And Explained about the Actual Application of the Exchange and the Arab Lexicon of Computer Processors and all of that

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Abstract

This research deals with the Arabic language and use it in the computer and the adaptation of modern technology in the Arabic language service and it's people. Arab shown characteristics of discipline and communication Avatar tangles and structural, and so on, which makes them eligible for use in the computer better. The discussion touched on the difficulties that stand in front of the barrier integration between computer and Arabic.

Introduction

It's known that the talk about the language and computer, and the ability of Arabic language to deal with the subject of the machine cannot be elaborated in a single research. That it needs many compilation and major efforts, however these attempts came to seek a new knowledge and to shed light on a subject that holds paramount importance in the curricula of modern linguistic research.

I have faced great difficulty in research in this topic, for the following reasons:

-Most of what is written in this topic are only researches published in newspapers or delivered in symposiums and specialized scientific conferences which makes the research not simple issue but this did not stand as a barrier between me and the fun and interest which I have gained when I was searching in this subject, it is an interesting, complex subject that I wished to have enough time to dive its depth and complexity.

And the fact that the subject of the Arabic language and computer is a large one I choose it to be focused on the most important points:

1-The flexibility of Arabic language and its ability to keep pace with the time.
2- Stages of the development of the Arabic language with computer.
3-The mechanic translation of Arabic language and its imperfections.
4-The mechanic translation of Arabic sentence:

In this point I talk about the scientists' interest in sentence and its types, analysis methods used in the sentence, stages of analysis of Arabic sentence and the most important problems facing the Arabic sentence automatically processing.

5- Automatic Arabic morphology:

In this subject I deal with morphologic analyst and his major functions and importance, I also mention the major problems that face the Arabic morphologic analyst, most important rules that have been developed to overcome some of these problems.

6-Automatic Arabic grammar:

I speak here about the types of grammar processor, and the ability of the grammatical speller to detect grammatical errors, and the extent to which specialized institutions arrived in this field. Then I stand at the most important challenges facing the automatic processing of Arabic grammar then I Mention these challenges, explaining examples for each.

7-Research conclusion:

And I put my conceptual and on the topic in general.

8-A list of the most important sources and references.

1-The flexibility of Arabic language and its ability to keep pace with the time.

It is a must for us to decide that the Arabic language has arisen and lived for a period of time as a literary language, includes the poets and orators, and the descending of the Quran with its literary miraculous form confirmed this feature,(1) but this does not mean that the Arabic language stood at this limit - literary language- but kept pace with the development that accompanied the march of humanity since they arise to this day,then came into prominence the so-called scientific language that aims to express scientific needs, as is the case of scientists who cared about medicine, mathematics, astronomy and philosophy, and in our time we see the Arabic language league efforts in attempting to give what is outlandish an Arabian identity, as corresponds with Arabic pronunciation and morphology, it is not strange for Arabic language to accompany the technology of this time and it is not surprising to see it breaking into a modern era - computer - which is the subject of this study.

One of the researchers says:" on the first matter the use of computer confined on the field of mathematics, and scientific and administrative statistics, but we have seen in recent years a great development in this area in which the technical media become applied in all the different spheres of linguistic data processing and non- linguistic data processing".(2)

The entire world witnessed on the Arabic language vitality, flexibility and capacity to accept the new and to generate the pronunciation, much as outlining the major scientific legacy and its ability to fulfill other purposes, and the United Nations Educational, Scientific and Cultural Organization and the international organizations and other international agencies confirmed that Arabic language is an alive, adopted and official language in addition to the other five languages: English

1- Abdul Sabour Shahin - Arabic, the language of science and technology - Dar The sit-in - P. 77 - Cairo I2 – 1986
2- Paolo Branca, the use of computers in language study: addressing legal terminology Annals of Tunisian university - e 26 – 1987

French, Spanish, Russian and Chinese (1)

In the first half of the last century, university education started in Egypt and continued for more than six decades. Valuable, Arabic translations and publication have been published, a successful experience also was held in Beirut - American University (Faculty of Medicine)- but the wind of colonialism has put the flame off, in Syria also, the education in Arabic in the university level has continued successfully since 1919 until today, and in all the sections and terms of reference.

