Green Linguistics: Programming Linguistic Immunity for Artificial Intelligence

Dr. Assia Sayad [1]

Faculty of Letters and Languages, Badji Mokhtar University – Annaba (Algeria) [1]

Email: **assia.sayad@univ-annaba.dz**

Abstract:

The development of computer systems represents a significant transformation in the field of science and all aspects of society. The use of intelligent automated systems has become evident in applied linguistic research. The question then arises: how can we create a "green" linguistics that ensures the safe and automated generation of specialized language? And to what extent do we need a secure artificial intelligence that protects machine language from empty scientific jargon? This work aims to present procedures that facilitate the efficient use of machines in producing specialized knowledge and to propose linguistic algorithms that strengthen the resilience of artificial intelligence software and its textual output.

Keywords: Computer systems, artificial intelligence, automated generation, green linguistics, linguistic immunity.

Introduction:

The endeavor to develop advanced computer systems represents a significant transformation in the field of science and all components of society. The use of intelligent automated systems has become increasingly evident in the field of applied linguistic research. Consequently, the deployment of artificial intelligence has sparked a critical ethical discourse among scholars concerned with protecting their respective disciplines. This discourse examines the principles and ethics that should guide the development of intelligent software and underpin the foundations of its utilization and application. The central research problem is formulated as follows: How can green linguistics be established to ensure safe automated generation of human language?

The research problem encompasses the following questions:

· What are the risks posed by empty terminology in automated specialized language?
· Is there algorithmic justice in the detection and classification of knowledge and sciences across all disciplines?
· When should a charter for automated specialized language be established and subjected to rigorous directives?

This work is premised on the importance of investigating areas where artificial intelligence may be misused, as language activity algorithms may harbor harmful intentions. For this reason, we have devoted attention to contemporary scientific literature to protect specialized language from random and uncontrolled automated generation. The time has come to govern the process of scientific production through artificial intelligence software, which to date remains insensitive to research problems as integral aspects of lived reality. We pose the following question: What is the correct decision that Arabic language academies should make regarding linguistic terminology generated by machines?

The scope of this work is delimited by the following objectives:

· To demonstrate certain principles of artificial intelligence in specialized scientific production;
· To emphasize the pressing need for ethical guidance in machine algorithms;
· To conceptualize the green intelligent system, characterized by terminological safety.

Our departure point is the ethics of artificial intelligence, which has gained prominence throughout the world. These principles represent the foundations of governance, aimed at enabling specialists to engage ethically with artificial intelligence algorithms[1].

It should be noted at the outset that multiple stakeholders are involved in constructing this automated scientific discourse, comprising:

(1) a language processing database, consisting of language segments annotated with explanatory indicators for structural processing, such as part-of-speech tags or syntactic parse trees;

(2) the speaker and the annotator the speaker produces certain language segments, while the annotator assigns necessary annotations to the raw data;

(3) the curator, who participates in selecting individual documents or creating "research terms" capable of generating a corpus of automated linguistic documents;

(4) and the user, who is the recipient of the automated linguistic system, interacting with algorithms either by participating in system creation, such as in developer tasks, or by using it to meet scientific, educational, or social needs.[2]

1. Automated Knowledge and Scientific Terminology

Specialized language is a technical language used within a highly circumscribed knowledge and scientific domain, employed by experts in that particular discipline for linguistic communication amongst themselves. Its distinguishing characteristics include its function as language of pure research within a given field, such as medical language, legal language, scientific language, and the like. Its foundation comprises specialized terminology; consequently, it requires high linguistic and methodological performance, and cannot be undertaken by those outside the discipline. Its audience consists of specialists in the field or those beginning their training in it.[3] Therefore, specialized language is a functional language for a defined elite, and is entirely removed from poetic language, general language, or everyday tourist discourse and obscure texts in which the producer is unknown.[4]

