



An Analysis of Normative Multi-Agent Application for the Cyber Security Domain



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Abstract

Agent application techniques are combatting the problems to cyber attacks in cyber security. Agents represent autonomous entities that obey external commands that benefit the user. The study will introduce several normative agent strategies, concepts, and structures that require the system to work efficiently. Normative multi-agent systems regulate and secure interactions between the individual users from a technical standpoint. On account of this idea, the paper analyzes three different normative models applied in cyber security. Each model has a different objective, but their initial goal is to maintain security policies between the user and their environment. The paper establishes common criteria's such as trust, norm life cycles and detection, accountability and traceability, and more between the three models. The criteria's are produced to compare measurements of strength and the frequencies of their interaction between norms and agents. For the latter, the results conclude that one model develops a stronger system of norm detection and active and passive mediums to transmit norms. These findings will determine which areas of the system will help the system improve efficiently, and it will provide further investigations of other normative systems.

Methods and Measurements

We gathered a collection of five different normative models and analyzed the common criteria's. The three normative systems that are selected to make comparison of each criteria's:

- Revani** – A sociotechnical system that consists of human and agent interaction, which verifies user authentication, which can satisfy the login or result to a violation.
- Security model for complex applications** - Regulates the amount of norms that are exposed to the environment.
- Framework for simulation of norms** – A system of norms that chooses which goal-orientated agents are cooperative with norms.

Methods and Measurements (cont.)

Normative application is an agent technique that regulates the interaction between the stakeholders and users. It ensures that the relationship is stable and flexible to external forces. Norms are required to recognize abnormal behavior within the system. The following criteria's will be measured:

- Trust
 - Low or High
- Privacy levels
 - Low or High
- Traceability and accountability
- Normative life cycle
 - Never, Rarely, or Frequently
- Norm detection
 - Low, Moderate, or High
- Norm transmission
 - Strong-active weak-passive or weak-active strong-passive

Results

	Multi-Agent System: Privacy Levels	Accountability and Traceability	Trust	Life Cycle	Norm Detections	Active or Passive
Security Model for Complex Application	High	High	High	Frequent	High	Strong-active, Weak-passive
Revani	High	High	High	Frequent	Moderate	Strong-active, Weak-passive
Framework for Simulation of Norms	Low	High	High	Frequent	Moderate	Weak-active, Strong-passive

Table 1: Table displays criteria's of the three normative models, and their measurements

The security model for complex applications acquire a more effective strategy for detecting norms. It targets high measurements that are beneficial to detect norms

Conclusions

The relationship between a norm and agent should be mutual. Agents initial trust when they respond to different attributes and behaviors of norms. The approach yields a correlation between trust and privacy levels of agents and norms. Moreover, successful norm detection allows the system to identify that accounts to specific agents. The research investigated three normative models. Notably, the results find that the security model for complex applications is more effective than the other models. The model entails of several different agents. These agents have jobs that are responsible for norm detection and other verifications. The security model is different from the other two models because it received a higher measurement in norm detection and obtains a strong-active and weak-passive medium. The findings of this work will contribute to the understanding of normative systems. The approach for these findings can allow other researchers to use these criteria for their own models.

References

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