

# Computational Arabic Grammar Reality, Constraints and Challenges

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## ABSTRACT

*There is no doubt that the use of computational technology in grammatical studies, has become the use of computers in the grammatical lesson widespread wide spread, which in turn led to the rise of many branches of language such as translation, discharge, and so on, and that the grammatical lesson can be activated better and more useful for students using computer technology. This research tends to develop a vision and vision of the computational constraints of Arabic grammar and the introduction of realistic solutions stemming from the core of grammar rules, and technical developments, to facilitate the process of computing grammar rules; It is expected that this study is designed to facilitate the process of computing grammatical rules based on accurate and scientific goals, select the linguistic elements that form the grammatical material in the field of computing, and benefit from its research experiences. Dissemination of awareness and awareness of Grammar and Grammar, encouraging educational institutions, especially universities, to allocate a course in computerization of the Arabic language, and to develop the work of linguistic complexes to meet the challenges of computing grammar, and to initiate software to develop an IT framework from a perspective. Not to leave the Arabic grammatical programs to companies and centers of Western research, and the formation of a forum for the pioneers of digital Arabic content from institutions and bodies to serve the grammatical computer service, and to pay attention to grammar to distinguish between the differences in grammaticality in the field of computing workers.*

**Keywords:** *ICT, Computerization, Arabic Language, Grammar learning, Educational process, Computer use teaching and learning, Information technology.*

## I. INTRODUCTION

Technical Revolution in Language: The world is witnessing an enormous revolution in informatics that has made knowledge a wealth that needs a critical mind and mind to activate the use of the vast amount of knowledge to meet the needs of any society, especially our Arab society. It puts us before many challenges that should take into account the need to participate in the presentation of our heritage, present and future of this world, and the idea of the main research centered on the Arabic grammar and the need to work on the use of modern methods and advanced techniques in the service of Arabic grammar in view of the challenges and obstacles faced by the grammar, modern innovative methods must be used to control obstacles and meet the challenges [1]. Technology has played a big role in the educational and research process. For its role in design, development, use, evaluation, intellectual interaction and applied learners, and the educational environment has become a feature of education and information technology, attention to education and information technology by educational institutions; in developed countries and developing is one of the evidences of the development of education, and the development of the individual and society, and became the necessity of education in our modern age.

This research represents an addition and a contribution to the technical grammatical effort in the field of teaching Arabic grammar and ways to improve its teaching methods. He will also highlight some important experiences in developing such curricula in the Arab world [2].

The importance of the current research in the confirmation of grammar issues and away from suspicion and preponderance and probability and this is

what is provided by computer grammar. It is worth mentioning that the computational science of the so-called grammar engineering is to be approved in the departments concerned with the specialization of the Arabic language in the Arab universities. Introducing research and theses written in Arabic on the use of computers in the service of Arabic grammar. A serious attempt to put recommendations and proposals for decision-makers of great importance in the development of computer grammar on the global linguistic map and in the desired place and taught to students in Arabic language sections [3]. Hence the importance of this research to know what the Arab nation has made towards this end, and to stand on the beginning to computerize the Arabic language.

In order to achieve the main objective of the research and the resulting sub-objectives, the research will rely on the descriptive analytical approach in the analysis of primary and secondary data obtained from different sources.

## **II. LITERATURE REVIEW**

Utilization of computer technology in the field of Arabic Grammar, in the twenty-first century, the world has been living under a rapid and efficient scientific, information and technological revolution. In present day international has witnessed a fantastic leap of informatics that has made technological know-how and information a tremendous asset in want of critical notion and mind to spark off using this considerable statistic so as to gain the wishes of society and the understanding of the sphere [4]. grammatical computing mainly or computational linguistics in standard reveals studies associated with it and the clinical studies it has dealt with has flourished inside the gift time in our Arab surroundings. for the duration of which he is aware of How this fashion originated?

We can say that the neglect of this subject hurts Arabic and fast breaches the lesson and linguistic research in cutting-edge improvement, and this harm may be meditated on different Arab activity in all fields, and it's miles acknowledged that computers represented a revolution in modern technology in technological development, computers have become one of the most vital needs of our modern life; one of the complicated existence problems; via communicating and dealing with computer systems through a Unique language researchers have benefited from the examine of human languages inside the improvement and modernization [5].

Laptop texts have emerged as certain whilst designing, publishing, printing or storing; these texts constitute a linguistic material that may be immediately

inserted into the facts processing, hence the want for linguists to be familiar with the facts curricula so that they can effortlessly access dictionaries of hundreds of thousands of entries, organized by means of the laptop from a Database the software program and the functions for which it is intended.