A "term" is defined as "a name capable of definition within a homogeneous system, constituting an exclusive designation [of a thing], organized [i.e., within an integrated system], and corresponding without ambiguity to an idea or concept".[5]Consequently, a term is a name possessing particular specifications that grant it the capacity to encompass an idea, the capacity to establish relationships with terms of similar structures, and integrated concepts. The term is regulated within the conceptual system of a specific specialized field; thus, homogeneity must be achieved between the term and the system to which it belongs.[6] Therefore, precision in the explanation and clarification connected to the term is necessary for its comprehension, followed by investigation into the space it occupies within the specialized domain. Whenever a term is isolated from its specialized system, disputes and confusions arise between the designation and the idea or concept connected to it.[7] Thus, terms are products of the specialized environment, meaning they are created by specialists according to rigorous linguistic standards to convey a specific concept or idea.[8] There exists a reciprocal relationship between general language and specialized language.[3]

2. Specialized Knowledge and Translation

Translation builds bridges among human communities, facilitating communication and interaction between them. It is the gateway through which the self reaches the other, or through which the other penetrates the self.[9] The impact of translation is perhaps most evident in cultural interaction, as it is embedded within a system of cultural concepts such as cultural exchange, acculturation, cultural penetration, cultural displacement, cultural invasion, alienation, openness to the other, closure within the self, and globalization. Translation is regarded as "the vessel that transports diverse cultural commodities from one harbor to another".[10]Translation is a communicative act that links societies culturally and requires meticulous examination of two different linguistic systems and two divergent cultural dimensions;[11] therefore, "obtaining high-quality translation is difficult, as translation is an arduous task characterized by betrayal and loss betrayal of fidelity and loss of many landmarks of the original text. The translator has two masters to serve simultaneously, a difficult task. The translator can be described as an intermediary in an uncomfortable position, mediating between two parties, each composed of several elements: the first party comprises the author, his work, and the source language; the second party comprises the reader, his comprehension, and the target language".[12]

The truth is that the translator, assuming he has understood the original meaning correctly, still faces two fundamental difficulties: "First, how to cultivate the concepts of the original text within the conceptual system of the target language and its cultural context, thereby facilitating the migration of ideas, enabling the recipient to integrate those concepts into his conceptual system, assimilate them, reproduce them, and create within them, so they do not remain foreign concepts, like migratory birds that lost their way and arrived mistakenly in an environment where they cannot settle, and thus soon depart far away. Second, how to transfer the stylistic techniques employed by the original author, for meaning is

not merely what is said in the text, but also how what is said was said that is, meaning is the result of semantic addition between the text's content and its stylistic and creative techniques. Since each language has its own styles and writing techniques, the translator faces considerable difficulty in adapting the target language to host those techniques without appearing narrow or inhospitable to incoming guests".[13] Furthermore, "most concepts in modern linguistics are new, necessitating the proposal of equivalents; hence the necessity of resorting to neologism, and the means of neologism are either familiar and customary or unfamiliar. Neologism either concerns meaning alone, such as in metaphor and implication, or concerns form alone, as in loanword adaptation".[14] Moreover, "some foreign words have found their way into Arabic through loanword adaptation (al-taʿrīb), which is the pronunciation of a foreign word by Arabs according to their method, following their way and manner of speech. The adapted word is called muʿarrab (loanword), and this adaptation is as old as the Arab nation itself, necessitated by contact with other peoples and the Arabs' need for words that did not exist in the Arabian Peninsula".[15]

3. Automated Linguistic Performance and Linguistics

The consequence of engaging in the individual transfer of linguistic concepts resulted in chaos that obscured the essence and formation of Arabic linguistics: "This crowding and apparent abundance do not indicate breadth and richness, but rather indicate... the chaos that dominates methods of work and a fundamental flaw: the absence of logical method and the lack of general philosophical perspectives in the matter of loanword adaptation".[16] The following table illustrates this chaos in the naming of the

