STUDY ON INTUITIONISTIC FUZZY GRAPHS AND ITS APPLICATIONS IN THE FIELD OF REAL WORLD.

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ABSTRACT

The creation of fuzzy graph theory, Intuitionistic fuzzy graph theory was the next relaxing method of distinctness limitation. Intuitionistic fuzzy relations and intuitionistic fuzzy graphs were presented by Atanassov. IFS, introduced by Atanossov, is a flexible framework for explaining uncertainty and ambiguity among the many conceptions of higher-order fuzzy-sets. This area has lately sparked fresh study in a variety of approaches. In 2006, R.Parvathi and M.G.Karunambigai [17] proposed a new concept for intuitionistic fuzzy graphs. NagoorGani.A and SajithBegum.S[20] extended the features of Intuitionistic fuzzy graphs by defining degree, order, and size. NagoorGani.A and Latha.R presented irregular fuzzy graphs and analysed some of its features in NagoorGani.A and Latha.R[18].

Keywords *: Intuitionistic fuzzy graphs, Fuzzy graph, Fuzzy-set*

1. INTRODUCTION

Cen Zuo , Anita Pal and ArindamDey (2008)The photograph fuzzy-set is an effective mathematical version to address uncertain actual life troubles, in which a intuitionistic fuzzy-set may additionally fail to show nice effects. Picture fuzzy-set is an extension of the classical fuzzy-set and intuitionistic fuzzy-set. It can work very efficiently in uncertain scenarios which contain extra answers to those kind: sure, no, abstain and refusal. In this paper, we introduce the idea of the image fuzzy graph primarily based at the picture fuzzy relation. Some types of image fuzzy graph such as a normal photo fuzzy graph, strong picture fuzzy graph, whole photograph fuzzy graph, and supplement photo fuzzy graph are added and some properties also are defined. The concept of an isomorphic photograph fuzzy graph is likewise introduced on this paper. We also outline six operations along with Cartesian product, composition, join, direct product, lexicographic and robust product on photograph fuzzy graph. Finally, we describe the software of the photo fuzzy graph and its application in a social network.

"Kiran R. Bhutani, AbdellaBattou(2003) The Cartesian product and disjoint sum of graphs play a prominent function and have numerous exciting algebraic residences. In this notice, we keep in mind operations on fuzzy graphs underneath which M-sturdy belongings is preserved. If G_1 and G_2 are M-sturdy fuzzy graphs then we show that $G_1 G_2$, $G_1 ½ G_2$ and G_1 þ G_2 also are M-sturdy however G_1 (G_2) want now not be M-robust. If $G_1 G_2$ is M-robust then we show that as a minimum one thing have to be M-sturdy. We display that the made from an M-robust fuzzy graph G_1 with a non- M-sturdy fuzzy graph G_2 stays M-sturdy if and best if G_2 satisfies special circumstance. For any fuzzy graph G, G_c, c is the smallest M-robust fuzzy graph that contains G and G ¼ Gc c if and best if G is M-strong. We in addition display that M-robust fuzzy graph G is a fuzzy tree if and best if the help (G) is a tree".

Muhammad Akram * and AnamLuqman(2009) A hyper-graph is the maximum evolved tool for modeling diverse realistic troubles in different fields, consisting of computer sciences, organic sciences, social networks and psychology. Sometimes, given statistics in a network version are based totally on bipolar facts rather than one sided. To cope with such varieties of troubles, we use mathematical fashions which are primarily based on bipolar fuzzy (BF) units. In this studies paper, we introduce the concept of BF directed hyper-graphs. We describe positive operations on BF directed hyper-graphs, which includes addition, multiplication, vertex-sensible multiplication and structural subtraction. We introduce the idea of $B = (m+, m-)$ -tempered BF directed hyper-graphs and inspect some of their homes. We additionally present an set of rules to compute the minimal arc length of a BF directed hyperpath.