And evidences of that the flexibility of Arabic language is multiplicity does not need to be mentioned again for that is not point of this research, what we are concerned about is To what limit can we put Arab language in the field of computer? Is this language appropriate to become a language to be used in computer one day?

I say: that the flexibility of language and its capacity to keep pace with science and development leads us to hope that the Arabic language with some of the efforts of linguists and researchers in the field of computer software. A language with clear presence within the technology of this age in general and the computer in particular in addition to flexibility there are many aspects of the Agreement between the Arabic language and computer:

1-Arabic language is compulsory for the arrangement of many of its morphologic, parsing and acoustic features and for the close link between sense and structure and confirms that its capacity to reduce complexity and mechanic programming(3)
2-Arabic dictionary features a small nucleus of roots and morphologic forms in the same time it contains many vocabularies with high morphologic productivity which makes the perfect situation to mechanize and to establish vocabulary diagram that connect between lexical elements.

1-Shehada Khouri – Arabic language and scientific and technological development in this era - Arab tongue Magazine. p. 41-42 - edition 26 – 1986
2-same recourse p42
nabil ali. - The Arabic language and computer - p. 42 3- world of thought magazine - Folder number 18 edition 3 P. 103 – 1987

There are a lot of differences that I will enumerate for some of them after the completion of the Agreement points

Initial starting from the roots and end as the words in the final form, which appears within the texts (1)

3-Connectivity feature: The communicative function is the most important aims of linguistic activity at the time in which communication systems consider an essential part computer system.

4- Symbolic processing: linguistic or technologic transactions depend on alphabet of preliminary symbols agreed upon. It is used to configure composite symbols, through a step-by-step series of installation operations that are generally "linear": so linguistic symbols Ensues as (in words and phrases and words in sentences in context) is similar in some respects to the of follow mechanical electrical and electronic signals that automatic systems deal with (2)

5. Structural similarities: There are many factors of structural similarities between computer system and language system. Here are following table to clarify this similarity (4)

Linguistic system elements	**Computer system elements**
auditory and speech Linguistic complexity system retrieval of human memory variant linguistic method(science language, imagination language, media language) dictionary of vocabulary language uses human brain ، hearing and auditory and speech elements ،and other linguistic expressions(face and hands gestures)	Input and output Operating system retrieval of mechanic memory programming data base applications tools

1-Nabil Ali- same reference- p.103-104
2-Nabil Ali- Arabic language and computer-p.117-altaarib for publishing 1988
3-Same reference-p.118
4-Same reference-p.118

The disagreements between Arabic language and computer:

1. Multiplicity of Arabic writing systems (formatted and non-formatted) and what associated absence of the formation of the complex and compound cases which lead to misunderstanding which is undoubtedly the major problem for linguistic analysis automated systems. Which means that one word with the absent of formation has many meanings.(1)
2. Colloquial and classical language and what follows of great difficulties on automated natural language systems.(2)
3. Retardation of the complexity system which is not good for automated translation depends on the mathematical and logical representation.(3)
4. insufficiency methods of teaching Arabic which make it difficult to accept the different methodologies of the methods developed for computerized teaching languages (4)
5. Some of Arabic writing problems, there are a lot of words uttered but not written, as in:**هذا ، ذلك ، لعبوا ، قاموا**

As noted, the most important sources of disagreement is related to insufficiency linguistic bases, and we have to face the sarcastic truth that the issue of the Arabic language and the computer in the first place is a linguistic one, and the solution lies in exploit the internal characteristics and the completion of the basic structures of the grammatical systems, dictionaries, curricula, terminology and basic research. (5)

So we shall not enter any new word in the lexicon without putting it into grammar.

1- Nabil Ali- Computer and Arabic language- Alum Al-fiker magazine- Volume 18**3عدد-** page 104- 1987
2- Ibid – page 104
3- Ibid – page 104
4- Ibid – page 104
5- Ibid – page 104

I have mentioned here the differences between the Arabic language and computer so the reader won't think it's alike in all aspects.

