

Artificial Intelligence, Context, And Meaning Making In Language: A Rationalization Approach

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Abstract

This paper undertakes the precarious analysis of meaning theories of languages put forwarded by linguists in various philosophical arguments and their implications in numerous aspects. The study followed a qualitative strategy to examine the syntactic properties of language and paradoxes of meaning-making, the role of artificial intelligence in meaning-making and its implications in real life. The major focus of the study entails the meaning extraction through contextual clues, artificial intelligence (AI), machine learning, linguistic expressions and how to do these expressions effect about address the issues of communication and to highlight the paradoxes of language theories of various philosophers. The opinions, philosophical assumptions, and findings have been critically evaluated in terms of understanding of language theories particularly meaning theories about machine learning. The study sums up that meaning theories have paid a critical role in the interpersonal and intercultural communication in different societies which has created a tremendous change in the use of language in communication. Whereas, the merger of machine learning has no doubts explored novel approaches in making the meaning-making process easier which has made communication more effective. It further suggests that the intuitive view of meaning is necessary to guide a linguistic action. AI not only helps in language research but also solve problems in translation studies, language acquisition, and understanding of meaning. As for foreign language studies, AI itself would keep involve and update as we challenge it in different foreign language education scenarios.

Keywords: Semantics, Justification, paradoxes, meaning theories, communication

Introduction

The phenomenon of language has been the subject of serious study over the centuries. The scientific study of the language is called linguistics. The 20th century, however, claims to be mainly scientific in its approach to investigate the highly complex phenomenon of language. However, let us explain what a scientific approach is, as distinct from others. The most important feature of linguistics is that it is empirical rather than speculative. It operates with verifiable data obtained employing observation or experiment. To be imperial is for most people the very hallmark of science. Language is the system of signals which helps in making understanding the utterances or sounds. Human beings are blessed with the supreme quality of language that makes the man different and superior to all creatures of the world. There are several languages in the world which are widely spoken for communication in societies. Every language is different from the other due to the cultural variety, diversity of society and the region. Even regions of one state have a variety of languages spoken in their societies.

Every language has a system of rules, structure, and features. The syntax of one language is different from the language, similarly, there is the phonemic variation amongst the languages. Based on the variation and diversity of languages, philosophers have generated language meaning theories. Meanings depend upon the connotations, the context for which utterances are made in the communication [1]. There are many ways of conveying the intended meaning to others through linguistic features. Through the historical perspective, there have been many debates on one of the major issues of the nature of meaning. The ancient Greek world first raised the issue and then numerous philosophers subsequently tackled it as well. Furthermore, the field of linguistics appeared to discuss the nature of meaning both in the context of diachronic linguistics and synchronic study. The language of every society is different in all

terms, for instance, dialect, vocabulary, phonemes but the agenda is similar to communicate even there is arbitrariness in one language [2]. For instance, a word bank gives two meanings if it is used in different places in sentences. For example, 'I am visiting the bank in a couple of hours', and a bank of the river overflows when water exceeds, are two examples. But the word 'bank' in the first sentence reveals a building near the road, however, a bank in the second sentence assures the enigma of the sandy area of the riverside. So, language plays a critical role if it is not overlooked syntactically, semantically and grammatically as well. Below are the major philosophical approaches in categorizing the streams of assumptions, theories, and understandings of various viewpoints in a language.

This study explores the linguistic theories pertinent to meaning-making, extraction of meaning through the linguistic choices, clues and the influence of machine learning in the language learning process based on theoretical underpinning and philosophical debates of various linguists.

The context in machine learning

The connotation of many conceptions varies according to its specific context, which highlights the need for the ability of acclimation to the context. Widmer proposed a two-layered model embedded in METAL(B), which adjusts itself according to the changing context. METAL(B) comprises of two devices, one responsible for regular on-line learning and classification task, one for contextual clue identification [3]. Contextual clue concerns those features which do not interfere learning process directly and help anticipate which feature functions well at a certain point of time. In the same vein, Turney claimed five methods used to reveal context-sensitive features and two approaches retrieving implicit information [4].

A failure-driven model presented for contextual analysis which successfully achieved higher learning chances by 17% and heuristic improvement of the system by 10% [5]. Behaviors detected by the context analysis program are to be projected into a rectangular coordinate system of context, whose description sheds light on a series of other behaviors. Accumulation of such descriptions helps people/machines understand all the behaviors. The contextual information would not interfere learning process straightforwardly but does affect it to some extent. Moreover, contexts with the same values on strategy axes and roughly equal values on focus axes are considered to be analogous. Accordingly, context 1 (clarify finding, surgery) and context2 (clarify-finding, neurosurgery) is deemed to be highly relevant. In conclusion, machine learning is in accord with incremental knowledge acquisition.