Using computational era in grammatical studies has grown to be urgent in our time because the use of computer systems in linguistic works has spread broadly, and linguistic research in this foundation have risen in a manner comparable to the modern development in other styles of human interest, particularly highbrow activity, that is the most important language the works provided on this component have proved that grammatical studies can get greater control, accuracy, correction and progress to what's better and more useful to its scholar, the use of pc technology [6].

The interconnectedness of grammar and computation lists calls for some of basic assumptions, the most vital of that is that computing paintings should be a method of serving the grammarians, and now not completely for it. the reviews and evaluations of computer professionals or designers, along with the secretariat inside the representation of Arabic grammar by using the PC and this calls for full knowledge of the possibility of introducing Arabic grammar to the laptop, and the possibility of processing in the laptop [7].

Arab grammarians and composers can provide them with a prominent role in the discipline of computational linguistics, and might play a prominent role in enriching them if they pay their foremost interest to the subjects and aspects associated with the Arabic grammar and the creation of information technology in the Arab countries. Could say that laptop science is the fabricated from this communique with the PC, and serves the goals and targets related to it, which are determined in solving the complicated problems related to computing [8]. PC processing of Arabic has turn out to be a totally essential, and cannot be deviated from or neglected, specifically that the observe of computer and statistics has carried out many outstanding outcomes for Arabic in the area of studying languages Arabic, linguistic data and gadget translation, and Automated processing, and the sphere of education, and other fields. nowadays, Arabic is also dealing with technical delays due to the shortage of hobby in this grammatical factor.

Hence, we can reduce the impact of this studies in highlighting and directing attention to a pressing issue and problem of present day Arabic, we are able to find out on this studies can discover how the trend toward computing Arabic grammar, and the situations that helped within the formation of this fashion, whether individual efforts as well as looking for out some of the

problems that faced the computational trend inside the light of the characteristics of Arabic grammar, programming and computing [9], and to discover an answer inside the treatment of those dilemmas, and on this studies we are able to stand on the degrees of the graduation of computational science in modern Arab research and the process of Arabic grammar inside the tongue computational mechanics to attain a aim and a huge and widespread breakthrough puts us a task to set up the regulations of the Arabic computing grammar, at the utility of both theoretical and theoretical approach and harness the electronic mind to clear up grammatical problems.

### **III. ADVANTAGES OF USING COMPUTER IN THE EDUCATIONAL PROCESS**

The computer provides the educational material in a gradient appropriate to students' abilities. Computer provides opportunities for interaction with the learner such as educational dialogue. It is easy for the student to choose what he wants in the right time and place [10]. Create an active and interactive learning environment between machine and human. Provides an excitement and thrill element.

It features the use of a computer in environmental education on, for example, it provides many of the effects of assistance that contribute clearly to provide content school in an interesting than through the employment of colors, sounds and images of fixed and mobile Contrary to the ways and means of educational traditional used in education. It distinguishes the computer also its ability to provide scientific material in an orderly and gradually commensurate with the capabilities of the students [11].

Using the computer in the learning of languages in particular; the learning of the skills of language, whether it be the language mother, mother tongue and foreign. Of serving technology computer as a tool teaching helps learners language; to develop their skills of interest to language, and represent for this element integral, which helps to create an environment learning active.

It has started to use computers effectively in the learning of languages in the sixties. Developed programs of learning of language English with the help of the computer with the beginning of the eighties of the century, the twentieth, passed the use of computer in teaching languages and learning of her stages three as it began to stage the first idea in the fifties, and sixties, and has on the basis of the theory of behavioral by counting t Computer tool is ideal for education; because e allows repeat learning of Article times for many [12]. Or a Phase II has begun in the seventies, and continued

during the eighties, and carried on the principles of the theory of communication, and was the cause of the spread of this theory is the criticism that defines her theory of behavioral; it because the programs of the T based on the theory of behavioral based replication, which thus lack the factor of communication; where the theory of communication on the use of student language in the purposes of realistic, and the evaluation of the student building to give the answer, rather than through the errors that committed [13]. It has been the development of many of the programs that adopt this theory in education.

And expose programs that based on the theory of communication to criticism because of the lack of the existence of the system is clear, and effective for the use of the computer in the development of programs of educational modern accredited can replace programs and traditional featured programs based on the element of interaction between the student and the material of scientific programming on the computer, and grew up many of programs of educational-based on the feature interactive media in the computer, and the Internet; the suspect for the third stage of the stages of the use of the computer in language teaching and learning.

