Robustness of Dengue Complex Network under Targeted versus Random Attack

By: Malik, HAM (Malik, Hafiz Abid Mahmood)[1]; Abid, F (Abid, Faiza)[2]; Wahiddin, MR (Wahiddin, Mohamed Ridza)[1]; Bhatti, Z (Bhatti, Zeeshan)[1]

View ResearcherID and ORCID

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Abstract

Dengue virus infection is one of those epidemic diseases that require much consideration in order to save the humankind from its unsafe impacts. According to the World Health Organization (WHO), 3.6 billion individuals are at risk because of the dengue virus sickness. Researchers are striving to comprehend the dengue threat. This study is a little commitment to those endeavors. To observe the robustness of the dengue network, we uprooted the links between nodes randomly and targeted by utilizing different centrality measures. The outcomes demonstrated that 5% targeted attack is equivalent to the result of 65% random assault, which showed the topology of this complex network validated a scale-free network instead of random network. Four centrality measures (Degree, Closeness, Betweenness, and Eigenvector) have been ascertained to look for focal hubs. It has been observed through the results in this study that robustness of a node and links depends on topology of the network. The dengue epidemic network presented robust behaviour under random attack, and this network turned out to be more vulnerable when the hubs of higher degree have higher probability to fail. Moreover, representation of this network has been projected, and hub removal impact has been shown on the realmap of Gombak (Malaysia).

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Author Information

Reprint Address: Malik, HAM (reprint author)

+ Int Islamic Univ, Dept Comp Sci, Fac Informat & Commun Technol, Kuala Lumpur, Malaysia.

Addresses:

+ [1] Int Islamic Univ, Dept Comp Sci, Fac Informat & Commun Technol, Kuala Lumpur, Malaysia

+ [2] King Khalid Univ, Dept Comp Sci, Fac Comp Sci, Abha, Saudi Arabia

E-mail Addresses: hafiz.abid@live.iium.edu.my

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