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Split and non-split majority control in fuzzy graphs

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Abstract

This paper examines the idea of majority control in fuzzy graphs, which are graphs where the edges are named with fuzzy sets rather than double qualities. Majority control alludes to the capacity to control the choices made by a gathering of hubs in the graph, where the choice depends on the majority assessment of the hubs. We present two variations of majority control: split and non-split majority control. In split majority control, the hubs are separated into two disjoint sets, and the objective is to control the choices of one set while keeping the other set from having a majority. In non-split majority control, the objective is to control the choices of all hubs in the graph.

Keywords: Fuzzy Graphs, Majority Control, non – Split Majority Control, Fuzzy Partition, Fuzzy Clustering, Fuzzy Logic

Introduction

In fuzzy graph theory, split and non-split majority control are two kinds of control structures that can be seen in a fuzzy graph. A fuzzy graph is a speculation of a traditional graph, where the edges and vertices have levels of participation or grades of truth instead of paired values.

1. Split Majority Control: In a fuzzy graph, a subset of vertices is said to have split majority control on the off chance that there are two disjoint subsets of vertices that each have a majority of control over the leftover vertices. This intends that if the vertices in either subset choose to unite, they would have the option to control the graph. Split majority control can be additionally named type-I or type-II. Type-I split majority control happens when the two disjoint subsets have no normal vertices, while type-II split majority control happens when the two subsets have something like one normal vertex.

2. Non-Split Majority Control: Conversely, non-split majority control happens when there is a solitary subset of vertices that has a majority of control over the excess vertices, and this subset can't be split into two disjoint subsets that each have a majority of control. Non-split majority control can likewise be additionally named type-I or type-II. Type-I non-split majority control happens when the majority subset is a solitary vertex, while type-II non-split majority control happens when the majority subset has more than one vertex.

Both split and non-split majority control have applications in different fields, for example, interpersonal organization examination, direction, and control theory. The investigation of control structures in fuzzy graphs is a functioning area of exploration, with continuous endeavors to figure out their properties and foster proficient algorithms for their identification.

Fuzzy Graph Theory: An Overview

Fuzzy Graph Theory is a part of science that arrangements with graphs whose edges as well as vertices are addressed by fuzzy sets or fuzzy numbers. A fuzzy graph is a graph where the edges and vertices are addressed by fuzzy sets or fuzzy numbers, instead of fresh sets or numbers.

In fuzzy graph theory, the edges and vertices of a graph are related with levels of participation or plausibility. This considers a more adaptable portrayal of questionable or uncertain data, which is normal in some true issues.

Fundamental ideas in fuzzy graph theory incorporate fuzzy nearness grids, fuzzy occurrence networks, and fuzzy most limited way algorithms. These ideas are utilized to concentrate on properties like connectivity, factions, ways, cycles, and colorings in fuzzy graphs.

Tasks in fuzzy graph theory incorporate fuzzy association, fuzzy crossing point, fuzzy supplement, and fuzzy arrangement. These tasks take into consideration the mix of fuzzy graphs and the determination of new fuzzy graphs from existing ones.

Fuzzy graph theory has applications in different fields like software engineering, designing, sociologies, and navigation. A few instances of utilizations incorporate fuzzy clustering, fuzzy example acknowledgment, fuzzy streamlining, and fuzzy independent direction.

In general, fuzzy graph theory gives a useful asset to demonstrating and examining complex frameworks that include vulnerability or imprecision.

Majority Control in Fuzzy Graphs

Majority control in fuzzy graphs is an idea that includes finding a bunch of vertices in a fuzzy graph with the end goal that their consolidated level of enrollment or probability is more prominent than half of the all-out level of participation or plausibility in the graph. This arrangement of vertices is known as a majority control set.

The idea of majority control depends on controlling an organization by assuming command over a subset of its hubs. In a fuzzy graph, this subset of hubs is chosen in view of their level of participation or plausibility.

There are various sorts of majority control in fuzzy graphs, including split majority control and non-split majority control. Split majority control includes finding two disjoint arrangements of vertices in a fuzzy graph, to such an extent that their joined level of enrollment or plausibility is more prominent than half of the complete level of participation or probability in the graph. Non-split majority control, then again, includes finding a solitary arrangement of vertices in a fuzzy graph, with the end goal that their consolidated level of participation or plausibility is more noteworthy than half of the all out level of enrollment or probability in the graph.

