A METHOD TO REDUCE LARGE NUMBER OF CONCORDANCES.

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Summary

In order to help to solve the problem of analysing large number of concordances of a given word 'W', the 'Diccionario del Español de México' (DEM), has implemented a programme that

i) Reduces this number, as to obtain the maximum possible information with the minimum number of concordances to be handled.

ii) Sortes and rearranges the output so that similar concordances are printed out together.

This was done by comparing up to four words to the left and to the right of word W, through the whole set of concordances, associating together those which were repeated in a particular context. Once knowing this, some significant concordances were selected to be printed out, and the rest was discarded.

I Introduction

In the composition of a dictionary, those involved in the definition of each word have to study very consciously its set of concordances, so that no meaning or use is missed.

there are, of course, some difficulties since on one hand, the sample is never large enough as to insure the occurrence of all the different meanings and uses of every word to be defined. This problem is solved by consulting other dictionaries and experts on the particular subject.

On the other hand, there are words having a very large number of occurrences, making their analysis a very difficult task, since it is not

possible to have present in mind everything that is being analysed. At first thought this could be solved by taking at random a smaller number of concordances; however, when reducing in this way, one is about to lose the grammatical and semantic information contained in all those concordances to be taken away; hence a method had to be implemented as to attain the maximum possible information.

In order to solve this problem, the DEM presents a method whose aim is to obtain optimal information with the minimum number of concordances to be handled.

This method consists of, for each concordance to analyse and compare four words to the left and to the right of word W together with their grammatical category associated, and establishing which one of them is identical to which other in a particular context: A tree structure is generated.

Having known this, it is proceeded to reduce the number, by selecting some of them considered to be representatives.

II Preliminary Requirements

Our sample (Corpus del Español Mexicano Contemporáneo: CEMC), consists of 1,973,151 occurrences, resulting in 65,200 different types,¹ whose frequency vary from 1 to 68,252.²

Some preliminary work has been done consisting in the automatic labeling of each and every word of the corpus with its grammatical category,² in which from the total number of occurrences, 1,083,945 were automatically solved, and

the rest had to be solved by hand, then the computer was fed with the results, obtaining in this form, the complete sample labelled. We took advantage of this work, since otherwise it would have been impossible to try to reduce the number of concordances in terms of the same grammatical category.

Next, was to implement a programme that produces, for any given word, its set of concordances; each word stating its own grammatical category. This is stored in a file called CONCUERDA, and it is organized in the following way:

Every concordance has three lines, each one of them consisting of:

- 6 characters (nnnnnn) reserved for the number of occurrence.
- 12 characters (tttppplll) reserved for the register of that line, according to the original text, and stating text code, page and line.
- 72 characters reserved for the actual text
- 18 characters for the label of each word of the line, stating the grammatical category code. The first two characters indicate the number of words in the line.

Figure number 1 shows part of file CONCUERDA and its organization.

III The Algorithm

3.1 Association of the i-Concordance to table ORDENA.

For each concordance, a table ORDENA is associated in the following way:

- The word in question is located in the middle line and associated to ORDENA(5)
- Four words are selected to the right and to the left of W, since they are supposed to be carrying the most significant grammatical and semantic information about the word W.³ We took this idea from the Centre du Trésor de la Langue française's work concerning to the treatment of binary groupes

- Each of the next four words to the right of W will take its place in O_{i+1} if and only if

$w_{5+i} \in O_{5+i}$ and $\nexists$ punctuation mark p_i such that

$w_{5+i-1} p_i w_{5+i}$ and $p_i \in \{.,,:;?!\}$

as they are considered to break up the continuity of a context.

- In similar way, the words to the left of W are associated to their place in ORDENA.

Figure No. 2 shows how to construct table ORDENA from a given concordance.

3.2 Generation of a Tree Structure starting from ORDENA.

Once obtained this set of up to nine words, it is proceeded to construct a tree structure for the words to the right of W and one for the words to the left of W.

