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Challenges Related to Grammatical and Morphological Processing of Arabic Texts by Means of Artificial Intelligence

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Abstract: - This research aims to study the challenges facing artificial intelligence in processing Arabic texts grammatically and morphologically, by conducting a survey on a random sample of Microsoft Word 2010 users. The research provided a theoretical framework for the subject of the study, as it addressed the concept of artificial intelligence, as well as the general challenges facing artificial intelligence and some challenges specific to processing Arabic texts. The research relied on the descriptive approach, and this helped highlight the importance of the study and provide a comprehensive vision of its subject. The study concluded a set of results, the most important of which are: - There are many challenges facing users in processing Arabic texts grammatically and morphologically, such as derivation, morphology, and the breadth and comprehensiveness of the Arabic language. - The inability of artificial intelligence so far to reach a high degree of quality and efficiency in processing Arabic texts grammatically and morphologically. - The possibility of processing the Arabic language in the future by adding some software operations that help develop the machine's capabilities to understand the Arabic language and the ability to express it effectively, through the use of new artificial intelligence methods, such as deep learning and machine learning. The study recommended a number of important recommendations, which are: - Microsoft Word is constantly updated by Microsoft, in order to ensure the quality and efficiency of the program in processing Arabic texts grammatically and morphologically. - Encouraging students and researchers to conduct more scientific research in the field of automated processing of linguistic texts, in order to enhance the progress and development of this vital field.

Keywords: artificial intelligence, texts, grammar, morphology, challenges, the Arabic language.

Introduction:

Reliance on artificial intelligence has now become widespread in many areas related to daily life, as we find that artificial intelligence software surrounds us from all sides and is considered a scientific and realistic fact that humans live with and help them live and get what they want with perfection. Artificial intelligence software in the Arabic language is a relatively recent process in the field of automation or the ability to deal with the great abundance of information and data available in various forms, which is based on the human factor in the ability to carry out translation or spell or grammar checking.[2]

Artificial intelligence faces many challenges and difficulties in the field of automatic processing of the Arabic language. This shows the way it deals with the vocabulary of the Arabic language as it is very unique and specific, and on the other hand, other difficulties related to the limited capabilities of artificial intelligence to employ these capabilities in serving the Arabic language. , and developing methods for treating them.

The research is based on the ability to identify the challenges facing artificial intelligence in processing Arabic texts grammatically and morphologically.[3] Studying the language ability of humans and simulating it is one of the most important areas of research in the field of artificial intelligence. Language is a means of thinking, expressing ideas and information, and exchanging them with others. It plays a vital role in communication, teaching, learning,

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[2] - Al-Masri, Ahmed (2017) A New Algorithm for Detecting and Correcting the Vertical Skew of Handwritten Arabic Texts Based on Horizontal Segmentation. Al al-Bayt University. Prince Al-Hussein Bin Abdullah College for Information Technology. Jordan.

[3] Salah El-Din, Wafaa (2021) Speech Recognition with Artificial Intelligence Techniques. Journal of the Arabic Language Academy in Cairo. Volume 145.

and meeting human social needs. Techniques for simulating this linguistic ability include most software based on Artificial intelligence, such as expert systems, knowledge representation and machine learning.[4]

The computer has methods for dealing with linguistic texts, because the bulk of human knowledge is limited to linguistic texts, and therefore it is necessary to have methods that enable the computer to process these texts, extract the knowledge contained in them, and use natural language processing and machine learning techniques, and the computer is now able to understand linguistic texts. Analyzing and extracting information from it is due to developments in the field of artificial intelligence. The computer can now recognize the Arabic language and process it more accurately and effectively.[5]

Achieving the strategic vision for developing Arabic language processing technologies and spreading them globally is a challenge that requires more academic research, sustainable development and technology. To develop advanced smart systems that support the Arabic language and enable comprehensive translation and understanding of texts. In addition, these efforts require broad cooperation between researchers, developers, and the Arab community to achieve progress in the field of processing the Arabic language and providing solutions appropriate to the needs of Arab users.[6]

Today, the information revolution is a lifesaver through which we can build a prosperous future and contribute to human development in the Arab world. Therefore, we must realize the importance of this technology and work to absorb and develop it for the sake of progress and technical development.[7]

The Problem of the study:

Artificial intelligence software has been able to develop many automatic linguistic processing systems that mimic human intelligence in producing speech and the ability to analyze it, but there are still a number of difficulties facing artificial intelligence in performing this function in a balanced manner, the most important and prominent of which are good linguistic formation, Arabic terminology, and also Challenges related to parsing and formation, as well as preserving meaning and content in written speech.

Accordingly, the research problem consists of a general and main question:

What are the challenges facing artificial intelligence in processing Arabic texts grammatically and morphologically when applied to Microsoft Word 2010?

Study questions:

• What are the ways to harness software that serves the Arabic language and continue developing language processing techniques?

• What is the appropriate strategy for developing plans and programs for integration between computational and linguistic research?

Objectives of the study:

• Harnessing software that serves the Arabic language and continuing to develop language processing techniques.