ZehuiShao ,SaeedKosari ,*,Hossein Rashmanlou and Muhammad Shoaib (2012) In recent years, the concept of domination has been the spine of studies activities in graph concept. The software of photo domination has grow to be massive in exceptional regions to resolve human-life problems, along with social media theories, radio channels, commuter train transportation, earth measurement, net transportation structures, and pharmacy. The reason of this paper become to generalize the idea of bondage set (BS) and non-bondage set (NBS), bondage range $\alpha(G)$, and non-bondage number $\alpha_k(G)$, respectively, inside the intuitionistic fuzzy graph (IFG). The BS is primarily based on a strong arc (SA) inside the fuzzy graph (FG). In this research, a new definition of SA in reference to the power of connectivity in IFGs was applied. Additionally, the BS, $\alpha(G)$, NBS, and $\alpha_k(G)$ ideas were offered in IFGs. Three extraordinary examples were defined to expose the informative development process through making use of the idea to IFGs. Considering the examples, some outcomes have been developed. Also, the applications had been utilized in water supply structures. The present look at became performed to make every day life greater beneficial and efficient.

MusavarahSarwar , Muhammad Akram ,* and NouraOmairAlshehri (2000) Hyper-graph concept is the most developed tool for demonstrating numerous practical problems in one of a kind domains of technology and era. Sometimes, facts in a community version is unsure and vague in nature. In this paper, our essential cognizance is to apply the powerful method of fuzziness to generalize the belief of competition hyper-graphs and fuzzy opposition graphs. We introduce diverse new principles, together with fuzzy column hyper-graphs, fuzzy row hyper-graphs, fuzzy competition hyper-graphs, fuzzy k-opposition hyper-graphs and fuzzy neighbourhoodhyper-graphs, robust hyper-edges, kth electricity of opposition and symmetric houses. We layout positive algorithms for constructing exclusive sorts of fuzzy opposition hyper-graphs. We additionally gift packages of fuzzy opposition hyper-graphs in selection aid structures, together with predator–prey members of the family in ecological area of interest, social networks and enterprise marketing.

SankarSahoo, Madhumangal Pal (2003) In this paper, we outline 3 operations on intuitionistic fuzzy graphs, viz. Direct product, semi-sturdy product and robust product. In addition, we investigated many exciting results concerning the operations. Moreover, it's miles established that any of the products of robust intuitionistic fuzzy graphs are sturdy intuitionistic fuzzy graphs. Finally, we defined product intuitionistic fuzzy graphs and investigated many thrilling consequences.

A. BozhenyukaandM.KnyazevabandI.Rozenberg (2003) In this paper, the idea of minimum intuitionistic dominating vertex subset of intuitionistic fuzzy graph became considered, and on its basis the belief of a domination set as an invariant of the intuitionistic fuzzy graph changed into brought. A approach and an set of rules for finding all minimum intuitionistic dominating vertex subset and domination set were proposed. This approach is the generalization of Maghout's technique for fuzzy graphs. The instance of finding the domination set of the intuitionistic fuzzy graph was taken into consideration as properly.

In fields like operations research, topology, number theory, and computer science, graph theory is critical for addressing combinatorial issues. Rosenfeld [24] discovered the structure of fuzzy graphs by considering fuzzy relations on fuzzy-sets. Intuitionistic fuzzy relations and intuitionistic fuzzy graphs were presented by K.T Atanassov [22] (IFGs).

1) 2. Intuitionistic fuzzy graphs and its applications

Shannon and KrassimirAtanassov (1994) gave the first step to the theory of intuitionistic fuzzy graphs (IFGs) using five types of Cartesian products($\otimes_1, \otimes_2, \otimes_3, \otimes_4, \otimes_5$). Shannon and Krassimir Atanassov (2006) proposed a novel extension of intuitionistic fuzzy graphs that relied on the notions of intuitionistic fuzzy-sets, intuitionistic fuzzy relations, and index matrices as a foundation.

A new definition for min-max intuitionistic fuzzy graph was proposed by Parvathi and Karunambigai (2006). Using appropriate examples, several features of intuitionistic fuzzy graphs are examined. To the intuitionistic fuzzy sub (semi) group, Young Bae Jun (2006) proposed the concept of intuitionistic fuzzy graph association.

