. Examples of CCVC are "trak," "plan," "tzar," "plas-tik," and "gram."

The significant syllables in the CVCC combinations (29,478) are rather plentiful. There are 9,664 meaningful sysllables. The productive double consonants (95) are: LB, MB, NB, RB, SB, WB, YB, ZB, LK, MK, NK, RK, SK, WK, YK, ZK, LD, MD, ND, RD, SD, WD, YD, ZD, LF, MF, NF, RF, SF, WF, YF, ZF, LG, MG, NG, PG, RG, SG, WG, YG, ZG, RL, WL, YL, LM, RM, WM, YM, LN, RN, WN, YN, RP, SP, WP, YP, ZP, WR, YR, BS, KS, DS, FS, GS, LS, MS, NS, PS, RS, TS, VS, WS, YS, LT, MT, NT, RT, ST, WT, YT, ZT, RV, SV, WV, YV, ZV, BZ, DZ, LZ, MZ, NZ, PZ, TZ, WZ, and YZ. Some examples of these are "kard," "nars," "nang," "sang," "gayd," and "nayf."

Like the VCC pattern we exclude syllables ending in IYB . . . IYZ (13) and ≅YB . . . ≅YZ (13). The computation is 95 x 17 x 6 = 9,690 − 26 = 9,664 syllables.

The last pattern (CCVCC) of which there are 501,126 combinations has only 25,054 useful syllables. Since there are forty-four productive double consonants

in CCVC and ninety-five productive consonants in CVCC, then we multiply them and get the product of 4,180. If we multiply this product by six, we get 25,080 syllables. By subtracting twenty-six syllables ending in IYB . . . ≅YZ, we get the difference of 25,054 combinations. Some examples are "klerk," "swits," "flayt," and "trans-fer."

To summarize, out of the total 565,494 syllabic combinations, there are only a total of 41,354 valuable syllables, perhaps with plus or minus two per cent of error. It is interesting to note that these 41,354 syllables can generate several millions of words in the Filipino language.[11]

Conclusion

This preliminary study is an overview of the first component of a larger study called the Transcription-Computer Project which has four essential components, viz., (1) the linguistic software conceptualization, (2) the linguistic software production, (3) the transcription computer conceptualization, and (4) the transcription computer creation.

The second component will make use of Victor Zue's technology on voice spectograms. The 41,354 syllables will be pronounced by several subjects and fed into the computer. The theory is that the computer will match the spoken word with its corresponding spectogram and subsequently generate the corresponding written word. Simple as this may seem, there are actually technical problems involved since voice spectograms made by one person differ considerably from those made by others. But researchers are going into this area and Zue was able to "recognize syllables, words, even whole sentences and nonsense phrases"[12] from the spectograms. Scientists believe that if a human can read spectograms, so can a computer.

The third component will tackle the problem of conceptualizing a transcription computer model that will realize the theory behind the second component. The model will try to surmount technical problems such as word spacing, otherwise the syllables will be lumped together in each line; the use of appropriate punctuations; and so forth. So far, none has been published about this model, but it is reasonable to believe that Pittsburg's Carnegie-Mellon University has been working on this model, using voice spectograms based on the English language.[13]

The last component is a realization of a dream, the completion of the Transcription-Computer Project. The entire scheme may take a decade or more to finish, but it is important, I believe, that steps should be made now on the first component. It is hoped that this preliminary study will serve as a modest contribution to the actualization of that dream.

NOTES

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[1]See in this connection, G.L. Simons, *Towards Fifth Generation Computers* (Manchester: National Computing Centre, Ltd., 1983), p. 1-266.

[2]"Computers," *Time* (1 April 1985), p. 59.

[3]"New Ideas," *Asiaweek* (30 April 1982), p. 37.

[4]MECS Memorandum No. 194, 30 July 1976.

[5]Alfonso O. Santiago and Norma G. Tiangco, *Makabagong Balarilang Filipino* (Manila: Rex Book Store, 1977), pp. 15, 23, 25, and 31.

[6]Proper names will be transcribed in the ordinary way. However, an editor will re-transcribe them into their original spelling. The computer, e.g., will transcribe "Charito" as "Tsarito," but the editor will re-spell it as "Charito."

[7]Cf. Santiago and Tiangco, *Balarilang Pilipino,* pp. 14-15. See in this connection, Rolando M. Gripaldo, "The Language Crisis: A Plea for the Immediate Use of Filipino as the Medium of Instruction," Paper read during the First National Philippine Studies Conference on 1-13 February 1985 at the Philippine Social Science Center, Diliman, Quezon City. The letter *j,* which was retained in "Language Crisis," is discarded in the present lecture. The Filipino letter *ng* is superfluous and must also be discarded.

[8]See Teodoro A. Llamzon, *Handbook of Philippine Language Groups* (Quezon City: Ateneo de Manila University Press 1978), pp. 34, 43, 47, 58, 62, 123, 138, 142, and 147.

[9]A.S. Hornby, et al., *Kamus Pembaca: Inggeris-Melayu* (Kuala Lumpur: Penerbit Fajar Bakti, 1972), pp. xiv-xv.

[10]Engr. Hermes D. Herbolingo, the chairman of the Department of Electrical Engineering, College of Engineering, Mindanao State University, Marawi City, made these computations. Engr. Herbolingo is also currently a System Analyst-Programmer of Computrade Philippines, Inc., Iligan City.

[11]In a comprehensive study, it seems advisable to include for its unique sound the double consonant TH in the patterns CCV ("the"), VCC ("oath," in Filipino "oath"), CCVC ("that"), CVCC ("bath"), and CCVCC ("broth" or "thorn"). It is highly probable the speaker or interviewee in ordinary discourse may insert English words with TH sounds.

[12]"Computers," p. 60.

[13]Ibid.