Previous Studies on Context, Knowledge, and Meaning Making

Bloom et al. (1992) proposed a task-driven approach of knowledge acquisition which presented contextual information to guarantee that the obtained knowledge was what one needed to solve the problem [6]. Another approach that is facilitating users in decision-making which put the knowledge into a specific context. Those approaches have one common shared foundation that developers tend to present knowledge in a specific context and utilize the knowledge only under the designated context [1]. Context is mainly determined by factors which have shaped the knowledge base. People do not have to make a sweeping assumption over the knowledge they obtained, but are supposed to document the context in which the acquisition happens.

However, knowledge acquisition was never easy. Even those actions which seem to be simple, such as remembering cellphone number, rely heavily on context. The preset knowledge that humanity has, such as knowing what a phone is and the keypad style, cannot be accessed easily by a machine. Clarifying context is of great importance, which enables the compurgation between disparate contexts and the amendment of output produced in different contexts. Although disadvantages still root in the approaches discussed above, they are all considered to be methods of incremental knowledge acquisition in context.

While talking of artificial intelligence which has brought revolutionary changes in meaning-making through linguistic clues, context, and transfer of knowledge. The context of acquiring knowledge is usually considered before the system is built, or when the system is being used. Musen et al. (1994) introduced a series of toolkits designed for the construction of intelligent software environment,

namely, MAÎTRE, DASH, and PROTÉGÉ-II. Toolkits in the PROTÉGÉ-II package clarify the detail features of each problem-solving approach in stock to characterize each approach's ontology and then determine its function/part/responsibility in the operation process. PROTÉGÉ-II package permits automatic selection of approaches suitable for a specific task from the stock of approaches and domain ontologies [7]. Whereas, the other option, considering the context when the system is being used, tends to put the knowledge in a specific context. New information would only be encrypted into the knowledge base when building the system, during which the information needs can be completely interpreted. This option concerns the incremental knowledge acquisition (steady growth of knowledge). There has been an increasing amount of literature discussing different methods to obtain knowledge.

Compton and Jansen (1988) mentioned the update of the system by adding new regulations straightforwardly to the existing context. Those regulations would not come into effect unless the former ones lead to the inappropriate output. Therefore, new regulations are evaluated in the context well controlled by developers [8]. They further suggested a justification-based way of language obtainment, which distinguishes active participants/users and elicitation devices in the process. In such a way, all the information collected from participants/users would be incorporated into the original model with the use of justification devices. The justification-based way of language acquisition is practical and sustainable due to the users' consistent input.

Language Theories and Context in communication

Firstly, Kripke's philosophical hullabaloo in a language. He argues that there are some disputes among philosophers about a priori, analytic, necessary and certain. Kripke differentiates "a priori" from "analytic". However, on the other hand, Kant says that a priori truths are those which can be known independently of any experience. It means it is possible to know this independently of any experience. Kripke considers it a mistake. He thinks that a priori knowledge maybe based on experience. For example, when a computing machine gives us the prime number and we believe that the machine is correct and our belief is based on evidence [9].

Whereas, Kripke also presents the necessity and contingent. Sometimes it may just mean a priori and sometimes it is used physically and can be distinguished as a physical and logical necessity. He further argued and is concerned about the metaphysical concept. To him, there might be something true or false and if something is true that might not be necessarily false and vice versa [9]. Keeping this view in mind we can think of a question, that world should have been different from the way it is? If it is no, then this is a necessary fact. If it is yes, then the fact about the world is contingent on one. It is not concerned with someone's knowledge. It is purely a philosophical issue and not a definitional concern. Here both the concepts "a priori" and "Necessary" are vague and these two terms are addressing two different areas. One is epistemological and the other is metaphysical. To support this view, he adds the argument from Searle's article on proper names according to which the referent of the name is not identified by one description but by a cluster and further contended that there are two ways to view the cluster concept theory and a single description. While exploring the meaning provided in various assumptions made based on philosophies, the following different theories of language provides a great insight to understand the enigma of human language and its rationalizations.