2- The development stages of Arabic language dealing with computer:

The entry of the Arabic language in the field of computer was not there with the appearance of first computer but there were introductions and attempts for Arabic language to deal with the computer can be summed up for us:

1. What has done by the National Planning Institute in Egypt, which owned a computer by 1962, which means after 14 years of the appearance of the first computer, and it was only used to print Arabic letters by substituting the Arabic letters instead of English.
2. The first quantum leap came in 1972, with the development of an automated system to automatically choose the form of the Arabic script as the previous character of his character and thus shortened Arabic keyboard to include only original characters such as (ع،ك،س) and the computer is the one who selects the appropriate format for the character. Which enabled the entrance of the computer applicable in Arabic on usual applications such as the development of Arab Extensions, As well as the storage of Arabic symbols effectively on magnetic disks, Moreover the automatic generation letter shaped system allowed transferring the Arabic data through the cystic and data transfer networks which reduced the transfer data code to include the original Arabic letters but not the other forms of it.
3. The Period 1972 - 1985 AD witnessed a series of important applications such as:

a- The use of the Arabic language in the information retrieval system, and that is by the replacement of English messages to deal with the Arab system instead.
b- The appearance of an Arab programming languages such as Arabic BASIC and Arabic Logo.
c- The establishment of the first Arabic industry in the field of educational programs, which focused on teaching Arabic computerized.
d- Partial attempts to develop morphological analyzers with limited potential**.**
e- Agreement, after ten years of discussions and attempts at unified Arab code for data exchange.

4. by the end of the 1985 second paradigm shift occurred by the success of the manage research and development in the global software company by the develops of the first morphological processor (parser and generator) integrated and capable of dealing with the various phases of the Arab formed, non-formed or partly formed words, And so was the transition from the letter level to the level of the word to start the new era of the Arabic language processing machine (1)

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(1) Look Nabil Ali- Computer and Arabic language- Ibid- pages 107- 108

Will come to talk about the importance of morphological processor in the research next pages when we will mention Arabic automatic morphology.

4. Automatic translation of the Arabic language:

Machine translation, as defined by Dr. Mahmoud Ismail Asseeni :Is the term used to express human language translation by computers. This translation was also named the automatic translation (from the French name (truductionoutomatiyue) and as the good level translation is not feasible through translator systems current mechanism - they always require some form of human intervention in the form of an effective review before translator, during or after - as many specialists prefer the term "translator to help the computer / machine" (1)

Talking about the Arabic language in conjunction with modern technology Old renewed, it is as old as the Arabic language is a social phenomenon emerged the day when he found a sense of social rights and the need to communicate with other people. It should be given to developments in science and what is produces from the technology in different knowledge and what it cause of the richness that is highlighted in equipment, tools and hardware (2) since the automatic translation phenomenon of progress, Arabic language had follow this phenomenon because of the utmost importance in Arabic language service. Perhaps "The importance of processing and automatic translation of Arabic language in important and multiple applications that is expected toward learning the Arabic language and to be learned by native speakers and others, as automatic translation from Arabic and towards with the help of the computer and detect linguistic errors in written texts, the automatic writing of spoken text, the engagement with the machine in Arabic language, the automatic indexing text, the Compression of texts and the retrieval, Form the formed, non-formed or partially formed texts and others.(3)

Before talking about the mechanic processing of Arabic sentence, and Arabic grammar, and Arabic morphology, I would like to

Mahmood Ismail Al Hanneeni- automatic translation and Arabic language- The use of the Arabic language in the computer- page 239.

1- Mohammad Kashash- Arabic fiker magazine- edition9- 1997- page 77
2- Mohammad Hassan Attayan- Arabic language processing method in IT- Research within the book the use of the Arabic language in IT- Arab League Educational, Cultural and Scientific Organization- page 25- 1996

I introduce to the most important difficulties in mechanic translation of the Arabic language in general: the Arabic language shows several problems in front of any translator or translation system, the most important problems are *:

