

Abstract

Trust and Reputation systems have been used in the recent past as soft security measures to augment the traditional security mechanisms such as cryptography, certification, etc. in various computational fields such as network security, e-commerce, P2P etc. Achieving Trust and Reputation in a computational environment is nontrivial one. Researchers have developed many trust and reputation models. However these models are evaluated by using mechanisms of individual researcher's own devising. Hence there is always a need of common test bed to test various models or strategies under one common platform and with common specific scenarios using a single objective metric. ART (Agent Reputation and Trust) testbed is one such common testbed where various models or strategies can be evaluated and performance can be measured using a single objective function. ART is based on MAS (Multi Agent System), a framework which allows different agents to communicate among themselves and share opinions about each other. In competitive environment agents might not share right information to misguide other agents. Therefore predicting the nature and behavior of other agents is very necessary to make right decision. In ART all agent (where researchers add their model) has to follow some common scenario and all evaluation is done by ART simulation engine. Designing proper strategy for interaction with other competitive partners is an interesting research issue. In our work we propose a new strategy which is based on strong mathematical foundation call Hidden Markov Model and intelligent machine learning tool call Reinforcement Learning that can be fit to an agent. The HMM models a belief function of other agents with whom our agent can interact. Finally based on the belief state, decision of whether to interact or not in the present encounter with the other agents in the environment is decided by using a form of reinforcement learning (RL) called Q-learning.

Key Words : Hidden Markov Model (HMM), Reinforcement Learning(RL), Q-learning, Trust, Reputation, MAS, Testbed.