• Develop plans and programs for integration between computer and linguistic research.

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[4]Al-Dahshan, Jamal (2020) The Arabic Language and Artificial Intelligence. How Can Artificial Intelligence Techniques Benefit in Enhancing the Arabic Language. Faculty of Education, Menoufia University - Sohag University Educational Journal, Issue 73.

[5] Alharbi, Abdullah Abdulmuhsen (2022) The Uses of Machine Learning (ML) in Teaching and Learning English Language: A Methodological Review.

[6] Al-Masri, Ahmed (2017) A New Algorithm for Detecting and Correcting the Vertical Skew of Handwritten Arabic Texts Based on Horizontal Segmentation. Al al-Bayt University. Prince Al-Hussein Bin Abdullah College for Information Technology. Jordan.

[7] Naji, Salah (2022) Applications of Artificial Intelligence Systems in Content Analysis and a Case Study of Natural Language Processing Systems. Cairo University - Faculty of Arts.

Study methodology:

The study relies on a descriptive approach by examining the challenges of artificial intelligence in processing texts grammatically and morphologically, by conducting a survey on a sample of Microsoft Word 2010 users and identifying the difficulties they face in using this application as a model of artificial intelligence software that processes the Arabic language.

The importance of the study:

The importance of the study stems from its topic, which is to identify the challenges facing artificial intelligence in processing the Arabic language grammatically and morphologically, by referring to the tools and capabilities available to artificial intelligence software to provide reliable scientific content in the Arabic language. Knowing the challenges, then developing strategies through which these difficulties can be solved, confronted and overcome.

Definition of terms

Artificial intelligence is defined as all the systems and devices that rely on it to achieve a set of tasks that improve themselves automatically, based on a set of information that is collected and entered into machines. [8]Artificial Intelligence is also known as a branch of computer science concerned with studying and designing a group of processes that are interconnected with each other in a way that helps achieve success and growth in various fields. [9]It is also defined as the ability to program machines, and make them intelligently, with the aim of interpreting data, and using them to achieve a set of specific tasks, and through flexible adaptation to the surrounding environment.[10]

Previous studies:

• **Abu Ghadeer, Nourjahan (2021) Employing artificial intelligence applications in translating the Arabic language and its problems.** This study aimed to identify the different methods and strategies through which artificial intelligence applications are employed in translating the Arabic language and their problems. This is done by relying on an applied study on a group of programs that encode the Arabic language, and using artificial intelligence software in this encoding and translation. The study concluded with a set of results, the most important and prominent of which is: Artificial intelligence applications have been able to translate the Arabic language, but they have failed in some aspects related to morphology and grammar. The study also presented a set of recommendations, including the necessity of working diligently to improve and develop artificial intelligence software related to the Arabic language. To ensure more positive and effective results.

• **Al-Dahshan, Jamal (2020) The Arabic language and artificial intelligence. How can we benefit from artificial intelligence techniques to enhance the Arabic language?** The study aimed to identify ways in which artificial intelligence techniques can be used to enhance the Arabic language. This is done by relying on the use of this software to keep pace with the needs of the Arabic language in order to rely on it like other natural languages. The study relied on the descriptive approach, by identifying a group of previous studies on artificial intelligence applications used in the field of the Arabic language. And to identify the positive aspects, negative aspects, and problems facing those in charge of working with these programs, and I concluded a set of results, including that these programs are marred by some problems with regard to understanding the sounds and linguistics of the Arabic language specifically. The study also presented a set of recommendations related to the need to increase work To develop software and create everything new related to the fields of the Arabic language to ensure benefit from it.

• **Ben Qabilia, Mokhtaria (2019) Contributions of Algerian informaticists in the field of the Arabic language: The University of Science and Technology in Oran as a model.** The study aimed to identify the contributions of

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8 Mubarak, Hamdi (2022) Efficient Data Collection and Coding for Building Arabic Artificial Intelligence Systems. Revised lecture from previous lectures. College of Humanities and Social Sciences - Hamad Bin Khalifa University - Qatar.

9 Abdulqader, Amal (2021) Applications of Artificial Intelligence to Enhance Labor Market Competitiveness in Academic Information Institutions. Egyptian Journal of Information Science. Beni-Suef University - Faculty of Arts. Volume 8. Issue 1.

10 Naji, Ihdaa (2022) Applications of Artificial Intelligence Systems in Content Analysis and Retrieval Processes: A Case Study of Natural Language Processing Systems. Scientific Journal of Libraries, Documentation and Information. Cairo

Algerian informaticists in the field of the Arabic language, by monitoring the experiences of a group of researchers in the field of the Arabic language, and methods of programming the Arabic language based on artificial intelligence in this field. The study concluded with a set of results, the most important of which are: The programs related to Arabic language programming in Algeria are somewhat weak in achieving the goals assigned to them; this is because it lacks the vocal ability and the ability to follow up and permanent development. The study presented a set of recommendations related to the need to increase interest by Algerian informaticians in the field of the Arabic language in order to keep pace with the rapid and successive changes in the field of the Arabic language and artificial intelligence science in general.