1- grammatical problems in the Arabic language like the problem of position which is the change in the typical order of the sentence (verb+ subject+ object) into (subject+ verb+ object). The re-arrangement of that component of the sentence has many results that are worth mentioning, for example, when the verb precedes the subject, it agrees with it only in gender. But when the verb follows the subject, there must be a match in gender and number. And it is a simple process is as well as in the computer in the area of agreement between the noun and its pronoun (1)
2. A problem in speech sections: grammatical books talk about three sections of speech while linguistic research reveals the need to learn other various sections to speech (2)
3. The difficulties in mechanic translation concerning the indicative meaning. Understanding language texts is not limited to the semantic meaning; translator depends on the understanding of life, and his knowledge of the world. He uses its ability to understand the needs and follow the discussions and access to the right conclusions. Therefore, we need to provide artificial intelligence in the area of representation of knowledge, and to create a new generation of translation software (3)
4. The diversity of the topics to be translated, Translation may be for legal, medical, literary or mathematic texts..... Etc. since it is impossible to find the translator who is specialized in all areas, so how we ask of the machine to translate of texts of all disciplines (4)

1-Mahmoud Ismail Al-Sini - machine translation of the Arabic language - research within the selected facts of the use of the Arabic language in the computer - Dar al-Razi. p. 244
2-Ibid.. p. 245
3-Ali Farghali - world of thought magazine - Artificial Intelligence and medical languages processing- folder 18 - edition 3- P. 134-135

Discussion about these problems will be in details when talking about mechanic translation in branches of Arabic language.

We see Nabil Ali divides the difficulties into:

1- The non-complete concordance between vocabularies of languages.
2. Variation in the nature of the combinations of sentences within different languages, especially between those which belong to different linguistic families Arabic and English for example.
3- Multiplicity in linguistic equivalent when translated from one language to another.
4- the size of required dictionary, which is not limited to words' dictionaries only, but also include phrases and idioms dictionaries (1)
5-mechanic Translation of Arabic sentence:

The talk about Arabic sentence mechanism processing is multifaceted subject with precise technical details and empties into many of the theories and methods of artificial intelligence, the need for sentences processing has emerged with the appearance of mechanic translation, the bilateral language Dictionaries - with their linguistic combinations - is not fully useful in this regard, for it is not possible to confine variant patterns of Arabic language sentences, language is capable of generating an infinite number of combinations of sentences. Linguists in ancient and modern times are concern with studying and analyzing sentences, they put analysis to grammatical units: transferring approach and generating approach.... etc. (2) what matters here is how to deal with Arabic sentence automatically, since Arabic sentence has many divisions agree to the standards of the various classification in terms of simplicity, installation and completeness.

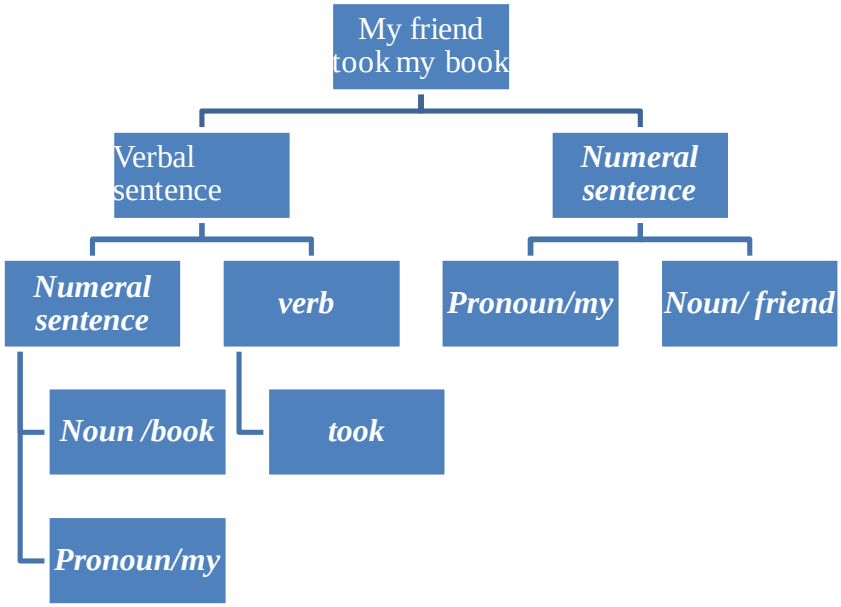
1-Nabil Ali - The Arabic language and computer - world of thought magazine - Folder number 18 – edition 3, 1987 - P. 94
2- Mohammad Hassan Att Tiyan- Method of processing Arabic language in informatics. p. 51