Table 1: Terminological Chaos In The Field Of Linguistics

Foreign Term	Arabic Equivalents
Linguistics	(fiqh al-lughah); (ʿilm al-lughah); (ʿilm al-lughah al-ʿāmm); (ʿilm al-lisān); (ʿilm al-lughawyāt al-ḥadīthah); (al-dirāsāt al-lughawyah al-ḥadīthah); (al-lughawyāt); (al-ālsiniyyah); (al-ālsiniyyāt); (al-lisaniyyāt); (ʿulūm al-lughah)

The following table presents another model of contemporary linguistic concepts:[17]

Table 2: Other Examples Of Contemporary Linguistic Terminology:

Foreign Term	Arabic Equivalents
Pragmatics	(al-tadāwuliyyah); (al-dharāʿiyyah); (al-brāghmātiyyah); (ʿilm al-maqāṣid); (al-nifʿiyyah)
Coherence	(al-tilāḥum); (al-ittiṣāq); (al-tamāsuk); (al-tanāssuq); (al-insijiām); (al-tarābut)
Cohesion	(al-tarābut); (al-rabt); (Formal) (al-tamāsuk al-shaklī)

This situation reflects several pressing necessities encompassing "the ethics of knowledge production and dissemination," which would halt this random flow of terminology that has lost its value when it became an instrument of obfuscation. Therefore, the researcher is obliged to follow certain standards for evaluating appropriate designations from available nomenclature, among which we mention:

· Conformity of the term with Arabic orthography, morphology, grammar, and syntax
· Harmony of the term with other terms in specialized language
· Flexible functioning of the term when transferring the concept
· The role of the term in achieving harmony between the source language and the target language[18]

4. Automated Linguistic Performance and Culture

Culture comprises the totality of habits and traditions, family life, the political and economic landscape, law, and modes of thought. It is the intellectual dimension that represents the society's compass toward values and civilization. Civilization, conversely, consists of a set of skills, technical knowledge, and the capacity to embody them using available material culture; it is thus the reality based on the activation of technique.[19] to achieve the aim of facilitating the use of terminology, to fulfill its hoped-for role in the life of the modern Arab individual, we present certain proposals embodied in the following cultural foundations:

- Awakening Linguistic Consciousness Across All Sectors of Society Language consciousness should be cultivated in all fields of society that constitute domains of daily life, following these principles:
  - Language is an instrument of historical and intellectual communication between preceding and succeeding generations
  - Language is a means of unifying the nation on cultural and civilizational levels
  - Language belongs to every Arab individual and is not the exclusive possession of the elite
- Necessity of Developing Arabic and Elevating Practical Usage Standards

Arabic must keep pace with emerging material and technical developments. This requires:

- The pursuit of Arabicizing educational disciplines in universities and enforcing the use of specialized language, then supporting successful linguistic experiments
- Encouraging scientific publishing in Arabic, recognizing that terminology is not merely lists and glossaries on display, but living organisms within specialized language
- Arabicizing technical, technological, and scientific devices, and activating Arabic in mobile phones, computers, and electronic tablets
- Reviving ancient Arab heritage by directing attention toward Arab scientific endeavors in ancient Arab thought, and highlighting the precedence of Arabic in encompassing scientific knowledge
- Institutional and Academic Development

-Several institutional measures are essential:

- Revitalizing national institutions such as Arabic language academies and their associations to perform their role in specialized linguistic oversight
- Establishing specialized programs in translation and Arabicization in Arab universities, with their work designated according to specific disciplines
- Harnessing all forms of Arab media to serve the Arabic language and elevate itsscientific level, and encouraging the use of proposed terminology lists[20]

5- Specialized Language and Artificial Intelligence

General Arabic language is the source of terminology, regardless of the domain whether religious sciences, linguistic and literary sciences, what is termed automated sciences (syntax, morphology, rhetoric), philosophical and social sciences, administrative sciences, exact sciences, and technological sciences, which today are nearly monopolized by advanced nations, from which we suffer in transferring whatever is feasible for us[21]. The question arises: How does the massive database derived from the Internet represent linguistic and scientific authority among specialists?