Theoretical framework

Informatics provides important opportunities to serve Arab culture, as its role and influence are increasing at the regional, global, developmental, and political levels. Language is one of the most important tools of culture. Informatics has achieved advanced developments in language processing, allowing machines to acquire linguistic skills such as derivation, morphology, abbreviation, indexing, and machine translation.[11]

If Arab culture does not interact with informatics, a sharp linguistic gap will arise that separates the Arabic language from use and circulation. Therefore, it is necessary to study languages and treat them in an applied manner to create smart information programs and systems that serve society in general, and help improve and develop programming languages for people with visual and hearing disabilities and speech difficulties.[12]

Language is a means of human communication and interaction, and is considered the basic starting point for communication with other cultures and civilizations. The Arabic language is characterized by strict precision that makes it able to fulfill its role in this new technical era, in which information in all its branches is processed, stored, and analyzed linguistically.[13]

Linguists and linguists have begun to think about how to encode language using mathematics and mathematical logic. Scientists such as Chomsky have contributed to the development of the theory of generation and transformation in language processing by defining the goals of teaching the mother tongue, addressing the Arabic linguistic reality, factors of linguistic weakness, and ways to reform and form linguistic skills.[14]

Although the computer is the product of centuries of cognitive and technical development, its designers did not take into account linguistic and cultural diversity during its design, and it has now become necessary to keep it up to date with other languages, including the Arabic language.[15]

Various software and technologies can be added to the open personal computer and developed with relative ease to support different cultures and languages, including the Arabic language. However, existing systems for processing the Arabic language have not gained widespread adoption, due to their lack of suitable practical solutions and their inability to effectively transfer the culture and language of Arab users. And transfer it to the outside world.[16]

Arabic language processing techniques face many difficulties, including the complexity, richness and high level of the Arabic language, and the lack of academic research related to it. Therefore, developing these techniques

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[11] Ali, Reham (2020) An improved framework linking interactive chatbots and emotion mining in Arabic to measure student feedback: a case study. Journal of Contemporary Business Studies. Kafrelsheikh University - Faculty of Commerce.

[12] Naji, Ihdaa (2022) Applications of Artificial Intelligence Systems in Content Analysis and Retrieval Processes: A Case Study of Natural Language Processing Systems. Scientific Journal of Libraries, Documentation and Information. Cairo

[13] Ezzi, Abeer (2021) Factors affecting the adoption of the use of chatbots and artificial intelligence systems and their relationship to customer relationship management. Egyptian Journal of Public Opinion Research. Cairo University - Faculty of Information - Public Opinion Research Center. Volume 20. Number 3.

[14] Yahya, Zainab Hussain (2017) Design and Analysis of Expert System to Measure Software Quality Using EAOMT.

[15] Salah El-Din, Wafa (2021) Speech recognition using artificial intelligence techniques. Journal of the Arabic Language Academy in Cairo. Folder 145.

[16] Rabahi, Muhammad (2021) Challenges of automatic processing of the Arabic language. Supreme Council for the Arabic Language. Volume 23. Issue 2.

requires conducting research in the fields of Arabic linguistics and developing advanced intelligent processing systems that contribute to converting written text into spoken text and vice versa.[17]

Natural language processing and the beginnings of simple processors:

First: Natural Language Processing:

Natural Language Processing (NLP) software is an important tool in enabling human-machine dialogue using a language that is very close to the natural languages that humans use to communicate with other humans. This happens through the use of artificial intelligence techniques. Language is a complex system consisting of symbols, meanings, sounds, and rules. Identification with these elements enables communication between humans.[18]

The term "natural languages" is used to refer to languages spoken by humans, such as Arabic, English, and Russian, while the term "non-natural languages" is applied to programming languages, secret codes, and the like. The field of natural language processing aims to enable direct communication between humans and computers. Whether written or spoken, using the natural human language instead of complex and difficult programming language, this makes it easier for the average user to use the computer and benefit from it in a better way.[19]

Natural language processing software works to analyze and understand texts and speech in a way similar to how humans analyze language. It uses artificial intelligence and machine learning techniques to identify the linguistic structure, meaning, and context in sentences and texts. Thanks to these techniques, natural language processing software can provide accurate answers to users' questions. It allows effective understanding and communication between humans and computers. In addition, the use of natural language processing software contributes to enabling humans to invest in computers in the future. Instead of the need to learn specific programming languages and formulate complex commands, the user can communicate with the computer in his natural language and easily direct it to perform tasks required.[20]

Natural language processing is divided into two parts:[21]

The first section: deals with processing written texts using linguistic, grammatical, and semantic data.

The second section: deals with processing spoken texts using previous data in addition to audio data.

The natural language processing process consists of several parsers and stages, which are:[22]

Syntactic Analyzer: It shows the grammatical and grammatical relationship between words.

Morphological Analyzer: It analyzes single words into their compound components and inflections.

