

Social Network Analysis To Study Network Connectedness Principles In Multi-Domain Applications

The philosophy of group behaviours, mass movements, and perception building that lies in social ties forms the basis for driving individual preferences. The combination of the actors and the relationships between them create a social network graph. This form can be seen in diamond and graphite or such type of materials that are fundamentally made of carbon atoms, yet display altogether different properties based on bonds formed between the carbon atoms of their molecules. An old proverb also emphasizes the impact of companionship in shaping one's personality, recognises the importance of social networks. In the present times, investing in influential relationships helps individuals build their social capital and to be able to get access to relevant individuals and their networks. The advancements in communication technologies has eliminated geographic distance as a limiting factor which has driven the world to be a single connected entity.

Social network analysis (SNA) is based on graph theory principles, which have been applied to solve specific problems related to information flow and exchange, opinion formation, behavioural sciences, research and innovation, organisation network, drug discovery, etc. In this thesis, we propose that SNA can be universally applied to any domain to study network connectedness principles for understanding behaviours and propagation mechanisms in real-world scenarios. To elucidate, we have selected four diverse domains i.e. animal behaviours, student interaction patterns in a school setup, epidemic spread & surveillance, and brain networks.

The application of network connectedness principles using SNA led to an important area of research as elucidated in four diverse domains in this presented thesis. The applications of SNA are domain agonistics and its principles are universally applicable in any field.