Referential theory entitlements that the meaning of an expression or a word refers to what it points out in the real world. Furthermore, words function as an apple; it refers to an actual apple in reality because of some strings well-formed. For instance, 'the cow ate grass' or 'grass cow the ate'. 'If a child is taught by his parents about the meaning of a word like apple, there are pretty high chances that they point to a picture of an apple or a real one. In the same way, words also refer to a thing (action, entities or relation) that exist in the outside world. However, there are many problems with the referential theory of meaning because not every word refers to an actual thing. It fails to explain other semantic characteristics because there seem to be nouns that do not name individual things or even abstract things which generally referred to as intention or connotation. Gottlob Frege, a German philosopher, pointed out this issue by comparing the following sentences.

- (1) The morning star is the evening star.
- (2) The morning star is the morning star [10]

Both stars refer to the planet Venus, depending on the relative position of the earth or Venus appears in the morning or the evening. So Sentences (1) and (2) significantly different from each other because Sentence (1) expresses an important astronomical truth whereas sentence (2) a simple repetition. Both sentences are not giving the same meaning but a referential theory of meaning does not explain the difference between these two sentences [10].

Furthermore, Frege (1997) proposed a solution to this problem of the referential theory of meaning by making a distinction between *Bedeutung* (reference) and *Sinn* (sense). He further claimed that *Sinn* is the cognitive representation of an object while *Bedeutung* refers to the actual object. In the above paradox, this distinction expresses that words can have the same referent with a different sense [10]. It also associates with philosophers (e.g. the Young Wittgenstein and Bertrand Russell) and gives a direct model of significance, however, the above-mentioned example have demonstrated that it does not cover all the aspects of the meaning of words. Besides, it is incapable to answer how we should continue with these 'meaning references' computationally.

The Greek philosopher Plato presents another solution to the issue of meaning which has been popular through the history of philosophy. A mentalist theory explains the meaning in terms of mental states of language use. It claims that a particular word associates the meaning with a particular idea in the human mind. Moreover, this theory gives an effective solution to the morning/evening star paradox. The morning and evening stars might be the same thing but the idea of morning star differs from that of the evening star. Moreover, this theory explains how this notion of the idea involves because it cannot be said that each individual has the same mental representation. If one person listens to a word apple, he might think an image of a dessert plate that is covered cream. Another person can think apple with powder sugar or some other may imagine with some pop-up. To be usable, the notion of the idea needs to reach the individual level. Yet, it is hard to accomplish this speculation without depending on the idea of thought that has some way or another strangely present in individuals' psyches. This isn't the course we need to wander into, particularly if we need to execute semantics computationally. We should have a theory that does not depend on ideas or referent.

The ambiguity that appears to encompass the mentalist view about the meaning of words has driven individuals to stick to 'recognizable' actualities. With the popularization of the behaviorist development that When we say that a linguist aims to be scientific, we mean that he attempts to study language in the same way as in scientific studies physics or chemistry that is systematically and as far as possible without prejudice. It means observing language use is forming a hypothesis about, testing this hypothesis and then refining them based on evidence collected. When a linguist makes a statement about a language he makes it based on observation. First, he observes semantically linguistic events, he finds some symbiosis similarities and constructs based on his observation. These are tested by further observations and out of them is constructed a theory of how language works.

The sort of synonymy needed "merely such that any analytic statement could be turned into a logical truth by putting synonyms for synonyms. "If we assume analyticity, we could define cognitively synonymous, we could say that "bachelors" and "unmarried men" are cognitively synonymous if and only if "All and only bachelors are unmarried men" is analytic. But an account of cognitive synonymy is needed that does not depend on analyticity. E.g. in "Necessarily, all and only bachelors are unmarried men." the term "necessarily" already depends on the concept of analyticity. On the contrary, Hookway negates the idea of constructing meaning from the hypothesis of manuals which are used in the translation. According to him, such meaning creates ambiguities in all terms and advocates that translation manual and constructions of the meaning theory are similar in context and constitute a similar meaning in a language. In other words, semantic theory delivers for every declarative sentence of the language. It states that theorem which explains the meaning of a sentence in some ways. According to Frege's point of view, the sense of any sentence is its truth condition. As explained by the example "**Snow is white**" now a theorem will explain its meaning of the statement and its truth condition [10].