The reality is that certain specialized language algorithms embody excessive dominance of particular scientific expressions over others. This cognitive bias may be unhelpful in representing the structure of sciences accurately. Therefore, it has become imperative for specialists to create datasets of documentable magnitude and to exclude data that do not serve specialized language models, particularly those generated outside any knowledge context or philosophical environment, given their capacity to mislead researchers of natural intelligence by conferring unwarranted meaning within the specialized domain.[22]

Rather, specialists are currently confronted with "stochastic parrots" that produce automated outputs biased toward one culture over another, and widen the chasm between truth and scientific illusion through machine training data algorithms. Many specialists in specialized language believe that the automated linguistic performance of models

resembling models of scientific language constitutes correct understanding of specialized language; consequently, we face genuine scientific risks, treating outputs of automated language models as meaningful scientific texts, particularly since such texts are disseminated widely in books, scientific journals, seminars, and other scientific forums where scholars exchange linguistic texts generated according to artificial intelligence algorithms.[23]

The current hope is to advance toward the production of linguistically coherent scientific texts linked to the context of the specialty without confusion and obscurity that might arise from general language algorithms, for instance; or bias toward one knowledge environment over another, or one temporal period over another. The intention behind the consistency of specialized language texts is to emphasize the necessity of binding scientific ideas closely to all that surrounds natural human intelligence when addressing scientific matters with honesty and fairness; natural comprehension necessarily requires the capacity to recognize ideological backgrounds, beliefs, moral aims, and subjective intentions within the context in which specialized scientific discourse occurs.[24] The use of natural language occurs among language speakers who share common linguistic constants that unite them, and through which some can transmit their mental states toward specific issues to one another during specialized linguistic communication. [25] Consequently, natural linguistic communication between humans is an activity shared in its construction, through which the purpose of spoken or written production is realized in a context specific to the mind of the specialized recipient the listener or reader and this cannot occur by relying on automated linguistic training data algorithms that did not include the participation of natural ideas with human specialists. The machine, according to machine learning algorithms, does not possess the capacity to perform those required interactions despite having achieved fluency in automatic text generation. In brief, the generation of specialized linguistic texts by artificial intelligence lacks linguistic competence in its conventionally understood sense, which natural intelligence possesses and which enables it to interpret communicative linguistic acts as acts that convey ideas in a precise, highly coherent contextual structure. The automated specialized language model is a system of arbitrary linguistic tissues based on probabilities for proximate or intertwined linguistic structures without awareness of knowledge context and without concern for the weight of meanings produced. This type of specialized linguistic production falls under arbitrary parrot language.[26]

The truth is that arbitrary parrot language creates cognitive chaos through those automated linguistic models that are alien to the language of specialists. The elite are prepared to proceed toward interpreting linguistic chains belonging to specialized languages they use, based on the assumption that these are meaningful knowledge productions transmitted by individuals among specialists who bear ethical responsibility for what is said.[27] The question that merits consideration here is: How can specialists using artificial intelligence algorithms be alerted to errors in those large language models, particularly given that they are scientific texts that appear superficially coherent and sound? And how can lapses in automated transfer of specialized texts from one language to another be remedied, in the absence of a unified terminological system within the natural specialized environment?[28]

6- Linguistics and Green Artificial Intelligence (Green AI)

The use of artificial intelligence in specialized languages must be ethical in nature. There is serious global discourse regarding the scientific requirements for establishing "green artificial intelligence" and laying the technical standards and practices necessary to realize it in practice. Therefore, it is essential to present the global landscape of current ethics guidelines for the use of artificial intelligence in specialized languages, to benefit scholars in specialized domains, research institutions, innovation and creativity institutions, and all those connected to the targeted specialized language.[29] Among the principles toward which one can orient in the current period are the following:

First: The Principle of Scientific Integrity in Automated Linguistic Performance

The use of artificial intelligence requires that those developing artificial intelligence systems disclose information related to all aspects of user communication; such as specifying the source requesting linguistic generation in a particular specialty (research institution, researcher, research professor, or graduate researcher), and determining the quality of data consumed in generating the required scientific text. From this, a foundation of concrete evidence can be provided, constraining the random use of artificial intelligence software and establishing laws that govern the limits of scientific benefit, raising responsibility for artificial intelligence algorithms and the potential negative impact of generating scientific texts automatically in an unsystematic manner when questions containing "non-specialized terms" or terms requiring re-examination of their concepts by natural intelligence are posed.[30] It is currently possible to implement a technical step to

activate "term banks" actually used in specialized language, to limit arbitrary term generation and confine oneself to the term bank that may ensure the exchange of information faithfully and reliably.[31]

Second: The Principle of Equality in Using Concept Algorithms

The process of representing words, terms, and textual data with scientific, cultural, philosophical, and knowledge-specific dimensions, when processing natural language data, faces a type of bias and diminishment of certain categories. The operation of "fair algorithms" ensures the possibility of supervised machine learning through an automated guide that guarantees fair representation of human minds in their diversity within comprehensive algorithms. These algorithms operate automatically in an intrinsic manner, placing the user engaged in research within a specific knowledge context in a predicament when dealing with similar issues that emerged in the thought of a group of individuals differing in their environment, thinking, beliefs, and knowledge formation, making indirect bias a hidden reality before similar issues researched by specialists.[32] Therefore, to ensure justice in specialized language algorithms, we propose improving the distribution of knowledge data documents using word representation concepts in their Western diversity, then representations of the terms themselves in the Arab concept with its various orientations[33], as the concept must be represented according to its arrangement in the contextual space within which it was formed, and the particular culture surrounding it that contributed to its construction.[34] Hence, it has become necessary to present a precise harvest of diverse intellectual fields, the subjective positions associated with individuals among specialists, and collective beliefs containing those terms, considering that the term is a component of broader discourse.[35] We are presented with a harvest proposal that encompasses education, pedagogy, media, economics, politics, and society.[36] The more comprehensive the representation, the more algorithmic justice is achieved in the use of concepts, and a linguistic network is formed.[37]

7. Ethical Issues in Automated Language Generation Algorithms

The question arises: How can human efforts maintain structures of higher concepts in the construction of scientific discourses?[38] There are substantial efforts that have addressed ethical issues witnessed in the use of artificial intelligence algorithms, all aimed at protecting public data and data of scientific sensitivity.[39] Among the concepts that have emerged for automated governance, we mention the expressions that appeared in studies by certain researchers in the course of ethics in the use of artificial intelligence:

- Scientific data generated automatically must be meaningful[40]
- Software must be accompanied by ethical algorithms of scientific research
- Automated oversight by committees monitoring specialized language and all that has been automatically generated
- Anticipation of unbeneficial linguistic uses of artificial intelligence[41]

Through careful examination of previous studies that have addressed this matter, we have observed that a learner of specialized language in any field of knowledge should:

Respect the constraints of specialized scientific communication with the machine; by using the terms of his scientific field with precision when engaging in automated scientific conversation[42]

Form himself scientifically to enable himself to construct purposeful conversations that help artificial intelligence software benefit from our experience and knowledge in solving major problems

Deal with the machine with human dignity, for it is presumed that the researcher in the specialty should feel that his dignity is preserved after every conversation he conducts with the machine

Conclusion:

It has become imperative for us to think critically, as specialists in a specific scientific field, about the matter of the impact of artificial intelligence software which we employ as a means of research and learning on the field of specialized language. Therefore, emphasis has been placed on the ethics of using natural language processing technology, which may not lead a learner of specialized language to that solid structure we aspire to, given artificial intelligence algorithms' lack of sufficient contextual support for divergent knowledge, and emerging specialist groups' contribution to scientific conversations lacking conventionally recognized terminology. The reality of specialized language warrants scientific concern, particularly as we face the matter of generalizing knowledge and flattening concepts. From here emerges a future vision that may cause scientific stagnation in the natural mind. Therefore, the proposal for the green artificial intelligence

project has come forward, which operates according to strict ethics in processing specialized natural language, advancing toward the governance of the specialized intelligent environment.[43] Based on these orientations, it has become a priority to include a course specializing in teaching the ethics of artificial intelligence and its governance system, ensuring the achievement of beneficial scientific purposes.