It will only be described here the construction of the right branch of the tree. The left is generated immediately after, though in symmetric form:

- The tree has a root node which is the word W itself, and has five levels, being the root in level 5.
- A direct descendant of a node w_i is given by the word w_j such that $w_i w_j$ are adjacent, i.e. if $w_i \in \text{ORDENA}_i$ and $w_j \in \text{ORDENA}_{i+1}$ then w_j is a direct descendant of w_i .
- The label of each node consists of:
 - Word w associated.
 - Its grammatical category.
 - Its frequency.
- And pointers to:
 - Direct ascendant.
 - First direct descendant.
 - Next node whose direct ascendant is the same as the one of itself.
- Another file called CONCORD, where it is stored the number of the concordance or concordances where that word in that

CONCORDANCES OF THE WORD * EDAD * (AGE).

1	012176020	UN HOMBRECITO DO/CIL Y MA/S PARLANCHI/N QUE EL COMU/N DE LOS NATIVOS DE 136803000684684 SU EDAD. HACI/A PREGUNTAS DISPARATADAS QUE EL VIEJO NO PODI/A CONTESTAR 112800008100 Y, PESE A LO DISPARATADAS, NO EXENTAS TOTALMENTE DE AGUDEZA. 103940010140
2	017075015	CLA/SICAS, A SABER: PRIMERO HAY QUE VIVIR, ANTES SE NECESITA HABER 1104000001599 LEI/DO TODO, CERVANTESO ESCRIBI/O EL QUTJOTEG A UNA EDAD AVANZADA, SIN 1100896846884 EXPERIENCIAS NO HAY ARTISTAS, Y OTRAS POR EL ESTILO. HASTA LOS 1181003046840
3	021065023	DIFI/CIL DEL NI*O. POR OTRA PARTE, INE/SO Y LUISITAQ HABI/AN LLEGADO YA 1446849460350940 A LA EDAD DE IR A LA ESCUELA Y NOSOTROS, QUE COINCIDIMOS EN LA 100787090942 ELECIO/N DEL INSTITUTO AL QUE DEBERI/AMOS MANDARLAS, ATRIBUIMOS A ESAS
4	022011045	LA KRUIJAA. MONOS, ARCHIMONOS, ESTU/PIDOS, VILES E INOCENTES, CON LA 1000000003040 INOCENCIA DE UNA PUTA DE DIEZ A+OS DE EDAD. TAN ESTU/PIDOS COMO PARA NO 1404004284810001 DARSE CUENTA DE QUE LOS PRESOS ERAN ELLOS Y NO NADIE MA/S. CON TODO Y 15004000053150403
5	025041012	HABLAMOS MUCHO TIEMPO DE NUESTRAS EXPERIENCIAS DURANTE EL CATACLISMO, 9 000428468 HASTA QUE EL PROFESOR DIJO QUE A NUESTRA EDAD Y EN CUARTO DE PRIMARIA 1440689342834540 NO PODI/AMOS CREER EN SUPERSTICIONES COMO EL RESTO DEL PUEBLO, NI 1119048068783
6	026060018	PORQUE ASI/ ME VEI/A MA/S BONITO, Y MAMA/ ESTABA DE ACUERDO, POR ALLA/ 133159003004041 VENI/AN LUISAQ, CONCHAQ Y CARMELAQ, TRES NI+AS DEL BARRIO, DE MI EDAD, 12988380078428 UNA SOLA SOMBRILLA FLOREADA PARA LAS TRES, PERO LUISAQ Y CARMELAQ ERAN 12688800038380
7	028060026	DE CARLOSQ, EL HERMANO DE LUISAQ Y CARMELAQ. CARLOSQ ERA TAMBIEN/N DE MI 134868483889142 EDAD, PERO USABA UNOS ZAPATONES DE SUELAS ENORMES, LE GUSTABAN LAS 1183959400590 CORREAS Y LOS GRITOS, PUES COMO FUI A DECIRLES A MIS AMIGAS CUANDO MI 1403003194042812
8	038077002	HOMBRECILLO. 1 8 SI/, YAA TENGO 34 A+OS. YA ESTOY DONDE LA EDAD SE EQUIVOCA PARA LOS 14119C0191685996 DEMA/S. PARA UNO MISMO. HA FLUIDO LA SANGRE INCANSABLEMENTE EN MIS 1100590000142
9	041048033	ARDIAN EN SUS PUPILAS FELICES Y ATERRADAS. REMIRO/ SUS ESCOTES SIN 1194280309284 EDAD, SUS OMOPLATOS SALIENTES DE CABALGADURAS, SU ESPANTABLE ESPANTO. 9 828840280 NO ERA EL POLVO DEL SOL SOBRE EL MANTEL CALADO, NI LOS PANES DIMINUTOS 1410687806803000
10	043124038	LOS MASAJES QUE SABE DAR, LAS ZONAS ERO/GENAS QUE NO HE DESCUBIERTO 120000000000109 SINO A MI EDAD POR SU CARNAL INTERCESIO/N, IBENDITA SEA ENTRE TODAS LAS 133428428800000 MUJERES Y EL FRJTO DE SUS PECHOS! TAT-TAT, POR ACA/ Y POR ALLA/. EL 140368428C413416
11	043219027	BAJO DE ESTATUA, APELLIDO DESCONOCIDO. 5 04000 INTERPRETACIONES POSIBLES DE LA DIFERENCIA DE EDAD: 7 0046848 A) EGO NUNCA MADURO/ COMO LO DEMUESTRA ALTER 8 40190000
12	050168030	SI/, LA ADOLESCENCIA NO PUEDE SER SUPERADA SINO COMO OLVIDO DE SI/, 12500100030045 COMO ENTREGA. POR ESO LA ADOLESCENCIA NO ES SO/LO LA EDAD DE LA 130045001916846 SOLEDA, SINO TAMBIEN/N LA E/POCA DE LOS GRANDES AMORES, DEL HEROI/SMO Y 12831004000783
13	054080014	SIMBO/LICA: ESTO LE PERMITE TAMBIEN/N ENCONTRAR - COMO ROUSSEAUQ, COMO 9 055910080 EL MISMO MONTAIGNEQ O ACASO EL PADRE LASQ CASASQ - UNA EDAD DE ORO QUE 1468831688868483 PODI/A SITUARSE EN EL NEOLITICOQ (LA IDEA ES DE LAS MA/S INTERESANTES 12904680094000