Arabic sentence is based on two pillars,[musnad] and [musnad elaih] which they are the verb and subject in verbal sentence and, subject and predicate in nominal sentence. One of its types the so-called simple sentence which consists of one supportive composite which leads to an independent idea as in " the moon rising" and " Zaid attended, " there is the so-called composite sentence, which consists of two supportive composites which are linked to each other, as in "when the electric power stops the school darken." this sentence has several types, no need to mention here, what is important for us here is the analysis of the sentence through tree diagram and for this sentence there are some types:

The pluralist division of the sentence: as in:" Mohammad writes "the sentence can be analyzed this way and so is the sentence "the student attains an award at the end of the year".

This method is appropriate for simple sentence but it is not enough for the longer statements' elements.

The synthetic bodies' method, the sentence "My friend took my book" is analyzed this way:



3- Analysis to direct components method: the sentence "the president of the Jordanian government decided to specify vehicles customs"

Arabic sentence Stages of analysis:

1- Morphological Analysis of words of the sentence
2. Lexical application of the sentence elements
3. Application the rules of exclusion of impossible alternatives, to get rid of what is impossible to occur as analyzed previously.
4. The application of grammatical rules to configure phrases and grammatical components on higher positions, in order to obtain possible alternatives for sentence structure, and helps the tree diagram to reduce these alternatives.
5. The application of the grammatical and parsing rules to prove the veracity of grammatical components assumed previous step.
6. Link the pronouns with its references by matching the grammatical morphological features with its counterparts.
7. Application semantic restrictions.
8. Regulating the words in sentence (the vocalization on letters) that contains the form of the main part word. Parsing Regulation marks And the necessary amendments at the to the end of the word as a result of the contact between two articulations (1)

Problems behind processing Arabic sentence:

There are a lot of problems in which the ways of mechanic processing of Arabic sentence deals with:

1- the absence of vocalization has previously been explained.
2-The multiple lexical meanings of words of the sentences: most of the words have more than one lexical meaning and computer has to choose from these meanings to suit the context of the sentence or the text, for example multiplicity of the meanings of the word [ʕain] or ['ain] in Arabic
3- Ambiguity resulting from the match of character with the noun described: In the following sentence "the elected professors and students" there is confusion in the word "elected" is it the status of teachers or students or both?
4. Morphologic ambiguity: the name of the doer with the name of the object with the word "chosen".
5-grammatical Ambiguity: it acts to be allocating to two different pronouns like "carry" and what hold two or more parsing statues as in the word "Judge"

Computer in all of this may not detect confusion only at a late stage of processing which means that it should keep in its memory all possible alternatives till it ends analyzing the entire sentence and we do not exaggerate if we say that the number of possible alternatives for unvocalised sentence composed of 30 word are more than 1000 alternative.

1-Nabil Ali- Arabic language and computer
2-Mohammad Hassan At Tiyan. Method of processing Arabic language. p. 55

Automatic Arabic language morphology:

What is the morphologic analyst?

It is a computer program that automatically handles several functions to recognize the overlap in structure and meanings.

The most important functions:

1. Analyze the word into triple, fourfold or fivefold root;, indicating its origin, and explaining the additional meaning of the word.
2. Shows the addition on the word as effects beyond the word itself occurring whether in the beginning of the word or in its end, and it could be found in the sentence as incidental characters or connected pronouns.
3. Shows the weight of the word, pure verbs or expanded verb.
4. It is capable of formulating many examples of a certain weight of the same origin, for two reasons: educational or semantic formulation within the text.
5. Turn changed letters back to their origins knowing its positions, (1)

Here is an example from Arabic on morphological analysis:

The word entered, feeding auto morphologic analyst: "**والاستيطاني**" the morphologic analyst output is:
Elements of the word: **و** + **ال** + **استيطان** + **ياء النسبة** + **علامة الضمة**
Root of the word: **وطن**
The morphologic form: **استفعال**
The morphologic weight: **استيعال**
Speech Section: abstract name-single-masculine.
Parsing statues:[marfu']
phonologic processes: replace [waw] [**واو**] with [ya'] [**ياء**]

As noticed the morphologic analyst analyzes the word into its primitive morphologic elements and locating its phonologic, morphologic and grammatical data.