References:

[1] Al-ashhab, Khālid. (2000). **The semantic and knowledge structure of generated terminology and its representation in databases and knowledge bases**. In Symposium on Terminology Issues in Literature and Human Sciences (Part 2, Seminar Series 12). Meknes University, Fes.

[2] Azāyīṭ, Banʿīsá. (2000). **Translating foreign terminology between literal tendency and knowledge-based grounding**. In Symposium on Terminology Issues in Literature and Human Sciences (Part 2, Seminar Series 12). Meknes University, Fes.

[3] Ram Mohan Reddy Kundavaram. (2022). **Cloud-Based Data Analysis Identifying Key Financial Influencers at Scale.** European Economic Letters (EEL), 12(2), 234–241. Retrieved from https://www.eelet.org.uk/index.php/journal/article/view/3389

[4] Bender, E. M., & Friedman, Batya. (2018). **Data statements for natural language processing: Toward mitigating system bias and enabling better science**. Transactions of the Association for Computational Linguistics. 6:587-604.

[5] Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). **On the dangers of stochastic parrots: Can language models be too big**? In Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency .

[6] Bolukbasi, Tolga, Chang, Kai-Wei, Zou, James, Saligrama, Venkatesh, & Kalai, Adam. (2016). **Man is to computer programmer as woman is to homemaker?** Debiasing word embeddings. In Proceedings of the 30th International Conference on Neural Information Processing Systems .

[7] Bouchahdan, al-Sharīf. (2002). **Functional language or functional teaching.** Journal of Humanities Sciences, 3. University of Biskra, Algeria.

[8] Fāsī al-Fahrī, ʿAbd al-Qādir. (1987). **Arabic linguistics: Models of achievement and models of horizons**. In Proceedings of the Regional Seminar on the Progress of Linguistics in Arab Countries. Rabat.

[9] Ghāzī, ʿIzz al-Dīn. (2007). **Artificial intelligence: Is it symbolic technology?** Journal of the Thought of Social and Human Sciences, 6, 62. Morocco.

[10] Ḥadūsh, Muḥammad. (2000**). Wandering concepts from one science to another**. In Symposium on Terminology Issues in Literature and Human Sciences (Part 1, Seminar Series 12). Meknes University, Fes.

[11] Hijāzī, Maḥmūd Fahmī. (1993). **Linguistic foundations of terminology**. Gharib Publishing and Distribution Library.

[12] Ḥosanāwī, ʿĀmir, & Aḥmad, Āminah. (2022). Artificial intelligence in translating linguistic terms: Problems and solutions. Al-Iʿāʿ Magazine, 9(1).

[13] Ībd al-Karīm, Amīn. (2000). **Building modern terminology on translation, or on authentic semantic and semiotic values?** In Symposium on Terminology Issues in Literature and Human Sciences (Part 1, Seminar Series 12. Meknes University, Fes.

[14] Jobin, Anna, Ienca, Marcello, & Vayena, Effy. (2019). **Artificial intelligence: The global landscape of ethics guidelines**. Nature Machine Intelligence, 1.

[15] L'Homme, Marie-Claude. (2020). **La terminologie: principes et techniques**. Presses de l'Université de Montréal.

[16] Maysāwī, al-Khalīfah. (2013). The linguistic term and concept formation. Dār al-Amān, Rabat.

[17] Misdī, ʿAbd al-Salām. (1984**). Dictionary of linguistics**. Arab Book House, Tunisia.