Karunambigai et al. (2007) used the intuitionistic fuzzy graph approach to investigate the shortest routes in networks. One of the most basic and extensively used notions in networks is shortest routes. Fuzzy networks, as well as generalised techniques for finding optimum pathways within them, have lately emerged as a useful modelling tool for imprecise systems. Fuzzy shortest routes may be used in a number of ways. The authors introduced a dynamic programming-based methodology for finding the shortest pathways in intuitionistic fuzzy graphs.

Thilagavathi et al. (2008) provided intuitionistic fuzzy analogues of various core fuzzy graph theoretic notions, as well as an alternative definition for intuitionistic fuzzy graph.

The notion of complement of an intuitionistic fuzzy graph (IFG) was examined by Parvathi et al. (2009), and several aspects of self-complementary IFGs were shown. Union, join, Cartesian product, and composition are some of the operations on intuitionistic fuzzy graphs that are specified, as well as some of its features.

Panagiotis Chountas (2009) suggested the index matrix interpretation of an intuitionistic fuzzy version of the specific case of a graph-the tree termed an intuitionistic fuzzy tree. NagoorGani and Shajitha Begum (2010) looked at the attributes of different kinds of degrees, order, and size in intuitionistic fuzzy graphs, and came up with new definitions for full intuitionistic fuzzy graph and intuitionistic regular fuzzy graph.

Cardinality of an intuitionistic fuzzy network is introduced by Parvathi Rangasamy and Thamizhendhi (2010). In intuitionistic fuzzy graphs, the terms bipartite, full bipartite, strong arc, strength of connectedness, dominating set, domination number, independent set, independent domination number, total dominating, and total domination number are also defined.

With appropriate demonstrations, Karunambigai et al. (2011) defined homomorphism, weak isomorphism, and co-weak isomorphism of minmax IFGs. Some isomorphism on IFG and isomorphism on strong IFG qualities are also investigated.

Constant intuitionistic fuzzy graphs and completely constant intuitionistic fuzzy graphs were presented by Karunambigai et al. (2011, a). It is investigated what circumstances are necessary and sufficient for them to be equal. On a cycle, a constant intuitionistic fuzzy graph is characterised. Three instances of graph operations on intuitionistic fuzzy trees were described by Parvathi et al. (2011).

Product intuitionistic fuzzy graphs were proposed by Vinoth Kumar and GeethaRamani (2011), who established various conclusions that are related to intuitionistic fuzzy graphs. Product partial intuitionistic fuzzy subgraphs have properties.

Strong intuitionistic fuzzy graphs were proposed by Muhammad Akram and BijanDawaz (2012), who examined some of its features. The concepts of intuitionistic fuzzy line graphs and self-complementary and weak complementary strong intuitionistic fuzzy graphs are presented.

Based on the strength of the arcs, Karunambigai et al. (2012) categorised them as -strong, -strong, and -weak. The structure of a full intuitionistic fuzzy graph and a constant intuitionistic fuzzy graph is studied using these arcs.

In intuitionistic fuzzy graphs, Velammal (2012) developed the concepts of edge dominance and complete edge domination. For numerous kinds of intuitionistic fuzzy graphs, the edge dominance number and total edge domination number are calculated.

Karunambigai et al. (2012) defined balanced intuitionistic fuzzy graphs and demonstrated some of its features.

Intuitionistic fuzzy hyper-graphs with applications were researched by Muhammad Akram and WieslawDudek (2012, a). In the field of circuit design, hyper-graphs are used to simulate system topologies and data structures, as well as to depict partitioning, covering, and clustering. To generalisehyper-graph findings, the idea of intuitionistic fuzzy-set theory is used. Cut-level sets are used to construct an accompanying series of crisp structures for each intuitionistic fuzzy structure defined. The use of intuitionistic fuzzy hyper-graphs is also discussed.

Irregular intuitionistic fuzzy graphs were researched by Jahir Hussain and Yahya Mohamed (2012). On very irregular intuitionistic fuzzy graphs and their complement, certain findings are established. In extremely irregular intuitionistic fuzzy networks, isomorphic features of -busy, v-busy nodes and -free, v-free nodes are also explored.