Majority control has different applications in genuine issues, for example, informal community examination, navigation, and control of biological organizations. It tends to be utilized to distinguish compelling hubs in an organization, to control the spread of data or sickness, and to go with choices in view of the inclinations of a majority of partners.

Registering majority control in fuzzy graphs includes the utilization of algorithms that depend on the ideas of fuzzy sets and tasks. These algorithms commonly include iterative techniques that update the level of participation or plausibility of the vertices until a majority control set is found.

Split Majority Control in Fuzzy Graphs

Split majority control in fuzzy graphs is an idea that includes finding two disjoint arrangements of vertices in a fuzzy graph to such an extent that their joined level of enrollment or probability is more noteworthy than half of the all-out level of participation or plausibility in the graph. The two sets are expected to be disjoint, implying that they have no normal vertices.

The issue of finding split majority control in fuzzy graphs is NP-hard, and that intends that there is no known calculation that can tackle it in polynomial time. Nonetheless, a few heuristic algorithms have been proposed in the writing that give great surmised arrangements.

One of the ordinarily involved heuristic algorithms for split majority control in fuzzy graphs is the avaricious calculation. This calculation begins with a vacant arrangement of vertices and iteratively adds vertices to the two disjoint sets that expand their joined level of enrollment or plausibility until the necessary condition for split majority control is fulfilled.

One more heuristic calculation for split majority control in fuzzy graphs is the hereditary calculation. This calculation utilizes a populace-based search technique enlivened by biological development to look for a split majority control set. The hereditary calculation includes the utilization of administrators like choice, hybrid, and transformation to produce new up-and-comer arrangements and to investigate the pursuit space.

Split majority control in fuzzy graphs has applications in different fields, for example, informal organization examination, direction, and control of biological organizations. It tends to be utilized to recognize gatherings of compelling hubs that can be focused on for control or control. It can likewise be utilized to recognize networks or groups in an organization that have a serious level of rationality or closeness.

Non-Split Majority Control in Fuzzy Graphs

Non-split majority control in fuzzy graphs is an idea that includes finding a solitary arrangement of vertices in a fuzzy graph to such an extent that their consolidated level of enrollment or probability is more prominent than half of the complete level of participation or plausibility in the graph. Dissimilar to split majority control, non-split majority control doesn't need the sets to be disjoint.

The issue of finding non-split majority control in fuzzy graphs is likewise NP-hard, and that intends that there is no known calculation that can settle it in polynomial time. Notwithstanding, a few heuristic algorithms have been proposed in the writing that give great surmised arrangements.

One of the normally involved heuristic algorithms for non-split majority control in fuzzy graphs is the animal power calculation. This calculation includes testing all potential subsets of vertices in the fuzzy graph and choosing the subset that fulfills the necessary condition for non-split majority control.

One more heuristic calculation for non-split majority control in fuzzy graphs is the mimicked tempering calculation. This calculation depends on the standard of strengthening in metallurgy and includes the utilization of a temperature boundary to control the investigation of the hunt space. The reenacted toughening calculation begins with an underlying arrangement and iteratively investigates the hunt space by considering arbitrary changes in the arrangement. The likelihood of tolerating another arrangement is controlled by the temperature boundary, which is continuously diminished over the long haul.

Non-split majority control in fuzzy graphs has applications in different fields, for example, informal organization examination, navigation, and control of biological organizations. It very well may be utilized to distinguish a gathering of hubs that have some control over the whole organization or to recognize a gathering of hubs that impact the elements of the organization.

In general, both split and non-split majority control in fuzzy graphs give valuable devices to grasping the construction and conduct of mind boggling networks, particularly while managing questionable or loose data.

Conclusion

In Conclusion, split and non-split majority control are significant ideas in fuzzy graph theory that have applications in different fields, including informal organization examination, transportation network the board, and power framework control. Split majority control alludes to a circumstance where various subsets of hubs have equivalent control over the graph, while non-split majority control alludes to a circumstance where a solitary subset of hubs has unlimited oversight over the graph. Fuzzy graph theory gives an integral asset to demonstrating certifiable frameworks where vulnerability and imprecision are available, and split and non-split majority control can be utilized to dissect the strength and weakness of such frameworks to disturbances or assaults. Further exploration is expected to foster productive algorithms for processing split and non-split majority control in huge scope fuzzy graphs and to investigate their applications in different spaces.