Semantic Analyzer: It builds the correct semantic structure of words that are related to each other in terms of meaning.

Discourse and Pragmatic Analyzer: It includes the stage of selecting meanings that are consistent with the context of the topic and the cultural and social environmental influences.

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[17] Mubarak, Hamdi (2022) Efficiently collecting and coding data to build Arab artificial intelligence systems. A lecture revised from previous lectures. College of Humanities and Social Sciences - Hamad Bin Khalifa University - Qatar.

[18] Al-Dahshan, Jamal (2020) The Arabic language and artificial intelligence. How can we benefit from artificial intelligence techniques to enhance the Arabic language? Faculty of Education, Menoufia University - Educational Journal, Sohag University, No. 73.

[19] Benazir N, Beegom (2018) Role of Information and Communication Technology (ICT) in Arabic Language Teaching.

[20] Ben Qabilia, Mokhtaria (2019) Contributions of Algerian informaticists in the field of the Arabic language: Oran University of Science and Technology as a model. The Supreme Council of the Arabic Language and Abdelhamid Ben Badis University - Mostanganem - Faculty of Arab Literature and Arts.

[21] Mubarak, Hamdi (2022) Efficient Data Collection and Coding for Building Arabic Artificial Intelligence Systems. Revised lecture from previous lectures. College of Humanities and Social Sciences - Hamad Bin Khalifa University - Qatar.

[22] Farghali, Ali (2018) Computational Linguistics and Artificial Intelligence: Implications for Computer Assisted Language Learning.

Second: The beginnings of simple processors:

Programs have been developed to automatically correct Arabic writing; And raising it to the level of stylistic correction to ensure the integrity of Arabic compositions, from spelling (this spelling correction can be simulated with an interactive program that corrects the way Arabic letters are drawn from right to left and from top to bottom) to cognitive representation technology.[23]

This is done by using modern technologies, as interactive literature can be developed by bringing words, meanings, structures and imaginations closer together, by providing eloquent poetic passages that are suitable for glasses and virtual reality, and preparing an interactive digital collection that allows the researcher to choose the topic, and display advanced and modern poems, poems with a single beginning, or poems that are distinguished by With the same rhyme, through the use of linguistic syntax, an experimental school program can be implemented that aims to improve reading and writing skills, as the largest amount of vocabulary and words related to a specific topic is collected, and then the students are asked to write a text on this topic using those words. This can contribute to developing students' writing and expression abilities.[24]

The original linguistic dictionaries can be converted into interactive digital dictionaries, so that the search for words and their meanings is organized in one place, and a specialized scientific linguistic team can be used to supervise the correct uploading of the materials.Linguistic, interactive electronic versions of the original linguistic dictionaries are provided instead of photocopies in PDF format. Linguistic dictionaries can be organized and managed by a specialized scientific linguistic team, which ensures the accuracy of searching for words and their meanings, and provides additional useful information.[25]

Therefore, it is considered a cognitive representation technology that enhances the idea of interactive reading correction, as words are represented according to computer codes and are analyzed on the basis of smaller sound units (phonemes) from a correct linguistic standpoint. This idea can be developed into an interactive reading corrector that is compatible with the rules of the Arabic language, and is not limited to Regular automatic reading.

In addition, an automatic translation service can be provided as part of the idea of a digital dictionary. When the automatic translation option is activated, it can provide a more accurate translation of words and phrases, and thus help improve the accuracy of the translation and provide appropriate options for the user. In these various ways, there is a development of modern technologies to improve Arabic writing. , correcting them, and providing interactive tools that help writers and readers effectively express and understand texts.[26]

Natural challenges in Arabic:

Characteristics of the Arabic language:

Among these challenges are also natural challenges related to the characteristics of the language itself. The Arabic language was distinguished by advantages that made it difficult to treat, including, for example,

Morphological diversity and linguistic flexibility

The Arabic language is characterized by linguistic mediation, from the point of view of the topography of languages, as it combines several linguistic characteristics that it shares with other languages and biases towards

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[23] Yahya, Zainab Hussain (2017) Design and Analysis of Expert System to Measure Software Quality Using EAOMT.

[24] Alharbi, Abdullah Abdulmohsen (2022) The Uses of Machine Learning (ML) in Teaching and Learning English Language: A Methodical Review.

[25] Al-Dahshan, Jamal (2020) The Arabic Language and Artificial Intelligence. How Can Artificial Intelligence Techniques Benefit in Enhancing the Arabic Language. Faculty of Education, Menoufia University - Sohag University Educational Journal, Issue 73.

[26] Al-Dahshan, Jamal (2020) The Arabic Language and Artificial Intelligence. How Can Artificial Intelligence Techniques Benefit in Enhancing the Arabic Language. Faculty of Education, Menoufia University - Sohag University Educational Journal, Issue 73.

the linguistic common, while possessing some unusual and distinctive elements. Semitic languages are distinguished by the morphological characteristic, as they depend on sexual morphological derivation and the phenomenon of pluralism appears in them. Morphological, as for grammatical flexibility, it is characterized by freedom of sentence structure, as the order of sentence elements can be changed with great freedom, and this poses a challenge to Arabic theorizing and automatic processing of grammar, as it differs from European languages that have a specific order of the sentence, and processing Arabic grammar needs to take into account all Possible uses of different Arabic sentence patterns.