In spite of the features that provided service multimedia some of the problems are still faced with the use of those programs in education, and those problems , lack of familiarity with the teacher in various skills, and applications necessary; for the production, and the development of software computer; it which may make effort supports programs of commercial lacking standards of design education based on the theories of modern in teaching language, and production programmatically approved [14].

The related problem of other non-existence of programs smart can rely on totally in teaching the language, such as: programs of dialogue education; programs are used only in teaching the skills of reading, or listening, but here is not suitable for learning writing, or challenges, and learning about after using a network the Internet world; which helped to rich environments for learning of languages.

With the development of techniques of computer developed programs teaching languages and learning it became more effective, and strengthened the development of technology media multiple of the capabilities of the learners to acquire the skills of language varied in complementary allows developing his skills language to differ from through software computerized using earning variety, it is through the program one can learner develop several skills, or arts language such as the skill of listening, reading, and the rules of grammatical, morphological, and others in the image of complementary without overwhelm the skill of

the other, in addition to the potential of the huge cross learning in distance using a network the Internet that Invest in the development of the skill of writing, and the skill of communication using e-mail, and learning in from distance; where creating this technology sophisticated halls to teach students whatever distanced them distances; as the largest library in the world including covered from books, research, and the rules of data, encyclopedias, dictionaries, and other Many [15].

#### **IV. EVOLUTION OF GRAMMATICAL COMPUTING**

We can say that the science of linguistic computing is the technology this is worried with using computer systems and the utility of science-based strategies inside the observe of language, especially in gadget translation, speech reputation and synthetic intelligence, this is, the operations achieved through the machine after being taught by means of human information in a particular area. Therefore, we can define computational grammar, profiting from the definition of Moses as: an inter-machine, among linguistics and pc technological know-how [16].

Computational syntax emerged in conjunction with the processes of language computing, and some researchers have pointed to it in his study, which dealt with the emergence of computational trend in the study of Arabic language science, and how he began individually and then officially and institutionally and the most important problems encountered and solutions provided to address them.

Data can interpret and examine a few linguistic phenomena, and may cope with the complicated structure of the linguistic context, showing us the coherence and interrelationship among its words, sentences and paragraphs, and the link among the manifestations of phrases and their lining of signals and meanings, because the pc can offer an interactive learning environment [17], it may installation programs offer mechanically corrective assist in topics where rookies make errors.

Computerized translation systems and software and linguistic computational programs were produced, a number of which can be in simple terms business, where computers are fed to translate written or spoken sentences and entire terms in unique areas, specially tourism and business and related to offerings consisting of greeting terms and inquiries approximately charges, locations, time and others.

There are many phrases utilized in pc linguistics, which researchers have been the use of in both overseas and Arabic references, causing problems within the use

of the term and translated into Arabic. the phases of this improvement are summarized underneath [18], [19]:

1. laptop changed into used within the Nineteen Fifties and Nineteen Sixties as a device for crushing numbers, and its applications have been restrained to commercial components of virtual nature so one can issue invoices.

2. laptop evolution inside the 1970s to emerge as a gadget for processing statistics in terms of garage, retrieval, deletion and addition.

3. in the Eighties, he moved from a records-processing system to a know-how-processing gadget, after which the decisive war of words between the computer and the language device came about as the tool for the formation of this thoughts-born new understanding, the pc. with language want to upgrade many of its characteristics and capabilities, so that you can prepare for this thrilling assembly, has included factors of the improve pc velocity, reminiscence potential, and storage capability of magnetic and optical media, and extra importantly, upgrade programming techniques, and the quality evidence of what the language has delivered in the development of the pc, we take into account the most simple packages for the 6th generation of computer systems, developed by means of japan, where we be aware organic bonding among the pc machine and its applications and its relationship to language, there are four basic packages for the 6th technology of computers, namely: expert systems, automatic translation, smart human systems and computer-aided programs for layout and production [20].

A lot of these technological packages desperately want to be as a chief element of language. expert structures want to store knowledge, on which their information is primarily based, and consequently want language, because the most critical manner of understanding switch and shrewd robot systems want language capabilities to house commands and talk with people, the system translation is by using nature the utility of natural language.

#### **V. IMPORTANCE OF ARABIC GRAMMAR COMPUTING**

The importance of language has come to be obvious thru the improvement of statistics structures across its diverse levels. all through the past half century, the improvement of laptop has brought about qualitative developments which have brought about a decisive war of words with the language gadget [21].

A number of applications were prepared, consisting of laptop-primarily based morphological analysis machine, the laptop-based morphological evaluation software, in

addition to this system issued via the Arab corporation for schooling, lifestyle and technology, a morphological grammar machine for Arabic [22]. Arabic computing allows in coaching Arabic and can be the precise manner to teach mandarin, and may be a powerful way to cast off slang by way of activate correction of mandarin, correcting verbal mistakes inside the formation of overdue phrases or otherwise.

