RESPONSE TO THE VAGUENESS OF LANGUAGE THROUGH THE LENCE OF FUZZY LOGIC

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Abstract

Fuzzy logic is a powerful mathematical tool for visualizing the vague and ambiguous concepts present in our common language. The problems of vagueness and uncertain concepts have been the prime issues in natural languages. Due to the vagueness and ambiguity in languages, propositions may consider as vague and ambiguous. *Propositions are the pictures of the world or propositions depict the world.* In this way, the nature of the world may be vague. Any proposition is either true or false. This opposition is based on the two fundamental laws of traditional logic: principles of excluded middle and the principle of non-contradiction. These

two principles have been caused many paradoxical situations. To overcome this situation we need to overcome first the strict truth bivalence of logic. There is a need to accept an intermediate value between true and false. This is called three valued logic. If three valued logic is insufficient then it is needed for four valued logic and so that multi valued logic. Fuzzy logic is multi valued logic. So, it has been said that where the traditional logic ends, from that point multi valued logic or more specifically fuzzy logic starts. This paper is tried to focus on that fuzzy logic provides us a meaningful and powerful representation of vague and ambiguous concepts presents in natural language.

Keywords: Vagueness, uncertainty, truth-bivalence, multi-value, fuzzy logic.

1.1 Introduction:

The 19th century development of modern logic has been witnessed the gradual transition, about the problem of vagueness sometimes considered as similar to uncertainty, ambiguity and fuzziness in natural language as well as in many other philosophical analysis related to the natural language. This problem is an integral part in the domain of natural language. There are several theories of vagueness that has been emerged in the late 19th century which are not equal to the probability theory of traditional account of dealing uncertainty and vagueness. According to

the traditional concept, it is probability theory which is based on the Aristotelian bi-valued logic regarded as the tool for capturing the uncertain and vague concepts[1].

Reality is sometimes more or less vague. There are two ways in which it is viewed that reality is vague. Firstly, the combination of objects is vague to describe the reality and secondly, the properties of those objects are vague. A term is vague if it has no precise definition and it refers to a border line case. For example many predicates such as tall, bald, fat, thin having the borderline case considered as vague term, because they have no precise boundary between 'is tall' and 'is not tall'. If a proposition 'a person's height is 6 feet' describes the fact that 'he is tall' then a person whose height is one inch less than the person having 6 feet height also considers him as tall person. Again , if another person's height is less than the second person , it also considers that person is tall. In this way, we will come to a very nonsensical situation that a person whose height is one inch has to be considered as tall. The other such predicates considered as vague in the same way.

In the philosophy of language the problem of vagueness is illustrated by the Sorties paradox of 4th Century BCE. According to the Sorties paradox, if there are 100 persons standing progressively to their height, the line starts with the man who

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[1] Klir, G.J., and Yuan, B., (1997). *Fuzzy Sets: Theory and Applications*, PHI.pp.1-3.

is short and ends with the man who is tall. Now, if the first person (N) is short in height , another person (N+1) is also short in height. In this way all the persons (N+1+1) , (N+1+1+1) etc. and finally the last person who was tall has to be considered as short, because there is no precise boundary to determine the height of the person between 1 and 100. Many analysis of linguistic philosophy has been influenced by the problem of vagueness. In this connection, three views of analytic philosophers have been considered here. These are as follows:

1.2 Wittgenstein's view on vagueness:

Tractatus Logico-Philosophicus (1921) and *Philosophical Investigation* (1953) are the two most important contributions to the history of analytic philosophy of Ludwig Wittgenstein (1889-1951) in the development of the twentieth century analytic philosophy. The introduction of *TLP* was written by a great philosopher Bertrand Russell (1872-1970) in the support of his philosophical thought. Language purports to communicate, to express thoughts and ideas, feelings; beliefs etc. language may be decisive in framing of our thoughts and ideas if its inner logical structure not be distinctly revealed.

In *Tractatus*, he presented a representational theory of language. He said, "The world is the totality of facts, not of things".[2] According to the *Tractatus* , all the facts i.e. states of affairs are interconnected in a logical way in order to claim that states of affairs whether actual or not, the object or the fact of the reality must be corresponding to the picture of it. If it corresponds to the picture of it, will make the representation true otherwise it will be false. After the critical analysis of his picture theory of language he had shifted his complete thinking about the language from the dogmatic approach to the anti dogmatic analysis. The transition of early Wittgenstein to the later Wittgenstein is just to revisit language from its formal analysis to the ordinary language form. In *Tractatus* he also wanted to discover the elementary elements through the logical analysis of propositions that he turned away in *Philosophical Investigation,* which is the most detailed presentation about the philosophy of language and meaning to the everyday language with the use of terms which are conventionally defined, as he thought meaning of the word determined by its use.

In his *Philosophical Investigation*, Wittgenstein introduced the most crucial concept 'language game' to replace the traditional view that proposition is the collection of logically ordered words which has a restrictions of uses with his new

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[2] Wittgenstein, L. (1922). 'Tractatus Logico Philosophicus' , Trans. By. C.K. Ogden, Chiron Academic Press- Sweden. p. 25

concept that words may have multiplicity of uses, diversity of uses. The concept of language game describes and proves the possibility of multiple and diversification uses of languages instead of its limited uses. Wittgenstein does not refer any restriction of the rules in a definite way for the language game instead he empowered the human insights with its conventional nature. So it cannot be claimed a standard and general definition of 'game' so that the use of the word 'game' can be generalized. Now let us take into consideration the most suitable explanation of 'family resemblance' to point out that the word 'game' can be used for various human activities without any similarity to all the activities. For example, there are many human activities defined as 'game' like cards, football, and hockey etc. though they all may not possess a single common feature that would define all those activities as 'game', at this point he presents the concept of family resemblance. Family resemblance does not mean that it is necessary for all the family members have same characteristics. They may have various characteristics though some of them may share some of them. In this way all the 'games' do not shared all the features but they all resemble with each other in other way. Not only the word 'game' but all the other words get their consistent meaning.