As for phonetic regularity, the Arabic language is characterized by a syllabic and accented phonetic system, as words do not begin with consecutive silent letters, and the position of stress in a word can be determined based on the series of letters in it, and this feature facilitates the development of tools for automatic recognition and distinguishing spoken words from others.

Contextual sensitivity:

As for contextual sensitivity, it relates to the interaction of linguistic elements within the context, and is represented at several levels, such as the matching relationship between the adjective and the described, the verb and the subject, the subject and the predicate.

Here we give some examples in terms of the matching relationship between the adjective and the described. The correct sentence: "The tall man is smart."

Incorrect sentence: "A tall man is smart."

In the correct sentence, the adjective "tall" matches the adjective "man" in the masculine and feminine.

Example of a subject-verb correspondence:

Correct sentence: "The man is reading a book."

Incorrect sentence: "The two men are reading a book."

In the correct sentence, the verb "to read" matches the subject "man" in the singular and dual.

An example of the matching relationship between the subject and the predicate

Correct sentence: "The book is beautiful."

Wrong sentence: "Books are beautiful."

In the correct sentence, the subject "the book" matches the predicate "beautiful" in the singular and dual.

Here are some other examples of contextual sensitivity in the Arabic language in terms of:

Number matching between the subject and the verb:

Correct sentence: "The students came."

Incorrect sentence: "The student came."

Number matching between the subject and the predicate:

Correct sentence: "Students are hardworking."

Incorrect sentence: "The student is diligent."

Matching the type between the subject and the verb:

The correct sentence: "The woman rose."

Incorrect sentence: "The man rose."

Matching the type between the subject and the predicate:

Correct sentence: "Women are beautiful."

Incorrect sentence: "The man is beautiful."

Matching gender between the subject and the object:

The correct sentence: "The man honored the woman."

The wrong sentence: "The most honorable woman is a man."

Matching gender between the subject and the predicate:

The correct sentence: "The man is generous."

Incorrect sentence: "Women are generous."

Thus, contextual sensitivity in the Arabic language means that the meaning of a sentence depends on the relationship between the words in the sentence, as the words must agree in gender, number, gender, tense, person, case, body, and other characteristics.

This characteristic is considered a major challenge in processing the Arabic language automatically, as exploiting computers requires special techniques to analyze and understand this contextual sensitivity. As for the richness of the lexicon and its dependence on the root, the organization of the lexicon in the Arabic language depends mainly on the three-letter root (F.A.L), where fifteen different patterns of verb additions can be formed, and each of these patterns gives a different form to the verb, which facilitates word formation and interpretation.[27]

The phonetic system of the Arabic language and the methods of working of grammatical, morphological and semantic analyzers

The phonetic system of the Arabic language is the linguistic model of the electronic language. This is done by carrying out a set of analyzes of the written text, which is a product of the development of computational linguistics and its field. The phonetic processing of the Arabic language is carried out by automated application on a set of written texts by analyzing, changing and transforming them.

The phonetic system of the Arabic language processes something linguistically through the machine. This is done by comprehensively modeling the components of texts in a clear and consistent manner. We can explain how the phonetic system of the Arabic language works through two basic parts: morphemes and phonemes.

So, the phonetic system of the Arabic language is the total processing and linguistic data of the expressed texts, through processing this data, clarifying the rules related to it, expressing it, forming a set of mathematical operations, and completing them with the processing system, which requires research and conducting field research to understand the texts and the possibility of generalizing them.

The following figure shows the possibility of dividing linguistic text in the Arabic language and dividing sentences into a group of partial words that make up it, through knowing the morphological structure of each word and how the words are related to each other.

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[27] Yahya, Zainab Hussain (2017) Design and Analysis of Expert System to Measure Software Quality Using EAOMT.

Figure No. (1) shows the structure of the general system
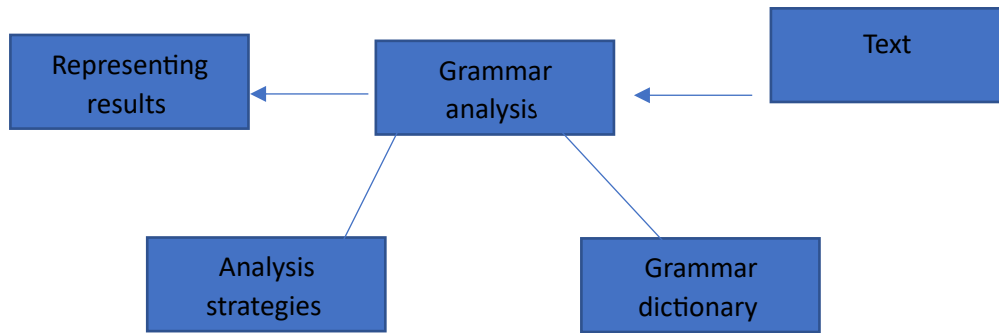
Aloulou ,Chafik.-Conception et développement d'un système MASPAR d'analyse selon un approche agent.-tunisa :Faculte des science economique et de gestion de safaxe ,2004.-10p

The automated processing of the Arabic language is carried out through an important source, which is the digital Arabic language dictionary, which includes a set of rules, data, letters, and nouns. This dictionary helps in accessing a set of derivatives and verb conjugations related to them.

