



NDDLMSCTSI: a novel method for assessing node trustworthiness for trust management and analysis in online social network

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Abstract This paper proposes a novel method for assessing node trustworthiness in social networks called Nonlinear Dynamics Deep Learning Methodology, Shifting the focus from content-based evaluation to the source of information (NDDLMSCTSI). The hybrid methodology combines deep learning with graph algorithms to provide a robust and comprehensive analysis of trust relationships, incorporating both direct and indirect trust pathways to differentiate between trust within communities and across community boundaries. The suggest model called 'Trust Management of Social Network' start from the vast landscape of Twitter, we collection data, transforming each user into a node and their connections into the intricate threads of a sprawling social network. A storm of information brews, waiting to be deciphered. In the second stage of model; we seek to understand its hidden structure. We identify influential individuals, the bridges between communities, by measuring their 'betweenness centrality'. As we strategically remove these bridges, the network reveals its secrets, dividing into distinct communities. In the third stage occur within each community, we embark on a quest for the 'truest nodes' individuals who embody trustworthiness and reliability. Utilizing the 'Floyd–Warshall algorithm' as our guide, we navigate the pathways between nodes, measuring the distances that separate them. Combining this knowledge with each node's 'degree centrality', we forge a powerful artifact—the 'Direct Trust Matrix'. This compass guides us through the intricate landscape of trust within each community. While the fourth stage extends beyond community borders. We

summon the enigmatic 'Generative Adversarial Networks' (GANs), acting as translators of trust between communities. These GANs learn the unique trust languages of each group, bridging the gaps and weaving connections through an 'Indirect Trust Matrix'. This reveals the hidden pathways of trust that connect individuals across diverse communities. The final stage focus evaluation the trust matrices involve used two measures are accuracy and cross entropy for both the generator and discriminator components of the GANs. While the proposed method offers a nuanced understanding of trust dynamic.

Keywords Social network · Direct trust matrix · Indirect trust matrix · Deep learning · Girvan Newman algorithm · Generative adversarial network

1 Introduction

Trust management involves evaluating, creating, and nurturing trust connections, between entities within a setting. In this study centered on friendships within the realm of Social Internet of Things (SIoT) various interpretations of trust have been explored. One particular definition, outlined in [1, 2] delves into the concept of trust as a relationship between a trustor (the entity placing trust) and a trustee (the entity being trusted). Trust is formed based on the subjective experiences and interactions between the trustor and trustee. Another definition, presented in [3, 4] defines trust as a firm belief in the competence of an entity to act dependably, securely, and reliably within a specific context. This definition emphasizes the importance of perceiving the entity's capabilities and reliability. In [5], trust is characterized as a subjective behavior involving judgment between two entities. Unlike belief, trust involves subjective assessment and

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