FAKULTÄT
FÜR !NFORMATIK
Faculty of Informatics

Candidate: Nataliia Rümmele, Vienna PhD School of Informatics
Supervisor: Univ.Prof. Dr. Hannes Werthner

Title of the dissertation: Temporal link prediction using graph pattern matching

Abstract of the dissertation: Many real-world systems are composed of individual components which are interlinked in some way. To understand and predict the behavior of such a system, we can model it as a network where components correspond to nodes and connections are links between the nodes. Real-world networks are highly dynamic: new nodes and links appear permanently while the existing ones can vanish, and various attributes for nodes and links may change. One of these changes, and the focus of this thesis, is the creation of new links. In the field of network analysis the task of predicting the appearance of a link between two nodes in the network is known as link prediction. An established approach to build a network evolution model is to use an observed property of the global network structure. However, we follow another approach: by identifying the patterns of node connections, the so-called graph patterns, we investigate how these patterns that are observable at the current time can help us predict the future link formation in the network. The considered graph patterns can, first of all, vary in their size (either in terms of the number of considered nodes or links), and secondly, they can include various additional information, such as attributes of nodes and links, or different types of connections between nodes. Hence, we can capture on a very fine grained level the evolution of the network over time. We focus on the following three important aspects. The first goal is to improve the quality of prediction. Secondly, we focus on the efficiency of the involved computations. The third goal is to widen the field of application domains where link prediction techniques have not been used before.