Figure No. (2) Automated Arabic language dictionary

	Root	**Derivatives**
verb	19457	5970488
the noun	39099	1781316
proper nouns	1384	11403
Machine nouns	445	11371
the total	60385	7774938

This automation is within the phonetic system of the Arabic language and the total methods by which grammatical, morphological, and semantic analyzers are used. We can understand these methods through which access is made to the morphological, syntactic, and semantic processor and sentence processing by identifying all forms of the root of the word, and extracting the origins related to them. After stripping them of the appendages and extracting the morphological data for these words to arrive at the root and their morphological scale.

As for grammatical analysis, it is carried out in the light of work on studying sentence structures, the possibility of adding a group of signs when constructing a sentence, and working on understanding the aspects of extraction that constitute it linguistically, based on the grammatical level, which studies the grammatical signs that are attached to the last Arabic words, and how they affect the meaning of the sentence. How words are related to each other in a sentence.

While the semantic level is the ability to linguistically analyze the meanings that words carry, after analyzing them morphologically and grammatically, as the semantic level clearly expresses the different methods in which linguistic connotations are studied in themselves, by trying to discover a group of factors that contribute to understanding the laws of Organizing the language in this direction.

The practical part : Testing the performance of analyzers and text applications on Microsoft Word

The sample:

The study sample is based on a group of users of Microsoft Word 2010, by distributing a questionnaire to a random sample of (50) university students who use the program. To identify the most important and prominent problems they face in processing Arabic texts grammatically and morphologically by distributing a questionnaire.

Testing the validity and reliability of the tool

The internal consistency coefficient for the areas of the study questionnaire was extracted using Cronbach's alpha equation, and the reliability rates of the questionnaire were high and acceptable, as shown in Table No. (1).

Table (1) Reliability coefficient for the study axes

The questionnaire's axes	Statements	Cronbach's alpha
Challenges facing small and medium enterprises	5	**0.874**

Source: researcher. Analysis outputs using SPSS

Basic information

Distribution of sample members based on gender


gender
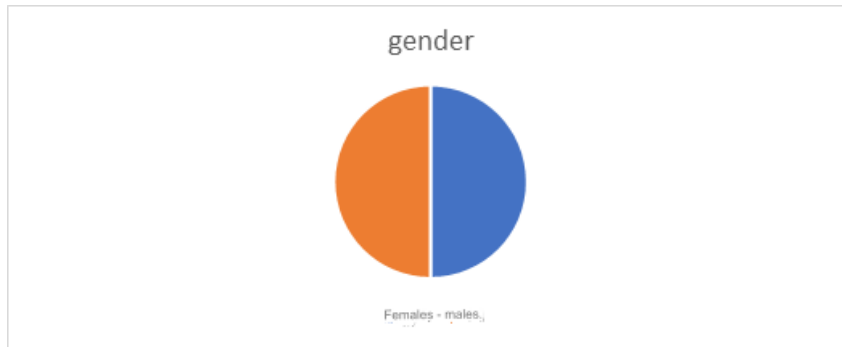
Females - males

A random sample of university students was relied upon, consisting of 50 males and 50 females Distribution of sample members according to educational level

Eduvational level

■ First university grade ■ Third grade ■ second grade
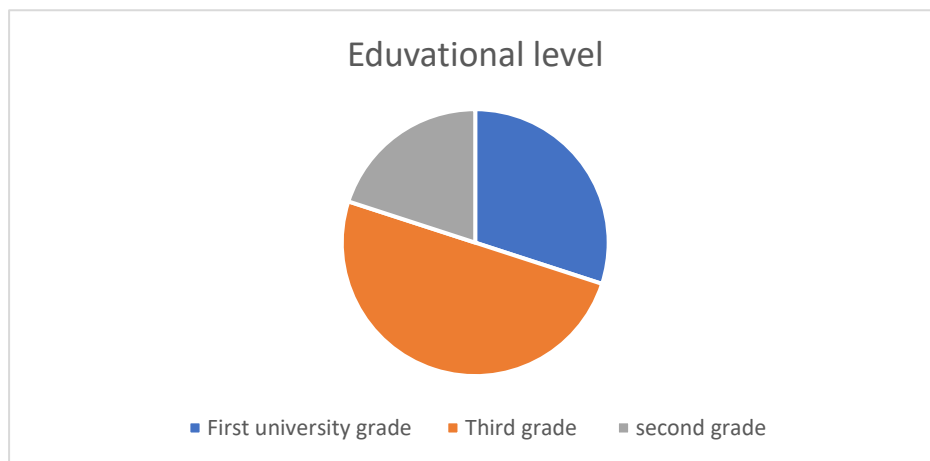
The study sample was divided according to educational level into (15) individuals in the first year of university, (10) from the second year students, and (25) from the third year students.
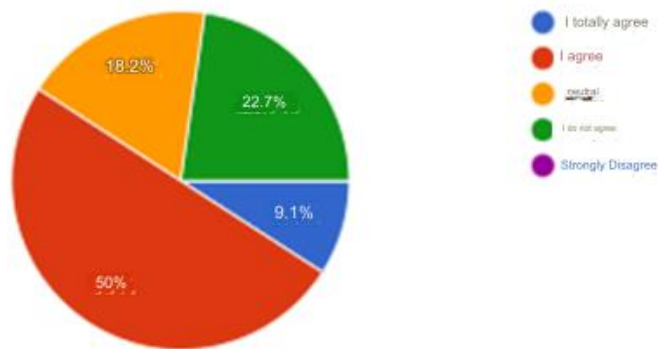
Results of responses to the questionnaire