[18] Miqrān, Yūsuf. (2009). **The translated linguistic term**. Dar Ruslan, Syria.

[19] Maghmouli, Ismail. (2004). **The term in heritage: The Arab role in foundation and development.** Al-Rāfid Magazine, Sharjah, UAE.

[20] Nwiwāt, Mokhtār. (2006). **General language and terminology**. In Proceedings of the Symposium "Arabic Language and Terminology" (May 19–20, 2002). Faculty of Letters and Humanities, Baji Mokhtar University, Annaba.

[21] Qāsimī, ʿAlī. (2019). **Terminology: Its theoretical foundations and practical applications** (2nd ed.). Lebanon Publishers Library, Beirut.

[22] Qaffārī, ʿAbd Allāh. (2000). **Arabic terminology and modern information technology**. In Symposium on Terminology Issues in Literature and Human Sciences (Part 2, Seminar Series 12).

[23] Qiddoūr, Aḥmad Muḥammad. (2001). **Linguistics and the horizons of language study**. Contemporary Thought Publishing House, Damascus, Syria.

[24] ʿAqīlān, ʿAbd al-Karīm. (2024). **Linguistic expression in artificial intelligence: Arabic as a model**. Al-Qasimiyya University Magazine for the Arabic Language, 3(2).

[25] Suwayssī, Muḥammad. (1989). **The language of mathematics in Arabic**. Tunisian Publishing House, Tunisia.

[1] *Jobin, Anna, Ienca, Marcello, & Vayena, Effy. Artificial Intelligence: The Global Landscape of Ethics Guidelines. Nature Machine Intelligence,2019. 1, 389*

[2] Bender, Emily M., & Friedman, Batya.. Data Statements for Natural Language Processing. Transactions of the Association for Computational Linguistics,2018. 588

[3] See: Bouchahdan, al-Sharīf. (2002). Functional Language or Functional Teaching. Journal of Humanities Sciences, University of Biskra, Issue 3, Algeria, 137–139

[4] Ibid., 139

[5] Hijāzī, Maḥmūd Fahmī. (1993). Linguistic Foundations of Terminology. Gharib Publishing and Distribution Library, 12

[6] L'Homme, Marie-Claude. (2020). La terminologie: principes et techniques. Presses de l'Université de Montréal, 52–82

[7] Ibid., 12

[8] See: Maghmoulī, Ismail. (2004). The Term in Heritage: The Arab Role in Foundation and Development. Al-Rāfid Magazine, Sharjah, UAE, Issue 87, November 2004, 21–23

[9] See: al-Qāsimī, ʿAlī. (2019). Terminology: Its Theoretical Foundations and Practical Applications. Lebanon Publishers Library, Beirut, Lebanon, 2nd ed., 175

[10] Ibid., 175

[11] See: al-Maysāwī, Khalīfah. (2013). The Linguistic Term and Concept Formation. Dār al-Amān, Rabat, 1st ed., 85–86

[12] al-Qāsimī, ʿAlī. (2019). Terminology: Its Theoretical Foundations and Practical Applications, 182

[13] Ibid., 182

[14] al-Fāsī al-Fahrī, ʿAbd al-Qādir. (1987). Arabic Linguistics: Models of Achievement and Models of Horizons. Proceedings of a Regional Seminar on the Progress of Linguistics in Arab Countries, April 1987, Rabat, 35

[15] Maghmoulī, Ismail. (2004). The Term in Heritage: The Arab Role in Foundation and Development, 23

[16] Suwayssī, Muḥammad. (1989). The Language of Mathematics in Arabic. Tunisian Publishing House, Tunisia, 11

[17] al-Maysāwī, Khalīfah. (2013). The Linguistic Term and Concept Formation. Dār al-Amān, Rabat, 1st ed., 96

[18] Ibid., 91–92

[19] See: Qiddūr, Aḥmad Muḥammad. (2001). Linguistics and the Horizons of Language Study. Contemporary Thought Publishing House, Damascus, Syria, 1st ed., 243.