Figure No. 1 File CONCUERDA, where the concordances of the word W in question are stored.

particular context came from, making in this way possible the retrieval operation.

-A node has as many branches as different words are found to be direct descendants to that word, with the same grammatical category through the whole set of concordances.

The process repeats itself until the last concordance has been processed.

Figure No. 3 shows, for a set of 14 concordances, the left and right trees generated.

12 050168030 SI/, LA ADOLESCENCIA NO PUEDE SER SUPERADA SINO COMO OLVIDO DE SI/, 12500100030045
 COMO ENTREGA. POR ESO LA ADOLESCENCIA NO ES SO/LO LA EDAD DE LA 130045001916846
 SOLEDAD, SINO TAMBIEN LA EPOCA DE LOS GRANDES AMORES, DEL HEROI/SMO Y 12831004000783

ORDENA[1:9]

NO	1
ES	9
SOLO	1
LA	6
EDAD	8
DE	4
LA	6
SOLEDAD	8

Figure No. 2 Table ORDENA is obtained from a given concordance. Note that ORDENA(9) is void, since there is a comma (,) after the word 'soledad'

90	323023064	SUCEDI/A ALLA/ POR EL A+O DE 1831, CUANDO DON ^{TE} PEPEO TENI/A UNOS 55 A+OS DE EDAD Y MUCHOS RI+ONES AU/N. TUVO UN IMITADOR NOTABLE, QUE FUE UN BANDERILLERO LLAMADO ANTONIO GONZA/LEZO EL ^{TE} ORIZABE+O, QUIEN DIO A	13914684C10B06C 138403201063009 106800668594
91	324034073	AHORA, LA EMPRESA QUE LA TIENE RENTADA, SE ESTA/ GASTANDO UN DINERAL EN ESTE SERIAL, BUSCANDO NUEVOS VALORES, MISMOS QUE - HASTA QUE SU EDAD SE LOS PERMITA - NO HABRA/N DE SALIR DE ENTRE LOS NI+OS TORE+OS.	13100000591684 12280000343285 1159104044680
92	333060012	CONSEGUIR DINERO PARA SACAR ADELANTE LA FUNDACIO/N. PRIMERO HABLO/ EL SE+OR CURA QUE ENTONCES NO TENI/A NI TREINTA A+OS DE EDAD. LUEGO DON TOMA/SO SA/NCHEZO (ESTE SI/ VIEJO Y COLUDO) PROPUSO COLECTAS Y RIFAS.	100000000096 138000103384010 1185219300030
93	333148021	CABALLOS. 1 0 EN SAN ^{TE} JOSE/O HABI/A MEDIO MILLAR DE HOMBRES EN EDAD DE TOMAR LAS ARMAS E IRSE A LA GUERRA, PERO NO TODOS SE SENTIERON CON A/NIMOS DE	134800084030496 1483000031359494
94	333148034	CASADOS Y TENI/AN HIJOS. LOS MA/S ERAN JO+VENES EN EL VERDOR DE LA EDAD, DE 16 A 30 A+OS, CON ALGUNA DESTREZA EN EL MANEJO DE ARMAS Y CABALLOS Y SIN DISCIPLINA MILITAR. 5 03400	138398000046846 1584040400468483