Perhaps, to get the meaning of the word all the features of that word generally overlapped so that family resemblance may not provide any exactness for the

different use of the same word. It is much clear that the concept of family resemblance lacks the precise boundary of exactness. If the precise boundary of exactness for any word and its family cannot be found for the definite use of such a word in the linguistic system then the fact is the usage of the word is inexact or vague. According to Wittgenstein, vagueness has been considered as essential phenomena of our language, thought and reasoning. Our language cannot eliminate its essential feature as vagueness, it does not follow that neither he was in the favor of vagueness nor his intension was to construct logic of vagueness. What he actually tried was to resist the strict necessity of the ideal exactness and also he was completely opposed the position that the essential feature of language should be eliminated from it. This crucial point of his philosophy has influenced to construct such a logic which could be the logic of exactness or vagueness. Unlike Wittgenstein, Frege and Russell both were in the search of ideal language and may say that the logic of exactness or vagueness which can ideally represent the uses of terms exactly. According to Frege, scientific work deals only with the precise use of terms. As R. Seising quoted from *Philosophical Investigation*, "…Frege compares a concept to an area and says that an area with vague boundaries cannot be called an area at all."[3] So it has been seen in Wittgenstein later work , that there

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[3] Seising, R. (2011). Language, Thinking, Meaning-and Fuzzy Logic. Brains, Atlantis Press, France.p. 576.

may be some external entities which lacks the precise boundary, these imprecise entities called as fuzzy entity, further it can be said that the usage of the word without the precision is fuzzy. So, the problem of *Tractatus*, as he thought, he has solved in *Philosophical Investigation* remains as fuzzy.

1.3　Russell's view on vagueness:

Russell suggested that words are vague not the things, and vagueness and precision both are the features of our language. According to him, vagueness and precision are the connection between a representation and the thing it represents. Vagueness is not the attribute of the world; it is significantly attributed to the language. Now, it is very important, at this point, to understand that when a representation becomes vague. It becomes vague when it represents so many things, more specifically, when the representation corresponds to many rather than corresponds to one. On the other hand precision is the accuracy, when a representation accurately represents one thing is called precision of language.

There are many words vague in language, baldness is one of them. If a person is bald means that, he has no hair left in his head, and someone has full of hair in his head is not bald, then what if someone has some of hairs. So, someone is exactly bald having no hair left (denoted as 0) and someone is not bald having full of hairs (denoted as 1). But those who have hair count between $(0+1)$ and $(1-1)$,

in this case determining the man is bald or not is the problem or the puzzle of vagueness. Because having some hairs is also called baldness. Here baldness represents many cases and it is not following the one to one correspondence. So, it is viewed that vague term cannot be defined precisely. Baldness is the gray area (that is also called borderline case) which has truth value gaps because it is not understood that the person is bald is true or false, at this point the rule of excluded middle of traditional logic has been limited to undertake the problem of vagueness.

1.4   Strawson's view on vagueness:

P.F. Strawson's 'On Referring' is the reply to Russell's 'On Denoting'. Russell's 'On Denoting' is an exposition of denoting phrases, it presents a solution regarding the sentences having non-existent subject, such as 'the present king of France is bald'. The phrase 'the present king of France' is non-existent because there is no present king in France. The problem is how these propositions with non-existent subjects do function. Russell solved this problem by the use of variable. Russell's exposition is that, the non-existent phrase 'the present king of France' does not have any meaning by its own, but it is meaningful if it uses in a proposition. So, the proposition makes it meaningful.

Strawson in 'On Referring' strongly rejected Russell's exposition of denoting phrases. Russell uses denoting phrases as expressions that denote to a particular

individuality and in this way Russell misunderstand the meaningfulness of non-existent subjects. He suggested that denoting phrases do not refer a particular individual, but it is used to refer the same. So, Strawson's account in this regard is that denoting phrases become meaningful in the way they are used.

There is also a challenging part of Strawson's exposition of denoting phrases or expressions. If meaningfulness of any expression is determined by its uses, so, there are so many vague expressions in language and these expressions have many uses. Here the expression or the proposition in which this expression has been using cannot have their meaningfulness by their uses. So, there may be a truth value gaps or the fuzziness in the exposition of his 'On Referring'.

1.5   Conclusion:

The significance of fuzzy logic and fuzzy set in the field of language has been recognized for the path breaking result to the issues related to vagueness of language which classical bivalence of truth is not proficient to determine. Lotfi Asker Zadeh in his paper in 1965 introduced fuzzy logic as an extension of classical logic , it also presented and measured the uncertain and vague concept powerfully and meaningfully by the fuzzy set and its membership function. Fuzzy set has an imprecise boundary and to be a member of fuzzy set it is not required for an individual to be true or false, rather it requires grades of membership between

the close interval of 0 and 1. In a fuzzy set membership of an individual is a matter of degree, not a matter of affirmation or denial.

Fuzzy logic is the logic of imprecision deals with those entities which lacks the precise boundary. These entities are the *borderline cases* (that is not the subject of predication), these entities have the truth value gaps being neither true nor false. On the other hand ordinary language fails to provide the ideal of exactness of the vague entity where as fuzzy logic based on the fundamental rules for the use of words provides that desired exactness. This study of fuzzy logic and fuzzy set to deal with the imprecise concepts in the language of philosophy still remains open to the future workers of this branch**.**

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