[20] Ibid., 258–260

[21] Nwaywāt, Mukhtār. (2006). General Language and Terminology. Proceedings of the Symposium "Arabic Language and Terminology" May 19–20, 2002, Faculty of Letters and Humanities, Baji Mokhtar University, Annaba, 13

[22] Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the Dangers of Stochastic Parrots: Can Language Models Be Too Big? In Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency, 610

[23] Ibid., 616

[24] Ibid., 616–617

[25] See: Miqrān, Yūsuf. (2009). The Translated Linguistic Term. Dar Ruslan, Syria, 39–41

[26] Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the Dangers of Stochastic Parrots: Can Language Models Be Too Big?, 616–617

[27] Ibid., 617

[28] Ibid., 618

[29] Jobin, Anna, Ienca, Marcello, & Vayena, Effy. (2019). Artificial Intelligence: The Global Landscape of Ethics Guidelines, 389

[30] Ibid., 391

[31] See: al-Qaffārī, ʿAbd Allāh. (2000). Arabic Terminology and Modern Information Technology. Symposium on Terminology Issues in Literature and Human Sciences, Part 2, Seminar Series 12, 256–257

[32] Bolukbasi, Tolga, Chang, Kai-Wei, Zou, James, Saligrama, Venkatesh, & Kalai, Adam. (2016). Man is to Computer Programmer as Woman is to Homemaker? Debiasing Word Embeddings, 1–6

[33] See: al-Ḥasanāwī, ʿĀmir, & Aḥmad, Āminah. (2022). Artificial Intelligence in Translating Linguistic Terms: Problems and Solutions. Al-Iʿā ʿ Magazine, Vol. 9, Issue 1, 191–192

---

[34] See: ʿĪd al-Karīm, Amīn, & (Michel Barbou). (2000). Building Modern Terminology on Translation, or on Authentic Semantic and Semiotic Values? Symposium on Terminology Issues in Literature and Human Sciences, Part 1, Seminar Series 12, Meknes University, Fes, 21

[35] See: al-Ashhab, Khālid. (2000). The Semantic and Knowledge Structure of Generated Terminology and Its Representation in Databases and Knowledge Bases. Symposium on Terminology Issues in Literature and Human Sciences, Part 2, Seminar Series 12, 143

[36] See: Banʿīsá, Azāyīṭ. (2000). Translating Foreign Terminology Between Literal Tendency and Knowledge-Based Grounding. Symposium on Terminology Issues in Literature and Human Sciences, Part 2, Seminar Series 12, Meknes University, Fes, 65

[37] Bender, Emily M., & Friedman, Batya. (2018). Data Statements for Natural Language Processing: Toward Mitigating System Bias and Enabling Better Science, 587

[38] See: Ghāzī, ʿIzz al-Dīn. (2007). Artificial Intelligence: Is It Symbolic Technology? Journal of the Thought of Social and Human Sciences, Morocco, Issue 6, 62.

[39] Jobin, Anna, Ienca, Marcello, & Vayena, Effy. (2019). Artificial Intelligence: The Global Landscape of Ethics Guidelines, 392

[40] See: ʿAqīlān, ʿAbd al-Karīm. (2024). Linguistic Expression in Artificial Intelligence: Arabic as a Model. Al-Qasimiyya University Magazine for the Arabic Language, Vol. 3, Issue 2, 175–177

[41] Jobin, Anna, Ienca, Marcello, & Vayena, Effy. (2019). Artificial Intelligence: The Global Landscape of Ethics Guidelines, 392–393

[42] See: Ḥadūsh, Muḥammad. (2000). Wandering Concepts from One Science to Another. Symposium on Terminology Issues in Literature and Human Sciences, Part 1, Seminar Series 12, Meknes University, Fes, 135

[43] Bender, Emily M., & Friedman, Batya. (2018). Data Statements for Natural Language Processing: Toward Mitigating System Bias and Enabling Better Science, 587