95	335044023	ENCUBIERTOS DEL DIABLO, O AL MENOS DO+ILES INSTRUMENTOS DE SUS AVIESOS DESIGNIOS, LA BEATA IMAGEN DE LA EDAD DE ORO REDIVIVA SE TRANSMUTO/, AL CONJURO DEL DESENGA+O, EN EDAD DE HIERRO EN QUE DOMINABA LA CRECIENTE	1107837000428 130000468403597 1287040400000
96	335044024	DESIGNIOS, LA BEATA IMAGEN DE LA EDAD DE ORO REDIVIVA SE TRANSMUTO/, AL CONJURO DEL DESENGA+O, EN EDAD DE HIERRO EN QUE DOMINABA LA CRECIENTE CONVICCIO/N DE QUE ESOS DESNUDOS HIJOS DEL OCE/ANO FORMABAN PARTE DEL	13000046840597 1287040400000 110402807C907
97	342250019	INDI+GENAS, COMO ES AU/N, EN PARTE ESTE/RIL, SINO QUE REALIZARI/A SU SU CONVENIENCIA RESPECTO A LA EDAD DE QUIEN LA IBA A USAR; OBSERVO/ SU EN EL PLAN DEFINITIVAMENTE REGENERADOR DICTADO EN EL LLANO DEL RODEO	1101914003002 1180400034680 1146800046878
98	343065005	JURA/IS Y YO PIERDO UN ALUMNO. 6 935968 PERO DESDE LA EDAD DE OCHO O NUEVE A+OS HASTA LA DE DIECINUEVE O VEINTE NO EXISTE EL DESIO DE UN TRABAJO MANUAL PESADO. ESTO ES EXACTO EN LA	15346843390400830 1410684680059040
99	344096030	PERCIBIR SUS CUALIDADES TANTO MATERIALES COMO FUNCIONALES, ASI/ COMO SU CONVENIENCIA RESPECTO A LA EDAD DE QUIEN LA IBA A USAR; OBSERVO/ SU CONTENIDO Y MANEJO, SE DIO CUENTA DE SU PESO Y RESISTENCIA ASI/ COMO DE	9 028000001 1428146845594092 1483059842030104
100	344096036	DESARROLLO DE LA IMAGINACIO/N CREADORA Y ALGUNAS HABILIDADES PARA OPERAR CON HERRAMIENTAS SENCILLAS; ES, ADEMA/S, ADECUADO A LA EDAD DE MI HIJO. INSTRUCCIONES. LA PRESENTE ESCALA CONTIENE OCHO ASPECTOS ESSENCIALES EN	9 840000000 12400918468428 9 000000004
101	345322048	LE ES FACIL HACER AMISTADES; 'ME ES BASTANTE FACIL HACERLAS Y ME GUSTA QUE SEAN ALEGRES, DE MI EDAD Y TENGAN UN NIVEL CULTURAL POCO MA/S O MENOS COMO EL MI/O.' Y FRENTE A UN GRUPO DE NI+OS: 'ME DA GUSTO VER	1259000590035 149098428396800 163006530468485930
102	345333029	TERMINAR LA CARRERA DE MEDICINA. 5 0040 CASO 2. ALUMNO DE 19 A+OS DE EDAD; SEXO MASCULINO. PROCEDENTE DE LA ESCUELA DE ARQUITECTURA DE UNA UNIVERSIDAD DE PROVINCIA.	130084000000040 8 04046840
103	346037019	IDENTIFICA CON LA PLENA REALIZACIO/N DE LAS ASPIRACIONES QUE EL HOMBRE TIENE DESDE EL TERMINO DE LA EDAD MEDIA, Y NO SE DANCuenta DE QUE EL A+O 2000 PUEDE NO SE LA CULMINACIO/N ROTUNDA Y FELIZ DE UN PERIODO	1.9400000068 15046840803159340 146800150003468

Figure No. 3 Left and right trees generated from a set of 14 concordances.