Besides, Kripke was a philosopher who argued the limitations of the theses developed by earlier philosophers regarding the philosophy of meaning [9]. These include the connotation denotation by J. S. Mill, sense and reference by Frege, Description theory by Russell, etc. Kripke developed his theses based on the views of earlier philosophers. He negated them with the help of examples and explained the limitations of these theories. He introduced different models for the analysis of the earlier theories [11]. These include modality, epistemic, material equivalence, metaphysical existence, the difference between a priori and necessary conditions and contingent as well. In the end, Kripke also admits that he did not give any clear solution to the problems found in the existing theories and notions regarding meaning, sense, and reference. Kripke also introduces the causal-historical theory of reference to the notion of rigid designators. He claims that he has presented a comparatively better and broader picture that excludes the limitations of the existing theories. Although his elaboration points out the flaws in the existing theories, he does not suggest a compact solution to these problems and leaves the readers in a lurch in the end [12].

Focusing on the phenomenon of how meaning can be gained through the descriptions of ideologies and perspectives various philosophers it may be said that the notion of “sense” developed from the concept of different “theories of meaning”. Aristotle, Augustine, and Aquinas discussed the types, elements, and definitions of meaning. They assert that meaning is a relationship between two things, sign and the kind of thing they mean. The modern interpretations of the notion of meaning include the psychological theories, logical theories, content/ message, content and usage, truth conditions and measurement. J. S. Mill presented the view that the semantic contribution of a word is its referent only. Although Mill was not the first one who presented this view. He asserts that the semantic value of the name ‘Aristotle’ is Aristotle himself is intended [11]. On the other hand, Russell applied the concept to ordinary, but not what he called “logically proper” names like ‘this’ and ‘that’. According to Russell, ‘The Morning Star’ and ‘the Evening Star’ might correspond in semantic value to different definite descriptions, and would make different semantic contributions to the sentences in which they occur. In this way, the semantic contribution must, as on the sense theory, be connected with cognitive significance. Moreover, a thinker can often be acquainted (on Russell's view) with the property in the semantic value of the corresponding description where they cannot be acquainted with the individual the name refers to.

Coordinated Management of Meaning Theory

Mittal and Paris highlighted that communication (primarily as part of interpretation) and context restrain each other. Context initiates behavior potential, which consequently changes the context itself. To improve and enrich the explanation model, context and communication tend to combine various concepts of context as elements of a global image [1]. They establish an intention-based interpretation framework which contains two layers of the context, the participants and the discourse. Meanwhile, they emphasize the other aspects of the situation, such as the manner of interaction, the on-going discourse, and the external environment. Lots of systems adequately represent various aspects of the context (domain model, task and method descriptions, execution traces, etc.) employed by their components, but do not explicitly use context.

Message generation/interpretation takes place in a single context, which in most cases is supposed to be shared by all participants. Cahour and Karsenty claimed that five types of components are necessary in characterizing the context of dialogue, namely, the dialogue memory, the task memory, the environmental situation, the psycho-social situation, and the general knowledge about the world. These components function as “knowledge base” in that each participant has its interpretation regarding the same context. Interaction failure is usually caused by the misunderstanding of the shared context [13].

By clarifying the context, one can modify paradigms that are well known in AI. For example, Reichman restated the two concepts, quantity, and relevance, proposed by Grice. Interface for complicated tasks depends upon a certain kind of cognition model. The term “context” put forward by Grant for the conceptual entity shares similarities with human cognition. The contextual model view is formulated on the very basic hypothesis that human knowledge can be separated into small pieces.

Therefore, it is universally acknowledged that contextual information is saved in long-term memory and recollected altogether when necessary for problem-solving.

Discussion

Context is of particular concern to clarify the problem-solving conducted by both humans and machines. People pay special attention to the connections among cooperation, context, explanation and incremental knowledge acquisition. Contextual information is quite essential in those fields where actions drop hints on reasoning and interpretation and can only be analyzed by observing experience. The definition of context is far from being settled. The context appears to have dual nature of static and dynamic, discrete or continuous, knowledge or process. This obvious dual nature stems from the fact that the concept of context depends on its cognitive science versus engineering perspective in its interpretation, which leads to the difficulty in merging the different concepts of context unless consensus is reached. As a result, context is viewed as a concept that includes complex topology, an ontology, a shared space of knowledge, a consistent set of propositional assumptions, a semantic background, the environment of communication, a set of restrictions that limit the access to parts of a system, etc.

Drawing on human and machine problem solving, computer system acceptance seems to depend heavily on the input and modification made by its users and the system intervention between the user and the task at hand, which is not the same as the causal designers' system. McCarthy believes that there is a shared context beneath all detail contexts that emerged in dialogue and every term and condition can be addressed. In line with another approach, Giunchiglia considers a series of individual contexts at the same level and the relationship between them (through context bridging rules for in and out of context) [1].