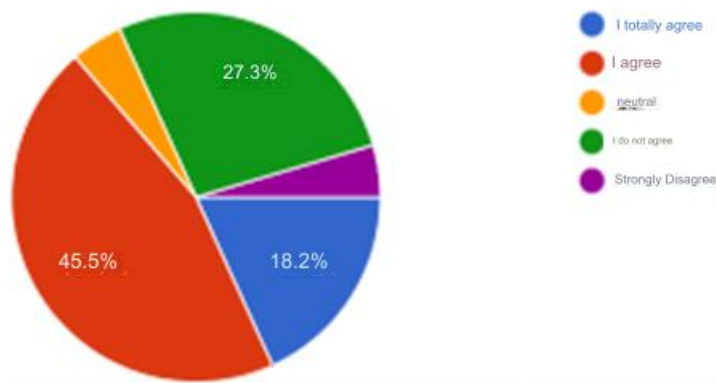I am facing a problem while using Microsoft Word 2010 related to Arabic grammar
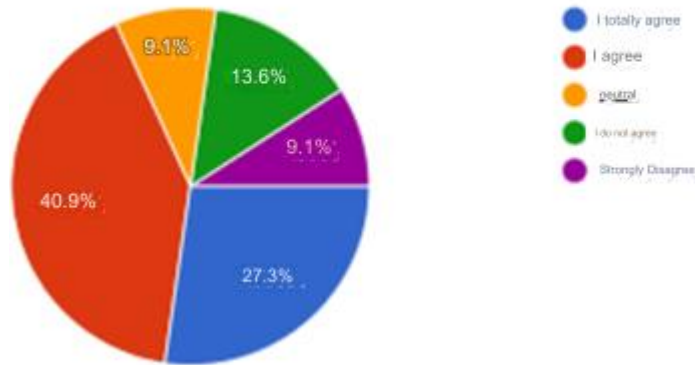
The study sample showed that there were approval rates of 27.3% "strongly agree," 40.9% "agree," 9.1% "neutral," 13.8% "disagree," and 9.1% "strongly disagree." ".

I face a problem while using Microsoft Word related to Arabic morphological rules.

The study sample showed that there were response rates of 9.1% "strongly agree," 50% "agree," 18.2% "neutral," and 22.7% "disagree."

Continuing updates to Microsoft Word 2010 help reduce existing issues

The study sample showed that there were approval rates of 18.2% strongly agree, 45.5% agree, 8% neutral, 27.3% disagree, and 9% strongly disagree.

The program's organizers are interested in identifying grammatical and morphological problems and solving them quickly
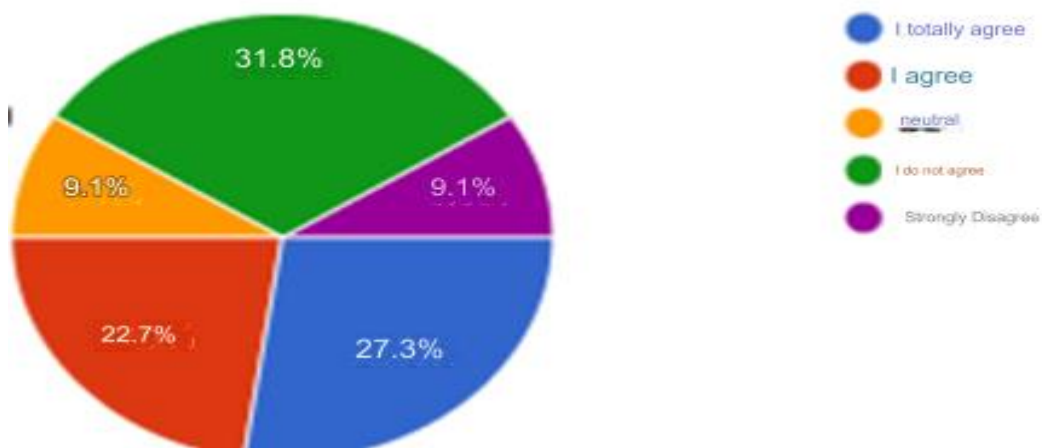
The study sample showed that there were approval rates of 27.3% "strongly agree," 22.7% "agree," 9.1% "neutral," 31.8% "disagree," and 9.1% "strongly disagree."