3.3 The algorithm to select significant concordances.

Once the tree is fully constructed it is proceeded to make the actual reduction.

There are some facts to be considered beforehand:

- The more words repeated exactly in the same context, the greater is the probability that the meaning of the word W in that context is the same.
- A set of words repeated a small number of times may be more significant than another one repeated a larger number of times since there are not so many different meanings or grammatical functions of a word W followed by the same set of words.

Next, it will be described the procedure:

In order to analyse the tree, a leftmost path is followed.

- A 6th level branch of the tree is first analysed (Remember that the root is in level 5, and that the tree to the right of W is being analysed). If the frequency is greater than 1, then its leftmost direct descendant is analysed in the same way.
- If a 9th level node is reached in this form, and the frequency $n > 1$, it means that the words W followed by these four words occurred a times in n different concordances. As it was said before there is a good probability that the meaning of the word W in this particular context is the same in all of the n concordances; hence, by talking only one or two of them, by means of a random function, we obtain a significant concordance, and the $(n - 1)$ or $(n - 2)$ left can be safely omitted from the final output.

- If at some intermediate level it is found that the frequency of the word associated to that node is 1, then the analysis of such branch would have to be stopped; however, it was thought that a possible way to reduce was not by identical words but by the same grammatical category. It is proceeded then to find all direct descendants of its own direct ascendant with the same frequency and grammatical category, and then the number of these concordances is reduced.

It is clear that the process takes into account that as the level of reduction is closer to 5, then the context is less significant; hence a larger number of concordances have to be chosen to maintain the required quality information.

After some study and many trials it was empirically decided by our team of linguists* that a reasonable pattern of reduction was the following:

- If the level of reduction is 4 or 6 and the frequency $F \leq 30$ then the number of concordances selected Q would be $Q = F // 2 + 1$ and $Q = F // 4$ if $F > 30$.
 - If level is 7 or 3 then $Q = F // 3 + 1$ for $F \leq 50$ $Q = F // 5$ for $F > 50$
 - If level is 8 or 2 then $Q = F // 4 + 1$ for $F \leq 70$ $Q = F // 7$ for $F > 70$
- Finally, if level is 9 or 1 then $Q = F // 5 + 1$ for $F \leq 50$ $Q = F // 10 + 1$ for $F > 50$

* At this point, we would like to thank in particular to Paulette Levy for her valuable discussions and interesting suggestions.

It has to be mentioned here, that this pattern of reduction may be changed according to the wrd analysed, as to obtain the best results each time.

When it is already Known the number of concordances that will be chosen (Q out of F) it is proceeded to select them again, by means of a random function, and each one of them is marked as such, to avoid any one of them be selected twice or more times.

3.4 Output.

The final output is presented indicating the group of words repeated the grammatical category of the last word - when applicable - and the frequency. Next, the Q concordances chosen are listed below.

Figure No 4 shows the form in which the output is presented.

IV The Computational System.

The system was implemented in the University of Norway version of ALGOL 60 NUALGOL for a UNIVAC 1106 computer of the "Centro de Procesamiento Arturo Rosenblueth" of the Secretaría de Educación Pública (Ministry of Education), with 262K words of 36 bites of central memory and 8,090,000 of characters in disc.

4.1 Data Storage.

We made use of 3 files:

- a) File CONCUERDA, where the whole set of concordances of the word W was stored, and it was described above.
- b) Files ARBOL and CONCORD; these two files are supposed to contain the information obtained while generating the right and left trees.

ARBOL: Each node of the tree is stored in a line composed of 72 characters, distributed in the following way:

7 for its own address in file ARBOL

1 for the level

24 for the word

2 for the grammatical category

3 for the length of the word

4 for the frequency

7 for the address of its direct ascendant

7 for the address of the next direct descendant of its own direct ascendant (i.e. like next brother)

7 for the address of the first direct descendant

4 for the number of direct descendants (i.e. No of branches emerging from it) and

6 for the address in file CONCORD where it is stored the number of the concordance where it comes from.

