

DEVELOPING DYNAMIC P2P TRUST MODEL USING THEORY OF ENTROPY-BASED MULTI-SOURCE INFORMATION FUSION

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ABSTRACT. *Trust relationship is one of the most key and complex concepts in P2P network societies, so its quantitative model inevitably includes multiple decision-making factors. In this paper, using theory of entropy-based information fusion, a novel dynamic trust model is proposed innovatively, in which multiple complementary decision factors are incorporated to reflect complexity and uncertainty of the trust relationship. Meanwhile, the weights of these decision factors are assigned by theory of entropy-based multiple information fusion, which overcomes the shortage of traditional methods, in which the weights are assigned by subjective manners, and makes the model has a better rationality and a higher practicability. Simulated results show that, compared to the existing approaches, the proposed model exhibits a remarkable enhancements in the accuracy of trust prediction.*

Keywords: P2P computing, Trust model, Decision factors, Information fusion

1. **Introduction.** P2P computing systems with large-scale users scattered all around the world, sharing their services with each other. From a network security's point of view, to encourage resource sharing and combat malicious behaviors, trust management is essential for peers to assess the trustworthiness of others and to selectively interact with more reputable ones. Without an efficient trust management mechanism, peers will have little incentive to contribute their computing or bandwidth resources. The peers will hesitate to interact with unacquainted peers due to the concern of receiving corrupted or poisoned files or being exploited by malware [1,2].

In recent years, many of state-of-the-art trust models have been proposed, such as [3-7], some of them are very innovative and elaborate, but most of the studies still have some limitations need to be solved: First, many current trust models use simple or one-sided trust decision factors to quantify and predict trustworthiness of P2P service providers or requesters, which may lead to inaccurate or unfair outcome of trust decision. We think that when trust relationship between peers cannot be fairly defined, it is unstable, and difficult to manage and predict. Second, many of current studies either pay little attention to the distribution of peers feedbacks, or use broadcasting way to search feedbacks in all over the network, which leads to slow convergence of aggregating process and huge cost of time and space [8]. Third, in many of previous studies, the subjective assigning methods to weights of trust decision factors cannot reflect trust decision scientific and reasonable, and may lead to misjudgment of trust decision result.

Focusing on these problems, in this paper, combining behavior habit of human beings, we innovatively propose a new P2P trust model, in which multiple complementary decision factors are incorporated to reflect complexity and uncertainty of trust relationship.