The motive of computing the syntax is to provide a complete and accurate description of the linguistic system of the computer, allowing it to fit the human in its efficiency and grammatical overall performance, in order that it could synthesize and analyze the rules [23]. automated regulations governing human languages by means of laptop Arabic has established it's well worth as a global language, in which it is straightforward to conform the programming models designed for the Arabic language to meet the needs of different languages, especially English, way to its mediation [24]. As for the factors and ranges, the stages of syntax are phonetic, morphological, grammar and semantic. the automatic morphological machine that analyzes or reconstructs phrases into their derivative and conjugative factors, and the automatic parsing system that mechanically expresses sentence and words. 2nd, packages based at the aforementioned linguistic systems, such as spelling and grammar.

## **VI. THE CHALLENGES OF COMPUTING ARABIC GRAMMAR**

The challenges facing grammatical computing put ourselves upon us.

Analysis of the Arabic language automatically morphologically and grammatically. Utilization of the computer in the morphological and grammar. There are also many challenges to the computing of Arabic grammar; [25] the issue of computing is multifaceted. It has become clear beyond doubt that the grammatical rules of technical templates for the containment of computer systems and software and the handling of hardware and equipment are voluntarily and flexibly.

The Arab information market has expanded and Microsoft has made available information systems that take into account the specificity of our Arabic language and some grammar rules. There are other problems centered and the development of algorithms for Arabic grammar and the application of weights. In addition, standardization did not perform its role except in some rare cases [26]. Arab standards were not applied in most of them, because Arab countries did not take practical measures to implement them. Perhaps these challenges are also not convinced computer manufacturers the need to devise an Arab operating system design, development

and benefit serve the grammatical rules and benefit from them [27]. Computerization is a requirement for the application of grammatical rules to machine translation from Arabic into foreign languages and vice versa. Common to those who write in Arabic to be a reference point in automatic correction.

## **VII. CHARACTERIZATION OF THE SYNTACTIC SYSTEM AS A MODEL OF COMPUTING**

This approach is a continuation to enable the computer to read correctly the Arabic text is not formed. Expression circulating in the classroom, which is a mental process organized in its own format and structural model controlled by quotations of a particular caliber; Each list contains a set of alternatives [28].

It may be necessary at first to classify Arabic words to the building and the Arabic; This will lead us to confine our efforts to the Arabized name and the Arabic verb. Do not change the movement of the last such as the collection of masculine peace and the five names and the five verbs and present tense and the other [29,30]. It remains to be realized that automated processing - at its relative shortcomings - would accomplish huge work, reduce tremendous efforts and save a lot of money because of its high capacity in containment and high speed in processing time. It takes time to review that book or text after it is created automatically by computer.

## **VIII. RECOMMENDATIONS AND PROPOSALS**

The research concludes with a number of recommendations:

1. The necessity of concerted efforts in the field of computational Arabic grammar between linguists and computer in programming linguistic systems, analysis and processing automatically.
2. The need to consolidate the relationship between grammar and computing and make it an integral relationship; such as the exchange of interests.
3. Grammatical and computer-based interdependence is based on a number of hypotheses, the most important of which is that computer work should be a means to serve grammar.
4. The need to spread computer awareness among grammarians to encourage educational institutions, especially universities, to allocate a course on computerization of Arabic grammar, and find a new specialization follows the Department of Arabic Language, called "Bachelor of Arabic Language Computing (Department of Arabic grammar).
5. The work of language synods should be developed to meet the challenges of computing and initiate software

to develop the IT framework from a grammatical perspective.

6. Printing university theses written in Arabic on the issues of the use of grammar in the computer.

7. The Arab software should not be left to Western companies and research centers, but should be designed by its people.

8. Forming a forum for the pioneers of Arabic digital content from institutions and bodies related to ICT and computer societies.

9. The necessity of linguistic work in the areas of facilitating the Arabic grammar and computerization to answer his models without hardship such as generative and transformative grammar and towards Arab cases ... etc.

10. Taking care of the grammatical differences that aid the engineering of the language and enriching its computerization with the levels of significance and contexts of change of metaphor and the like.

11. There is a clear distinction between scientific grammar, instructional grammar, and language teaching. It is essential to differentiate between these levels in grammatical programming.

12. Rearrange the grammatical lessons according to the cognitive and educational hierarchy and diligence and add educational games using the computer.

13. Design a website that includes all the grammar rules divided into classes and levels of study, which programmers refer to find more than one way to explain and apply the rules, which is easy to program.

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