

Notification No: F.NO.COE/ Ph.D/(Notification)/543/2023

Date of Award: 10-08-2023

Name of the Ph.D Scholar: Tanveer Hassan
Name of the Supervisor: Prof. Chaudhary Wali Mohammad
Name of the Department: Applied Sciences and Humanities
Ph.D Topic: Social Network and Recommendation Systems based
Software Requirement Elicitation and Prioritization
Process

Ph.D Research Findings

This thesis contributes the different method for the analysis of the stakeholders using social networks for the elicitation and prioritization of the software requirements for the different stakeholders. In this thesis **four methods** have been developed to the for the analysis of stakeholders using social networks. The **first contribution** to the thesis is the development of a *StakeSoNet* method in which social network has been employed for the analysis of stakeholders. In the proposed method, confidence value is introduced for capturing the suggestions of one stakeholder for another stakeholder using linguistic variables. The $L^{-1}R^{-1}$ inverse arithmetic principle with graded mean integration has been used for modeling the linguistic variables in StakeSoNet method. The applicability of the *StakeSoNet* method is discussed by considering the stakeholders of an **institute examination system** (IES). The **second contribution** of the Thesis is the development of a method, i.e., *StakePage*, for the analysis of stakeholders of an information system using **Page Rank algorithm**. In this methodology, the stakeholder matrix is used to store the information of stakeholders and their recommendations about other stakeholders. The usefulness of the *StakePage* methodology is discussed by analyzing the stakeholders of an IES. The **third contribution** to the Thesis is the development of a methodology for the elicitation and prioritization of software

requirements using social network and fuzzy set theory. In the proposed method, a systematic approach has been used for analyzing the large set of stakeholders in which confidence value is used for the recommendation of stakeholders. The K-means clustering is used to group the FRs and NFRs of an information system. A program has been developed using Python language for clustering the requirements of an IES. The **fourth contribution** of the Thesis includes the development of a **recommender system** for the elicitation and prioritization of requirements when **incomplete linguistic preference relations** are used during the decision making process. A program has been developed using visual C++ for computing the ranking values of the requirements of an IES with incomplete linguistic preference relations.

The work described in this Thesis has the following future scope of extension:

1. The methods presented in this Thesis have focused on social network and recommender systems for the elicitation and prioritization of the requirements of an information system. In this Thesis both complete and incomplete preference relations have been used during the analysis of the requirements. The proposed methods can be extended by identifying the discordances among the stakeholders and their requirements.
2. In real life applications, different formats of linguistic preference relations are used during the decision making process like incomplete multiplicative preference relations, incomplete fuzzy preference relations, incomplete additive linguistic preference relations, incomplete multiplicative linguistic preference relations. In future, our work can be further extended in this dimension for the development of recommender systems with different formats of linguistic preference relations.



22-08-2023