1-see Mamoun Hattab- morphologic analysis of Arabic language using computer- the cultural season of Jordanian league of Arabic language 14-p.58-leagues publications-e1996.

When computer processes the morphologic analysis it specifies it into syllables then passes it into computer data base which transform it into mathematical equation, as a result a computer can recognize the extras at the beginning, the center and the end of the word and identifies its weight, explaining the transformed letters, as stated in the previous example.

Problems of processing morphology automatically:

1- Complexity and overlapping in the processes of transposition and vowelising , which leading to additional views in response section to its origin, in the process of analysis and in recanting an origin to the sections in the process of installation or generation.
2. There has been a morphologic ambiguity in Arabic, particularly in the absence of vocalization and this means that the automatic system to take into consideration all possible cases of confusion.
3- Arabic elements of structure do not depend - in many cases- on the elements that locate around them only, but the elements that away from them also, example(the parsing mark in the word its morphologic elements are **بالاستعلامات**

ات+ ب+ال+استعلام

This relation depends on the proposition that is elements far from it)

4. The lack of precise formulation of Arabic morphology's rules, rules of derivation, transposition or vowelisation
5- The lack of systematic lexical data about on the morphological productivity, that in which link the root with morphological formulations applicable to it, and the derived words and their senses, with their grammatical categorizations, and semantic frameworks that define the relationship (2)

2-Nabil Ali - language and computer - Dar At-taarib for publication - e1 – 1988- P.298 – 299

Despite the problems that morphologic analyst faces, we see Ma'mun Hattab in his research "Arabic language morphologic analysis using computer" clarifies a set of rules to overcome some of these problems and these rules are:

1-arabic language weights rules:

It has been built up through the studying the weight of the individual, and words which belong to it, and occurs of external influences, and the impact of each influence. Then building a base or a group of bases for this weight. After that, transfer the base into mathematical formula in which the computer could deal with.

2-Rules for analysis the context:

This part of the indicative analysis of the text, the need for such rules appeared as a result of the confusion to distinguish between the name and the word for example.

3. Lists of exceptions: to restrict the exception weights of Arabic language using the available dictionaries.
4-rules to recognize vowelisation and transposition in the word: a result for building the weight rules but we put them in separate point for its importance.
5-As a result for the different proofreaders and linguists in weighting precise rules have been organized so that they agree the pattern of rules in morphologic analyst (1)

1-Ma'mun Hattab- cultural season 14-p.64-65

A global company for programs was able to develop the first Morphologic processor (analyst and generator)an integrated one that is capable of dealing with different stages of the Arabic word vocalized and not completely vocalized. Thus, the entry of this morphologic processor Arabic language becomes able to be automated systems, such as:

1- Mechanization the Arabic dictionaries which depend on feature of productivity which links between the list of roots and morphologic formulas that applies to every root in it.
2-texts analysis: processor was already used in the analysis of the Holy Quran.
3-exploring orthographic errors and correct them.
4-squeezing Arabic text as possible to get rid of great amount of excessive morphology.
5. restoration Arabic Information, where was the processor been put in the heart of an integrated system for organizing chest information bases dealing with full Arabic texts, the system have been already used in restoring the Quran verses according to its words, roots, and parts of verses .
6. The morphologic processor represents a great part, in the process of grammatical analysis of written and spoken

Arabic texts, and in developing multi-stages of vocalization processor.

And it seems that success in this case, will be the following qualitative leap that will pave the way to the use of Arabic in systems that deal with natural languages that is if it succeeded – it will enable the formation of Arabic texts which are automatically free of vocalization signs (1)

1-Nabil Ali- Arabic language and computer- world of thought magazine-p.108

7-automatic Arabic syntax:

The talking about the automatic processing of Arabic syntax was subject to be indirectly talking about while talking about automatic processing of Arabic sentence and Arabic processing of morphology, as we had stated in many points that there is close link to Arabic syntax. This is due to the fact that the Arabic language sciences and knowledge are in overlap complement each other. But I wanted here to individualize this issue - processing Arabic language automatically- in order to complete the knowledge.