Isomorphism findings on very irregular intuitionistic fuzzy graphs were investigated by Jahir Hussain and Yahya Mohamed (2012, a). Isomorphism and complement on neighbourly irregular intuitionistic fuzzy graphs are also demonstrated.

Karunambigai et al. (2012) proposed a criteria for balancing the Product intuitionistic fuzzy graph. On the balance of regular and product intuitionistic fuzzy graphs, several characteristics and findings are developed.

In intuitionistic fuzzy graphs, Muhammad Akram and Alshehri (2012) examined some of the features of intuitionistic fuzzy bridges, intuitionistic fuzzy cut vertices, intuitionistic fuzzy cycles, and intuitionistic fuzzy trees.

Some features of a regular intuitionistic fuzzy network were described by Karunambigai et al. (2012). Strongly regular, edge regular, and bi-regular intuitionistic fuzzy graphs are defined with appropriate examples, and the necessary and sufficient conditions for an intuitionistic fuzzy graph to be strongly regular are provided, as well as certain edge and bi-regular intuitionistic fuzzy graph findings.

Some features of an edge regular intuitionistic fuzzy graph are presented, and the link between the degree of a vertex and the degree of an edge in an intuitionistic fuzzy graph is examined by Karunambigai et al. (2012, a). A condition is given under which an edge regular intuitionistic fuzzy graph and a completely edge regular intuitionistic fuzzy graph are identical. Also discussed are partly edge regular intuitionistic fuzzy graphs and completely edge regular intuitionistic fuzzy graphs, both with appropriate examples.

On intuitionistic fuzzy graphs, SankarSahoo and Madhumangal Pal (2012) describe three operations: direct product, semi-strong product, and strong product. In addition, numerous intriguing operations-related outcomes are examined. Furthermore, the products of strong intuitionistic fuzzy graphs are shown to be strong intuitionistic fuzzy graphs. Finally, a product intuitionistic fuzzy graph is defined, and a number of intriguing outcomes are examined.

Al-Hawary and Bayan Horani (2012) explored the findings of balanced intuitionistic product fuzzy graphs and developed the operations of direct product, semi-strong product, and strong product on intuitionistic product fuzzy graphs.

Some features of union and join on regular intuitionistic fuzzy networks were developed by Ismail Mohideen et al. (2012), and theorems relating to these ideas were given and proven.

Muhammad Akram et al. demonstrated an application of intuitionistic fuzzy graph (2012). As examples of intuitionistic fuzzy digraphs in decision support systems, they presented intuitionistic fuzzy organisational and neural network models, intuitionistic fuzzy neurons in medical diagnosis, intuitionistic fuzzy digraphs in vulnerability assessment of gas pipeline networks, and intuitionistic fuzzy digraphs in travel time in their paper. These decision assistance systems' algorithms are also devised and deployed.

3. OBJECTIVES OF THE PAPER

The objective of this research work is

1. To learn more about fuzzy graphs and intuitive fuzzy graphs.
2. To investigate edge dominance in fuzzy graphs and intuitionistic fuzzy graphs in a safe and fair manner.
3. To use intuitionistic fuzzy graph knowledge in real-world applications.

4. REVIEW OF LITERATURE

The increased interest in intuitionistic fuzzy-sets, it is important to identify the applications of intuitionistic fuzzy-set theory in many domains such as decision making, quantitative analysis, and information processing, among others. The necessity for knowledge-handling systems capable of dealing with and discriminating between distinct facts of imprecision necessitates a clear and formal characterisation of the mathematical models that perform such analyses, which is done using fuzzy graphs and intuitionistic fuzzy graphs.

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5. CONCLUSION

In this paper, the idea of fuzzy-sets and intuitionistic fuzzy graph became considered, and on its basis the belief of a domination of the intuitionistic fuzzy graph changed gave the idea for many types of uncertain problems of real world. An approach and a set of rules for finding all intuitionistic fuzzy graphs and their applications were proposed. The instance of finding the intuitionistic fuzzy graph was taken into consideration as properly to solve many fields of real world problems.In fields like operations research, topology, number theory, and computer science, graph theory and to predict uncertainty in field of various studies of real world problems.

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