From the computational point of view, each one of the trees is generated in the following way:

- The root, whose node associated is the word W is in a prefixed address, and it will be present in every concordance. This word is taken from ORDENA (5)
- The next word in ORDENA will be stored by means of a hash function, and it is decided to be the same node as one previously stored, if and only if the word, its grammatical category, level and direct ascendant are exactly the same, in such case the frequency is augmented by one and in file CONCORD is stored the number of this concordance in addition to the previous one.

CONCORDANCIAS REDUCIDAS DE LA PALABRA ** EDAD			** CON FRECUENCIA TOTAL * 379
REDUCCION POR LA DERECHA:			
EDAD AVANZADA	FREC= 3		
188081055	1.-	OPORTUNA, Y LOS MEDICAMENTOS ADECUADOS, SUPRIMIE/NDOSE TODA CLASE DE ENSAYOS Y EXPERIMENTOS CON SERES EN EDAD AVANZADA. HACEMOS VOTOS MUY FERVIENTES POR QUE TALES CONCLUSIONES SE LLEVEN A LA PRACTICA	
EDAD DE LA + NM	FREC= 5		
469322047	2.-	CRISTALITOS DE SISA. LOS RESULTADOS SUGIEREN QUE LAS UNICAS DIFERENCIAS OBSERVADAS SE EXPLICAN EN FUNCION DE LA EDAD DE LA PROTEI/NA PERO QUE NO EXISTEN VARIACIONES ESTRUCTURALES INTRI/NSECCAS	
050168030	3.-	SI/, LA ADOLESCENCIA NO PUEDE SER SUPERADA SINO COMO OLVIDO DE SI/, COMO ENTREGA. POR ESO LA ADOLESCENCIA NO ES SO/LO LA EDAD DE LA SOLEDAD, SINO TAMBIEN LA E/POCA DE LOS GRANDES AMORES, DEL HEROI/SMO Y	
EDAD DE ORO	FREC= 3		
054080014	4.-	SIMBO/LICA; ESTO LE PERMITE TAMBIEN ENCONTRAR - COMO ROUSSEAU, COMO EL MISMO MONTAIGNE O ACASO EL PADRE LASO CASASO - UNA EDAD DE ORO QUE PODRI/A SITUARSE EN EL NEOLITICO. LA IDEA ES DE LAS MA/S INTERESANTES	
335044023	5.-	ENCUBIERTOS DEL DIABLO, O AL MENOS DO/CILES INSTRUMENTOS DE SUS AVIESOS DESIGNIOS, LA BEATA IMAGEN DE LA EDAD DE ORO REVIVIVA SE TRANSMUTO/, AL CONJURO DEL DESENGA/O, EN EDAD DE HIERRO EN QUE DOMINABA LA CRECIENTE	
EDAD DE LOS + NM	FREC= 5		
408212010	6.-	SILENCIOSOS. LA EDAD DE LOS PECES SE PUEDE DETERMINAR EN MUCHOS CASOS CONTANDO EL NUMERO DE ANILLOS DE LAS ESCAMAS, LOS CUALES REPRESENTAN ZONAS DE CASANDRA	
107010049	7.-	(UN POCO PEDANTE) SI QUIEREN DECIRLO ASI/. BUENO, CIERTAMENTE LA EDAD DE LOS YELMOS BRILLANTES COMO ESPEJOS NO ES E/STA (EN CRESCENDO BRIOSO)	
EDAD DE NUNE A+OS	FREC= 3		
472302007	8.-	ANISOMETROPIA PUEDE SER DISMINUIDO ENORMEMENTE POR UN PEDIATRA ALERTA O UN ME/DICO GENERAL QUE EXAMINE LA AGUDEZA VISUAL A LA EDAD DE 4 A+OS. SE PUEDE SOLICITAR LA AYUDA DE LA MADRE; A ELLA SE LE PUEDE DAR UNA	

Figure No. 4 Final Output of the selected concordances of the word EDAD (AGE).

TREE STRUCTURE GENERATED FOR WORD *EDAD* (AGE).