There are two types of memory in the context system, namely, long-term memory and short-term memory. Context is stored in long-term memory and recollected altogether to accomplish a certain task. Determining whether you need to save all past contexts or have a series of basic contexts that can be combined to reveal complicated contexts to properly represent a particular situation is quite different.

According to McCarthy, a lot more efforts are to be made in writing the axioms instead of building a logical mechanism to establish a context-based system. A device called context manager can generate interpretations of the source and target contexts to enable an appropriate knowledge transfer from the source one compatible to the target one, which is certainly a vivid example of contextualization. The context manager is supposed to save all possible information and offer easy access to and clear interpretation of the information, producing new information based on the knowledge in stock and helping users decide problem-solving. For instance, a helpful context manager would create compatible user requirements and a database conceptual schema. However, it has to be noted that only the presentation of knowledge rather than the modeling of knowledge can be dealt with by the context manager, which makes context manager functions as a filter in the process. The dual nature of the context manager makes it possible to prepare the necessary knowledge for the current task and retain the rest of the knowledge.

Context organizes the knowledge base as traceable units in a hierarchy to decide when the knowledge should be used. Context is comprised of a series of concepts that characterize the terms used to encode ontology knowledge and requirements which regulates the way these concepts are established. Therefore, contextual information is displayed as a block of reasoning. But the interpretation of the usage of certain knowledge in other situations is quite difficult.

Nevertheless, the relationship between context and knowledge is far from being clarified. One may contextualize knowledge based on the steps to resolve problems. Contextualized knowledge tends to be overtly examined in problem-solving and influence the situation implicitly. Contextual knowledge may evolve to be new knowledge in another context as a problem getting resolved. Accordingly, it has to be mentioned whether it is formulated in the overall or a specific step of the problem when presenting the operational definition of context.

MacCarthy proposed the equation (CP) in which P sets out to define characterize context by clarifying all implicit contextual information which grants meaning to P. In other words, context functions as a reference frame suggesting the information not expressed in the story, making implicit things not directly

involved in problem-solving [14]. Therefore, it is necessary to characterize context as information which limits the way of solving a problem without direct intervention. Work in AI mainly involves the contextual representation of nested knowledge. Lots of questions remain unsolved, for example, whether the context is part of the knowledge base or only a particular one? How context and meta-knowledge, context and knowledge representation, context and time, context and decision associate with each other? What are the relationships between the contextualization process and control knowledge?

The four factors, data, algorithms, computing power, and scenarios have exercised much power in the development of artificial intelligence. The quality of large-scale data lays the foundation; scenarios optimize the roadmap of new technologies which in turn influence the quality of data construction. Although Artificial intelligence has generated tremendous changes in scientific research in multiple ways, we should always handle it with careful consideration instead of following the trend blindly.

Conclusion

The present study addresses the complexities, and normality of language meaning theories with the perspective of many linguists and their philosophies in understanding the paradoxes of meaning. However, it may be summarized in the way that no final solution to the problem of sense can be extracted by the views presented by different philosophers. Although they explain the faults of the existing theories in a persuasive way, and his views broaden the scope of philosophy of meaning, yet no claim can be made that their views are a final solution to the problem regarding meaning, sense, and reference. Even his Causal Historical theory also lacks vastness to meet the problems convincingly. Meaning theories suggest people's actions form the social worlds around them and the idea behind the development of this theory is that people construct their social realities and those social realities are formed through dialogues and conversations in which the words and their meaning mean a lot. Furthermore, it can be justified in the end that meanings are the construction of social norms, and it gives a boost to govern some relevant terms which are usually the product of the environment. So, philosophers consider language as a literal perspective of communication which enhances the credibility of talk, helps in understanding others' stance and makes an impression of a substantial role in communication. A many of philosophers suggest that there is a variation of language use from person to person, place to place, e.g. highly qualified people discourse seems entirely different and poets use metaphorical diction in their poetry, literary person use figure of speech or literary terms in their language and laymen take the support of colloquial language for communication. To sum up, the researchers would suggest that basic semantic knowledge is necessary for everyone to understand the complexities, semantic context, and variation in the expression of language. Afore-mentioned philosophical description of language theories provides deep insights and clarity to inquire and understand the ambiguities in meaning, origin, and relationship of language with context.

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