INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student	:	Niladri Sett
Roll Number	:	09610102
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Name of Thesis Supervisor(s)	:	Dr. Sanasam Ranbir Singh and Prof. Sukumar Nandi
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SHORT ABSTRACT

Analysis of complex network has emerged as a booming research area since last decade. Social network, a type of complex network, has gained attention from the contemporary researchers, due to the abundance of social network data in the Web in recent times. Rapid increase in the number of subscribers to the social platforms (such as blogs, dating sites, friends making sites) provided by the Web has revealed unseen human relationships, and motivated the researchers to make good use of this. This thesis deals with an important problem of social network analysis (also of complex network analysis): link prediction. Given a social network, the link prediction problem predicts new relationships which will appear in future. Homophily, i.e., similarity between two individuals influences new connections. This work models homophily by combining link strength and structure of the network towards link prediction. Link strength is encoded in link weight in several ways, which is derived from pattern of dyadic interaction between two nodes. Structural homophily is captured by traditional proximity based link prediction methods like common neighbor, Jaccard's coeffcient, Adamic/Adar etc. Several social network properties, such as, reciprocative nature of relationships, temporal change of homophily between actors, information flow between actors through heterogeneous paths etc. are investigated in this regard, and new link prediction methods are proposed exploiting dyadic interactions and structural similarity. This thesis also proposes a time aware method to predict broken relationships, and analyzes their effect in link prediction. It further devises methods to deal with sparsity problem of dyadic time-series towards effective link prediction. Using unsupervised and supervised methods, rigorous experiments are performed over various real and longitudinal social network datasets to demonstrate the effectiveness of the proposed methods over the existing ones.