

# Abstract of the Ph.D. Work

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**Title** : Trust Network based recommendation system

The immense growth of information has led to the extensive usage of recommender systems for retrieving relevant information. Meanwhile, a variety of websites has become increasingly prevalent for multi-media sharing, digital business platforms, and social network websites. Due to the comprehensive use of these application platforms, online data volumes are growing at an incredibly rapid rate. The availability of such a massive volume of information, also known as information load, has made it problematic for users to extract relevant information. Recommender system is being widely used by customers in helping them to make correct decision. One of the widely used methods for recommendation is collaborative filtering. However, such methods suffer from two problems, scalability and sparsity. In the proposed research, the two issues of collaborative filtering are addressed, and a cluster-based recommender system is proposed. A game theory concept, known as Shapley value, is used to identify potential clusters from the underlying network, which divides users into different clusters. After that, the recommendation algorithm is performed in every respective cluster. The proposed system recommends an item to a specific user

based on the ratings of the item's different attributes. Thus, it reduces the running time of the overall algorithm, since it avoids the overhead of computation involved when the algorithm is executed over the entire dataset. Besides, the security of the recommender system is one of the major concerns nowadays. Attackers can come in the form of ordinary users and introduce bias in the system to force the system function in a way that is advantageous for them. In this research work, different attack models are identified that could pose a threat to the security of the proposed cluster-based recommender system.

Recommendation system finds its application in various domains, and one of them is text summarization. Information overload is one of the common issues faced by meteoric data development on the World Wide Web. The objective of text summarization is to select relevant content from the massive information source, thereby providing informative content to the user according to their needs. Text summarization aims at capturing the girth of the document without capturing its effRecently, researchers have been devoting a lot of effort to develop semantics-based models to improve summarization performance. A versatile and principled game theory-based multi-document summarization framework integrated with Wikipedia ontology is proposed in this work. The framework exploits the sub-modularity hidden in the underlying ontology and is optimized using the proposed improved algorithm, to enhance the summarization performance.

Nowadays, online social communities are commonly using recommendation system to predict the success of altruistic request. These social communities are often used by needy people for donations or help. So, it would be beneficial to formulate a technique that would help in predicting the success of response. The objective of the proposed research is to enhance the accuracy of prediction of success of altruistic request. Three features are

proposed i.e. topic, role and centrality, in addition to the features proposed by ADJ to capture user's interaction in the past and topic effect on the prediction of response.

In today's scenario, the recommendation system is widely using the concept of information diffusion. Recommendation is one of the applications of influence maximization. Influence maximization incorporates the idea of information diffusion that aims to identify a set of influential nodes that have maximum influence spread. One of the common phenomenon observed in online social network, is diffusion over a social network that can be in the form of spread of rumours, propagation of the virus, and opinion analysis of public. Diffusion of information is a crucial research area that has attracted the attention of the research community and finds applications in diverse fields, such as biology, sociology, etc. One of the prime areas of research related to information diffusion is the identification of influential individuals, with whom the diffusion process is to be started. This problem can be beneficial for the company, that wants to launch a new product through online social media and would like to initially target a small set of users (referred to as influential), whose influence will further propagate to more number of users in the network, through the effect of word of mouth. The scenario mentioned-above is a discrete optimization problem and is known as influence maximization (IM) problem. Such a set of nodes are responsible for optimizing the influence in the network and is NP-Hard problem. To address this issue, different centrality measures have been proposed such as betweenness centrality, closeness centrality, degree centrality, but all of them suffered from some drawbacks. Some recent research works consider that network dynamics is significantly affected by the community structure, which is an important topological property of the social network. This research work proposes a novel framework, named, a community-based hybrid approach for identifying influential nodes in the social network (HWSMCB), to deal with the influence maximization problem. A dynamic Weighted Sum Method (D-WSM), a multi-criteria decision method

(MCDM), is introduced to take into account the node's topological features simultaneously. The proposed HWSMCB is based on D-WSM and exploits community structure to identify influential nodes from the underlying social network. The proposed research focusses on non-competitive class for solving the IM problem and comprises of following features: 1) It takes into account the node's topological features; 2) The proposed research introduces Dynamic Weighted Sum Method (D-WSM), a multi-criteria decision method (MCDM), to incorporate node's topological features simultaneously; 3) Node influence spread is utilized to compute dynamic weights for node's topological features; and 4) It is based on the fact that nodes in a SN naturally cluster together.

Hence, the focus of the research in this work is to determine influential nodes from the underlying network using multiple criteria (centrality measures).