Results:

The applied study conducted on a sample of Microsoft Word 2010 users showed that there are many problems they face when using artificial intelligence to process Arabic texts. These problems are:

- The inaccuracy of artificial intelligence in determining word type, number, gender, time, person, case, body, and other grammatical and morphological characteristics.

- The inability of artificial intelligence to understand or use some words correctly, such as ambiguous words, as well as some complex linguistic methods, such as the conditional sentence or the constructional sentence.

Based on these results, it can be said that although artificial intelligence has achieved positive results in the field of Arabic language automation, it still suffers from some problems that affect its accuracy and efficiency.

The results also showed that there are some problems related to processing Arabic texts grammatically, morphologically, and semantically at some time, but the continuous updates to the program develop ways to process these texts by adding some software operations that help develop the machine's capabilities to understand the Arabic language, as well as the ability to express it with some degree of clarity. Effectiveness and the possibility of mastering the various methods and strategies through which this language is dealt with, formulated and presented, and familiarity with all its details.

The results indicated that communicating with those in charge of the Microsoft Word 2010 program by presenting the problems that appeared to users contributed to helping those in charge of solving the problems quickly, and in ensuring the development of different methods for treating and solving these problems in a way that matches the needs of these users and helps them obtain a better experience with the program. Permanently and continuously.

Recommendations and suggestions:

The research recommends a set of recommendations, including:

- Paying attention to developing the services that Microsoft Word provides to users on a permanent and ongoing basis to ensure continuity of use and increase reliance on the program more widely and in different scopes, whether at the personal, group, or community level.

The research also presents a set of proposals:

- Increasing scientific research related to the automatic processing of linguistic texts; This is to ensure knowledge of more important and necessary aspects of this topic, and this field in particular. This is because addressing these precise and detailed aspects related to the fields of artificial intelligence and the Arabic language, its grammar and morphology, is a scarcity in scientific research.

- Informing students at universities about the different methods for creating self-processing text programs to ensure that problems that arise during use are treated, and that they do not rely entirely on these programs. To prevent the Arabic language from being distorted or making more errors.

Conclusion:

Today, the world is witnessing a tremendous cognitive development and a scientific and technological revolution, as a result of the rapid progress in the field of information and communications that man has contributed to. This has led to a new dawn of development and cognitive growth, which aims to solve all the problems facing humanity today and explore the horizons of the future. Informatics plays a decisive role today, and the computer has become an essential and indispensable tool in various areas of social, linguistic, economic and scientific life.

Therefore, it is necessary to understand and adopt this technology and work to Arabize it, and to pay great attention to reviving the mother Arabic language and combating the obstacles it faces, such as its influence on local colloquialism, the decline of its classical vocabulary, and its poor and inappropriate use of expressions. We can achieve this by processing the Arabic language using computers and relying on it in various studies and research, in addition to that, following artificial intelligence methods and using its branches, because of their direct impact in solving many difficulties and challenges, making optimal use of technical developments, and adopting computers to effectively contribute to formulating A distinct technical reality for the Arab world.

Information technology has helped reduce the gaps between sciences and arts, and between knowledge and societal experiences. Effective communication between individuals, institutions, and groups is more important than the administrative and economic aspects. These concepts have been strengthened thanks to the development of information technology, as there are greater opportunities to achieve human and social technology that restores... Society has its balance and rationality.The development of information technology reflects positively on the Arab heritage. However, Arabs are still limited in benefiting from and participating in it. As a result of economic, social and development factors, some studies indicate the existence of a digital gap between Arab countries and developed countries.

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Appendices

Questionnaire form

May the peace, blessings, and mercy of God be upon you

After Greetings

Dear Student/Dear Student

In your hands is the following questionnaire, which includes a set of research questions that attempt to survey the opinions of a specific sample of respondents for the purpose of collecting data that is part of the study of this research, which is titled: Challenges of artificial intelligence in processing Arabic texts grammatically and morphologically. I ask you to kindly review and read the following phrases and put a mark (√) in front of the appropriate choice from your point of view, knowing that the questionnaire data and the answers to it are subject to the principle of confidentiality, and are only used for the purposes of scientific research related to the study. With

sincere thanks and gratitude

: Demographic data

: Type

(   )male

(   )feminine

the form

Statement	Strongly agree	agree	Neutral	disagree	Strongly disagree
I face a problem while using Microsoft Word related to grammatical phrasing.					
I face a problem while using Microsoft Word related to Arabic morphological rules.					
I face a problem while using Microsoft Word related to semantic aspects.					
The continuous updates to Microsoft Word help reduce existing problems.					
Those in charge of the program are interested in identifying problems and solving them quickly and effectively.					