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Unraveling The Complexity Of Hyperacusis: A Metric Dimension Of A Graph Concept

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Abstract : The prevalence of hyperacusis, an auditory condition characterized by heightened sensitivity to sounds, continues to rise, posing challenges for effective diagnosis and intervention. It is believed that this work deepens will deepens the understanding of hyperacusis etiology by employing graph theory as a novel analytical framework. it constructed a comprehensive graph wherein nodes represent various factors associated with hyperacusis, including aging, head or neck trauma, infection/virus, depression, migraines, ear infection, anxiety, and other potential contributors. Relationships between factors are modeled as edges, allowing us to visualize and quantify the interactions within the etiological landscape of hyperacusis. it employ the concept of the metric dimension of a connected graph to identify key nodes (landmarks) that serve as critical influencers in the interconnected web of hyperacusis causes. This approach offers a unique perspective on the relative importance and centrality of different factors, shedding light on the complex interplay between physiological, psychological, and environmental determinants. Visualization techniques were also employed to enhance the interpretation and facilitate the identification of the central nodes. This research contributes to the growing body of knowledge surrounding hyperacusis by offering a network-centric perspective on its multifaceted causes. The outcomes hold the potential to inform clinical practices, guiding healthcare professionals in prioritizing interventions and personalized treatment plans based on the identified landmarks within the etiological network. Through the integration of graph theory into hyperacusis research, the complexity of this auditory condition was unraveled and pave the way for more effective approaches to its management.

Keywords : auditory condition, connected graph, hyperacusis, metric dimension
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