"there are many characteristics for Arabic syntax that make the matter of aromatically processing it by computer an interesting both on the level of language, or on the level of computer, on the other hand the close relationship that connect the language's syntax, morphology, structure and meaning impose upon the researcher the need to take in mind the complex overlap relations linking between different language sections within the Arabic language (1)

It must be when talking about automatic Arabic grammar to clarify what is meant by grammatical analyst.

Grammatical Analyst: Is This Automated Program which analyzes sentences to initial elements or in other words the parsing analysis of sentence, and extracting grammatical conversion relations and represent it blatantly (2)

1-Nabil Ali- computer and Arabic grammar- cultural season 14 -publications of the e1996- P.145
2- Nabil Ali- the Arabic language and computer – world of thought magazine - P. 91

As is the case for the other languages' processors, grammatical processor has two main splits: analytical split and generating split.

Analysis, in turn, has two levels:

1-the stage of automatic grammatical differentiating: the automated system task is limited to the provision of grammatical health for sentences that already exist.
2-the stage of full automatic parsing: function of automated system extends to include determining the structure of the sentence in terms of restructuring its components, and the functions of its elements as well as identify the positions of delays and omissions, and to devise what is deleted and compensation for the concept in advance, or say another sentence response surface structure to its deep structure.

4-As for the generating split:

it is the reverse operation: transforming the deep structure of the sentence to its surface form, the grammatical automatic generation by building new sentences and feeding them with semantic labels (vocabulary and relationships of elements of reference and their accessories) the grammatical type of method in which the sentence can be formulated as(1)

Before talking about the challenges facing the automatic Arabic grammar as I would like here to stand on the issue of the grammatical speller and attempts by institutions interested in this subject.

The grammatical speller:

grammatical checking Applications are more important for the normal user of computer, by normal user I mean the researcher whose need to computer does not exceed printing, but this service was not a great deal of effectiveness until office 97 now the Office 2000 is much in this area, in a magazine specialized in computer science" " we tried to try to enter the most common grammatical mistakes and we can see the capacity of grammatical speller to discover them ,we started with the number and counted mistakes we typed the following sentences:

1-see Nabil Ali - the Arabic language and computer – Dar At Ta'rib . p. 389 - 390 - see Nabil Ali computer and Arabic grammar-cultural season P. 145 and beyond.

I saw seven schoolgirls.
رأيت سبعة تلاميذ

I bought eleven apples.
اشتريت أحد عشر تفاحةthe program underlined the word seven and the word "**احد** with green line and when clicking one click of the right-click mouse on the two words the program pointed out the correct word, which is "**سبع**" in the first case and the word "**احدى**" and "**عشرة**" in the second case.

The second field in which we find common mistakes is "**رفع**" and "**نصب**" the dual and plural after "**كان واخواتها**", or "**ان واخواتها**", so we typed the following:

1- The travelers were late.
كان المسافرون متأخرون
2- The two cars were fast.
كانت السيارتان مسرعتان
3- The boys were happy.
إن الاولاد فرحين
4- The two programs are still good .
مازال البرنامجين جيدين
5- I wish the two cans were bigger.
ليت العلبتان كبيرتان

in the first sentence it remarked the error (**متأخرون**) but it considered it as a spelling mistake instead of grammatical mistake and remarked the errors in each of the following sentences (**السيارتان, البرنامجين, فرحين, العلبتان**) However, the suggested of correction, which it showed us when we clicked the right-mouse click on the Word **العلبتان**, seemed to us wrong, and asked us to replace the word **العلبتان** with the word **العلبة** to correct the error.

We tried some other wrong sentences which include [**حالا**] and [**نصبا للفعل المضارع**] and [**استثناء**] and [**بدل**], as in the following sentences:

1- The two girls are small.
الطفلتان صغيرتان
2- The two cars are fast.
السيارتان مسرغتان
3- You will not eat the food.
لن تأكلون الطعام
4- The soldiers entered victoriously.
دخل الجنود منتصرون
5- we the programmers adopt Microsoft programs.
6- The students are successful.
التلاميذ ناجحات
7- The students came but the neglected ones.
جاء الطلاب الا المهملون
8- I paid 18 dollar.