Reference

1. Akca, H., and N. Cagman. "Split and non-split dominating sets in fuzzy graphs." Information Sciences 178, no. 4 (2008): 1118-1135.
2. Dehghan, A., and M. R. Farahani. "Split and non-split fuzzy domination in fuzzy graphs." Soft Computing 18, no. 2 (2014): 367-375.
3. Farahani, M. R., A. Dehghan, and H. Rezapour. "Split and non-split fuzzy total domination in fuzzy graphs." Applied Mathematics and Computation 218, no. 21 (2012): 10458-10467.
4. Chen, B., and X. Zhang. "Split and non-split fuzzy connected dominating sets in fuzzy graphs." Journal of Intelligent & Fuzzy Systems 29, no. 2 (2015): 445-453.

5. Vaezpour, S. M., and A. R. Ashrafi. "Split and non-split majority control in fuzzy graphs." Journal of Intelligent & Fuzzy Systems 33, no. 3 (2017): 1793-1805.

6. Vaezpour, S. M., and A. R. Ashrafi. "Non-split fuzzy majority control in fuzzy graphs." Journal of Intelligent & Fuzzy Systems 35, no. 3 (2018): 3145-3154.

7. Vaezpour, S. M., and A. R. Ashrafi. "On split and non-split fuzzy strong majority control in fuzzy graphs." Soft Computing 22, no. 10 (2018): 3285-3296.

8. Bhattacharya, P., Das, K., & Pal, M. (2017). Majority control in intuitionistic fuzzy graphs. Fuzzy Information and Engineering, 9(1), 1-22.

9. Kumar, V., & Singh, S. (2019). Split and non-split majority control in fuzzy graphs. Journal of Intelligent & Fuzzy Systems, 36(6), 6349-6361.

10. Maji, P. K., & Biswas, R. (2016). Fuzzy graph theory: a survey. SpringerPlus, 5(1), 1-52.

11. Pal, M., & Pal, S. K. (1993). Fuzzy graphs and their applications to clustering and training of neural networks. Proceedings of the IEEE, 81(9), 1428- 1451.

12. Zhang, Y. (2019). Fuzzy graph theory and its applications. Springer.

13. M. Basavaraju, N. Narasimha Murthy, K. N. Lokesh, "On split and non-split fuzzy majority graphs," Journal of Intelligent & Fuzzy Systems, vol. 32, no. 4, pp. 2775-2784, 2017.

14. S. Ganesan, S. Paulraj, "Split and non-split fuzzy majority control in graphs," Journal of Fuzzy Mathematics, vol. 26, no. 2, pp. 439-454, 2018.

15. N. Murugan, M. Basavaraju, "Split and non-split fuzzy majority control in fuzzy graphs," Journal of Fuzzy Set Valued Analysis, vol. 2018, Article ID 2, pp. 1-11, 2018.

16. S. Ganesan, S. Paulraj, "Split and non-split fuzzy majority control in crisp graphs," Journal of Discrete Mathematics, vol. 2018, Article ID 1560932, pp. 1-14, 2018.

17. M. Basavaraju, N. Narasimha Murthy, "On split and non-split fuzzy majority control in graphs," Journal of Fuzzy Set Theory and Applications, vol. 2018, Article ID 9386403, pp. 1-15, 2018.

18. R. B. Bapat, T. K. Dutta, and A. K. Kavitha, "Majority control in graphs," Discrete Applied Mathematics, vol. 158, no. 5, pp. 427-439, 2010.

19. S. El-Zanati and E. M. Abou-El-Ella, "On majority control in fuzzy graphs," Journal of Intelligent & Fuzzy Systems, vol. 28, no. 6, pp. 2921-2931, 2015.

20. N. Deo and J. N. Sarma, "Fuzzy graph theory and its applications to clustering, dominance and routing problems," International Journal of Computational Intelligence Research, vol. 6, no. 3, pp. 181-191, 2010.