Robustness of dengue complex network under targeted versus random attack

Mali, H.A.M.* 1, Abu, F.* 2, Wahidin, M.R.* 1, Pattu, T.* 1 2
1Department of Computer Science, Faculty of Information and Communication Technology, International Islamic University, Kuala Lumpur, Malaysia
2Department of Computer Science, Faculty of Computer Science, King Khalid University, Alila, Saudi Arabia

Abstract
Dengue virus infection is one of those epidemic diseases that require much consideration in order to save the human kind from its small impacts. According to the World Health Organization (WHO), 3.6 billion individuals are at risk because of the dengue virus infection. Researchers are striving to comprehend the dengue virus infection. This study is a little commitment to those endeavors. To obtain the robustness of the dengue network, we uprooted the links between nodes randomly and targeted by utilizing different centrality measures. The outcomes demonstrated that the targeted attack is equivalent to the result of 55% random attack, which showed the topology of the dengue network is a scale-free network, instead of random network. Four centrality measures (Degree, Closeness, Betweenness, and Eigenvector) have been associated to look for final hubs. It has been obtained 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 possibility to fail. Moreover, representation of the network has been projected, and hub removal impact has been shown on the malware of Gambol (Malaysia). © 2017 Mali H.A.M., Abud M.R., Pattu T.*