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A Global Reputation Model for Grid Computing

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Trust and reputation are important decision-making factors in large-scale distributed systems. The Constellation Model is one of our previous works about grid resource management. Since local feedback plays an important role in aggregating global reputation, a new local feedback metric is introduced to reflect the dynamic feature of trust. This paper introduces our recent effort of combining reputation into the Constelltaion Model. We propose a novel global reputation model for grid systems such as Constellation Model.

We model the relationship between global reputation and the nodes' feedback credibility. A node's feedback credibility which is calculated by similarity measurement will impact on its reputation in a direct way. In our model, to promote a node's reputation, there exist two possible ways: the first one is to provide high-quality services to others. The second way is to provide authentic feedbacks towards others. In addition, to evaluate a node's local feedback trustiness, approach based on similarity measurement is employed. If local feedback trustiness is too low, compensation calculated by exponential smoothing is applied. This design is employed to combat malicious collectives and slandering in large-scale communities. The computational framework of EigenTrust which is proposed by S. D. Kamvar at Stanford University is used to compute global reputations of all the nodes in the Constellation Model.

In the Constellation Model, nodes (stars) in a solar system can be organized using a Peer-to-Peer way. Distributed Hash Table *protocol such as Chord which is proposed by I. Stoica,* et al. *at University of California, Berkeley can be used to implement the distributed ranking mechanism.*

We have implemented a prototype of Constellation Model. Experimental results show that, our model can reflect dynamic characteristics of trust better. Our model can also improve the evaluation accuracy of global reputation by leveraging feedback credibility. In Comparison with EigenTrust, our model shows an improved robustness with the presence of malicious behaviors in the Constellation Model.

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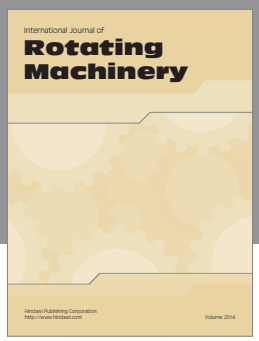

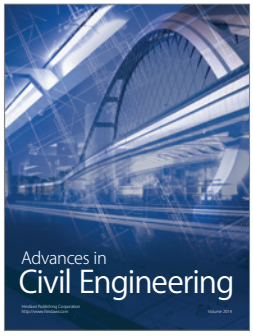

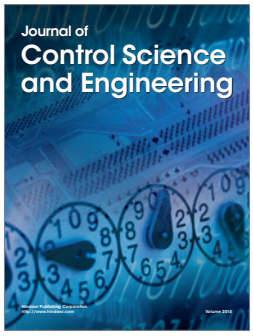

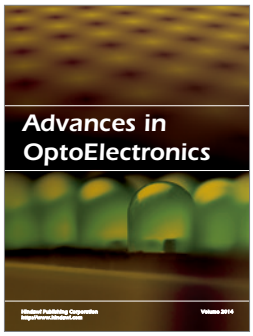

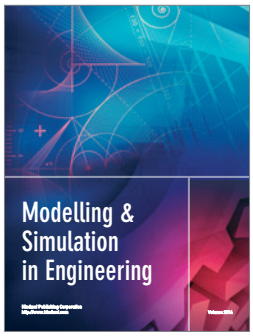

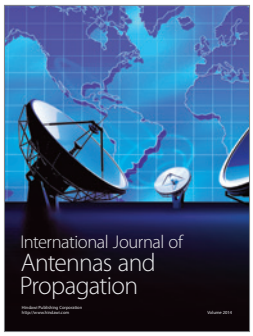

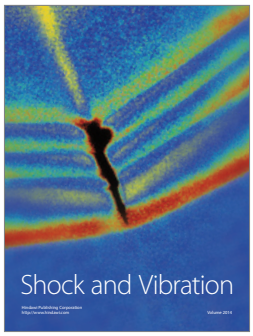

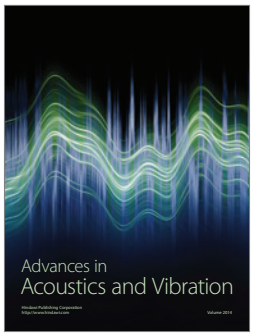

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