The speller grammatical recalled errors in each sentence: **الطفلتين, مسرعون, تأكلون, منتصرون, مبرمجون, ناجحات, مهملون, دولار**, it suggested that correction properly. We have tried to introduce some other wrong sentences such as:
I went without books.
ذهبت دون كتب instead the word[**من دون**]
Who came were only the active ones.
ما جاء الا النشيطين

In this sentence [**ما**] cancels the function of [**إلا**] in the sentence, so the correct sentence should be [**ما جاء الا النشيطون**] but the grammatical speller did not refer to the mistake.
Finally we have typed sentences with errors in the use of propositions, such as:
1- I visited Egypt the year 1997
زرت مصر بسنة 1997
2- The man was in the garden.
كان الرجل في الحديقة

We also discovered that it does not remark the errors in the use of Proposition [**باء**] instead of[**في**], therefore, do not wait for him to correct such errors, you also typed some wrong long sentences, the checker could, not to mention the error.

We conclude from this view that the grammatical speller, in the first version of it, is generally good, it discovers most common grammatical errors, but still needs to be further developed and this is what we expect in future in next versions of Office (1)

1- see Arabic advantages in office PC Magazine - Fifth Year - Arab edition - a number 8 1999 P. P. 34 – 35

The challenges facing the Arabic processing automatically:

Like the other branches of the language. Arabic grammar faces many interrelated problems and some of them were stated when dealing with processing the sentence and automatic Arabic morphology, we sum up here the most important of these challenges:

1- the absence of an official form of Arabic grammar: There are several models of grammar, differ in basic motives, and in their focus positions and their ability to deal with Arabic grammar problems. What is currently available from these models do not exceed a few scattered attempts drafting some of the Arab forms of grammar in official form according to the transforming model, or lexical functional model, many of these attempts build some concepts sometimes discord with the core of Arabic grammar. And to formulate Arabic grammar in an official form a great effort is needed to be done by the group of computer scientists.
2- Dropping signs of vocalization in most of the Arabic texts.
3- The multiple cases of grammatical ambiguity and the high overlapping because of this ambiguity:

A) The lexical ambiguity: the most confusing type of ambiguity for the automatic analysis of grammar, which deal with [**المبنيات**] like propositions, here is this table, which shows the possible meanings of some propositions.

The number of possible meaning	The proposition
11	**من**
6	**إلى**
23	**اللام**
14	**الباء**
9	**في**
7	**على**
9	**عن**

1-See Nabil Ali - The Arabic language and computer - Dar At Ta'arib. p. 391 – 402

B –morphologic ambiguity –

C-Grammatical ambiguity: it is either to be local grammatical ambiguity on the level of phrases, or general grammatical ambiguity on the level of full sentence, and here's an example of each type:

Local ambiguity: the sentence "kind children and men " here it is a local and in which the word "good" can be an adjective describing the word "men" only or including the word "children".

General ambiguity: the sentence "the man died as he heard the news and fell on the ground." in which the ambiguity in, whether the phrase "and fell on the ground." Is added to the original sentence or the subsidiary sentence. "as he heard the news."

D – Ambiguity in the returning of the pronoun: in which the references of pronoun are numerous as in the sentence "left the mother the old woman with her daughter despite her weakness to take care of her. [**تركت الام العجوز رغم ضعفها مع ابنتها لترعاها**] the process of clearing the ambiguity in the return of the pronoun needs in many cases to indicative, sensual and positional evidence, which complicates the task of automatic analyst.

E –semantic ambiguity: the sentence " the president did not come the ceremony today" here there is a semantic ambiguity, since there are more than one indicative meaning for this sentence: Is it meant that the Head of State or head of other of what can be the headed?" did the Vice President came instead of him?

2- The difficulties arising from the grammatical flexibility of Arabic: As in preceding, delaying deleting and reservation, the analyst must follow all these cases.

3-Multiplicity of parsing marks and the cases of preference specially in nouns [مرفوعا او منصوبا او مجرورا]
3-the lack of grammatical statistics:
4- the mechanic processing of Arabic grammar needs many of the statistics to rationalize its performance:
A-statistics on the types of Arabic sentences.
B – statistics on maltiplicity about transativeness intransativeness
C - statistics on the Use of terms jargon
D - statistics on different types of ambiguity
E - statistics on the preceding and delaying.

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