31596	2DE	PR2	1	30936				4647
31608	3Y	CO1	1	32712	36576	36552	1	3228
31620	4MI	AJ2	9	12	33168	32100	4	69
31632	2MODERADAMENTE	AV13	1	36360				2046
31644	2PUES	CO4	1	32436				3879
31656	3Y	CO1	1	34008	32496	37344	1	3987
31668	3Y	CO1	1	32688		5232	1	4149
31680	2DE	PR2	2	33372				4674
31692	2DE	PR2	1	31056				4749
31716	3SO/LO	AV5	1	34008	32208	34644	1	141
31728	4ESA	AJ3	5	12	31896	32232	4	507
31740	2ALGU/N	AJ6	2	36312				2685
31752	2PROBABLEMENTE	AV13	1	31944	35028			1563
31800	2CON	PR3	1	31980	31920			219
31812	2CON	PR3	1	35400				633
31824	2CON	PR3	1	35664	33192			1680
31836	4SU	AJ2	16	12	34344	32088	6	3
31848	4TU	AJ2	2	12	31728	31116	2	498
31860	4TAL	AJ3	1	12	32352	32280	1	2802
31896	4POCA	AJ4	2	12	32076	32148	1	540
31908	2INVERSAMENTE	AV12	1	32424	32580			1749
31920	2PARA	PR4	1	31980				2607
31932	3A	PR1	10	34344	5556	5472	5	15
31944	3A	PR1	25	34008	30828	3468	20	27
31956	3A	PR1	1	32832		31332	1	54
31968	3A	PR1	1	31620	32880	31560	1	114
31980	3QUE	CO3	2	34008	32112	31800	2	216
31992	4TODA	AJ4	1	12	32124	32532	1	366
32004	3A	PR1	2	31728	36324	35496	1	537
32016	3QUE	CO3	1	31836	32568	32160	1	1128
32028	3A	PR1	1	33060				1740
32040	3CIERTAMENTE	AV11	1	34008	35604			411
32052	4ESTA	AJ4	6	12	33252	32184	5	1980
32064	2POR	PR3	2	30504				2625
32076	4CUYA	AJ4	1	12	32556			648
32088	3DE	PR2	9	31836	32016	35256	8	6
32100	3DE	PR2	6	31620	31968	31344	4	72
32112	3DE	PR2	21	34008	32040	37320	19	345
32124	4OTRA	AJ4	1	12	31848	32136	1	381
32136	3DE	PR2	1	32124		34524	1	384
32148	3DE	PR2	2	31896		30996	2	543
32160	2HASTA	PR5	1	32016				1131
32172	2HASTA	PR5	1	32208	34836			1215
32184	3DE	PR2	1	32052	32304	35124	1	1983
32196	2CONFORME	CO8	1	35628				2346
32208	3EN	PR2	15	34008	31980	35340	11	189
32220	6YA	AV2	2	24	34080	39324	1	222
32232	3EN	PR2	1	31728	32004	35976	1	510
32244	3EN	PR2	1	34344	32796	35892	1	1809
32256	6NO	AV2	2	24	39264	37884	2	651
32268	4ESTE	AJ4	2	12	31860	36156	1	2787
32280	3A	PR1	1	31860		36168	1	2805
32292	3PERO	CO4	2	32712	31608			2877
32304	3A	PR1	2	32052	32856	36804	1	3000
32316	2LE	PN2	1	36900				3159
32328	3EXACTAMENTE	AV11	1	34008	30468	36516	1	3165
32340	3A	PR1	1	31848		5220	1	3192

Figure No. 5 File ARBOL, where the tree structure is generated.

- Otherwise it will be a new node.
Figure No 5 shows part of file ARBOL, EDAD (AGE) is being processed.

V Results And Applications.

The first results were very encouraging, since for those words with medium number of concordances - say up to 600 - we were able to reduce the number between 30% and 40%, according to the word in question.

No lost information was reported (by comparing the original set of concordances with the reduced version)

It is expected that for words with higher frequency, the method here described will be more efficient.

However, from the computational point of view, there are still some difficulties, since the generation of each tree is very time consuming as the frequency of the word in question increases. We are still working to optimize it.

The most important application besides the original main objectives, is that by this method it is possible to find expressions and patterns of language repeated and used consistently.

VI References

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