

DTM: An Efficient and Dynamic Trust and Reputation Model for E-commerce Agents

Maryam Asadzadeh Kaljahi¹, Ali Payandeh², Mohammad Bagher Ghaznavi Ghoshchi³

¹Department of IT, Tehran University, Iran

²Department of Computer Engineering Maleke- Ashtar University, Tehran, Iran

³School of Engineering, Shahed University, Tehran, Iran

ABSTRACT

In widespread and decentralized environment of the e-commerce clients are exposed to significant risk due to frequent interaction with unfamiliar, diverse, multi-agent and untrustworthy servers. As a consequence trust and reputation-based systems have been important issues and studied as an alternative to traditional security mechanism to reduce the risk. Different models of trust have been proposed to assess the credibility of agents, but they face the challenges of detecting and resisting dishonest and malicious advisors which collect local reputation scores and aggregate them into the total trust. This paper presents DTM- a dynamic and robust trust model which takes advantage of mostly previous model to trade off the damage of fake reputation information. The DTM model uses normal distribution factor for weight of recommendations and both number of iterations and fluctuating behavior factor on the dynamic adaptation between current and previous experiences. As a result of the aggregated trust will filter malicious behavior and reflect more accurate trust value. The DTM model can also resist against several attacks such as strategic and collusion attacks. Simulation experiments show that the DTM model can discern a small difference between real quality of service and computed trust, and the most notable is robust to malicious agents.

KEYWORDS: Trust, Reputation, E-commerce, Credibility, Malicious Attack, Security.

INTRODUCTION

In e-commerce clients often interact and take decisions under uncertainty with servers that are unknown to them and they are vulnerable to risk and have to manage it involved with the transactions. It is hard to solve these problems efficiently by conventional security policies, such as authentication [1,2,3] or security protocols such as SSL/TLS that has drawbacks against malicious servers[2,3]. One way to address this problem is trust-based approaches that can assist clients in accessing the level of trust they should place on a transaction. Trust is critical in such setting as it can make social interactions much fruitful as possible [4] and improve the robustness of the system. In the context of the e-services, trust is defined as: "Trust is a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action, both before he can monitor such an action and in a context in which it affects his own action [5]". Trust is defined in term of evidence of future behavior based on interactions include direct measures and indirect measure as the reputation.

Like the interpersonal relationships in social networks, there are two kinds of trust between clients and servers: direct trust and recommendation trust (reputation). Direct trust means two agents (clients and server) directly exchange information and the reputation is based on collecting and aggregates recommendations about server's past behavior. Reputation assumes a very important role when the client doesn't have a sufficient knowledge of the server, so client can decide if server is reliable interlocutor or not.

But in e-commerce competitive environment agents can misbehave in a number of ways, such as providing fake recommendations on servers or showing a misleading, deceptive and malicious behavior to create problems to its competitors. The challenge of building a trust mechanism is how to effectively cope with such malicious behavior [6]. To suppress some deficiencies in existing trust models a novel, dynamic and robust trust model is introduced to decentralize e-commerce systems called DTM (Dynamic Trust Model).

The major contributions of this paper are illustrated as follows: filtering of unfair suggestions and establishing dynamic parameter to update trust measures. In DTM model weights of advisors are adjustable based on normal distribution factor to be able to efficiently distinguish reliable from deceptive feedbacks. As second contributions of DTM trust model, a new framework is introduced that determines a dynamic criterion to suitably provide and update the weights that should be assigned to the current with respect to previous experiences. In this way the accuracy of computed trustworthy will be improved. The remainder of this paper is organized as follows: In section

***Corresponding Authors:** Maryam Asadzadeh Kaljahi, Department of IT, Tehran University, Iran
Email: mnewm22@yahoo.com