

Research on the Forecast Model of Trust Relationship in Sociological Theory Based on Superiority Perspective

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Abstract: With the prevalence of social networks, trust, as the basis of interaction between users, plays an important role in information sharing, experience exchange and social public opinion. However, trust is a complex and abstract concept, which is affected by many factors. It is difficult to identify the inducement and formation mechanism of trust. In social networks, trust is defined as one's expectation and belief to another in the actual social interaction, so trust in social networks refers to interpersonal trust between people. The perspective of superiority is a new concept and practice model generated in the field of social work. The similarity is based on the advantages, unexploited potential and resources of the service object and the achievements that have been made. This can be regarded as a paradigm in the social work field. The breakthrough. This paper studies the development law of trust relationship by studying social hierarchy theory and homogeneity theory, and then constructs a trust relationship prediction model, and expounds social hierarchy theory and homogeneity theory. The experimental results show that compared with other methods, the method has higher precision in the prediction of trust relationship.

1. Introduction

Trust reflects a user's comprehensive evaluation of another user's behavior and capabilities. It can usually be regarded as a decision support tool for analyzing relevant reliable information sources, especially seeking advice from trusted sources to make decisions. In the real world, there are many entities in the real network. We can regard the entities as nodes and the relationships between entities as connections, and the structure of this type of network is different from that of other networks, so this type of network is called complex network [1]. However, only a single probability value cannot judge the trust level of a specific entity. Although people have pointed out that the "trust relationship" has a positive effect in both theoretical and empirical research, there is no consensus on how this effect can be achieved. As a profession, social work has formed a professional theory of social work at the same time of its formation and development. Among them, the advantage perspective and system theory have extremely important status and significance for the development of social work theory and practice [2]. In social networks, the need to build trust models has become an increasingly important research topic in the face of so many user interactions and user-generated content. At present, some scholars have carried out the research of trust relationship mining to reflect the complexity, dynamic and uncertainty of trust relationship. Sociology should reflect on its theoretical contradictions at a deeper level, seek the unity of theoretical commitment and theoretical principles, and make further efforts for its healthy development.

2. The Basic Connotation of Superiority Perspective

The social work mode from the perspective of superiority refers to everything that social workers do, to a certain extent, based on discovering and seeking, exploring and utilizing the advantages and resources of the case owners, to help them achieve their own goals, realize their dreams, and resist the control of the mainstream of society in the face of setbacks and misfortunes in their lives. It is a brand-new mode and value orientation in the professional practice of social work. For the definition of advantage perspective, generally speaking, all that social workers (social workers for short)

should do is to find and seek, explore and utilize the advantages and resources of the case owner to some extent. It no longer emphasizes friendly and emotional influences, but mainly evaluates personal advantages or resources [3]. Specifically, social workers, while affirming the aspirations and abilities of the recipients to learn and change autonomously, focus on tapping the advantages and potentials of the recipients, dilute the problem, but do not ignore the problem, through appreciation, encouragement, narrative, etc. Helping grantees regain their awareness and self-confidence in their relationship with their surroundings and their ability to enhance their self-power. Therefore, the advantage perspective emphasizes the discovery of the “sparkle point” on the client, explores the potential of the client, fosters, encourages, assists, supports, stimulates, and releases the inherent advantages of the people, and solves the problem through the power of the case.

3. Sociological Theory

3.1 Social hierarchy theory

Social hierarchy theory is mainly used in directed networks, which reflects a user's position in the network and also reflects the degree of attachment of individuals to other individuals in the network. In social hierarchy theory, it is common to use a positive directed link to indicate that the creator of the link thinks that the receiver of the link has a higher level. Social network is a relatively stable system, in which there are social individuals and unique connections between individuals, and this unique social relationship is shown as a stable interaction [4]. Its main content is to talk about the general viewpoints or thinking modes of people and society. The concepts used are imprecise and the logic is not rigorous. It seldom puts forward verifiable and empirical arguments, let alone demonstrates or refutes these arguments. Social hierarchy theory is used to explain how the social hierarchy of users affects the establishment of trust relationship between users, that is, low-level users are more likely to establish trust relationship with users higher than them. For example, in social networks, high-level users usually belong to authoritative users. Trust seems contagious [5]. But trust between people seems to be very difficult to establish, because trusting others means handing over resources to the trusted, if the trusted is trustworthy, it will bring benefits to the truster; the biggest difference is that people can attach meaning or value to the things they encounter, so we can regard social reality or social order as constructed by people's meaningful behavior.

3.2 Theory of homogeneity

Homogeneity is the trend that individuals are related to similar individuals, which is used to explain that users with similar characteristics in real society are more likely to establish connections, that is, users tend to choose users who are similar to themselves in some aspects. Homogeneity factors mainly consist of two categories: the similarity of individual characteristics and the similarity of social environment [6]. The research method of social network is very similar to that of complex network. Social network is not only the research focus in the field of sociology, but also the research hotspot in the field of economics and computer. It also extends to a wide range of interdisciplinary fields, such as complex science, mathematics, biology and theoretical physics [7]. Because this theory contains a series of interrelated and logically rigorous hypotheses or basic principles, the established general arguments can be stated as empirical hypotheses that can be tested in principle. Homogeneity is the most important theoretical basis for trying to explain people's trust relationship with each other. Homogeneity effect shows that similar users have a high possibility to establish trust relationship [8]. For example, users with similar tastes in commodities are more likely to trust each other on commodity evaluation websites. In the short term, due to limited rationality, individuals may make choices under the circumstance of misunderstanding of the environment, thus they may not be able to have a complete set of coping strategies for the situations they face. But in the long run, with the increase of information, individuals will correct their behavior.

4. Trust Relationship Prediction Model

4.1 Regularization of social class

The social level of users reflects the importance of a user in the network. For trust networks in different fields, the social network system has typical evolution characteristics and its environment has typical social ecology [9]. This paper studies the social network trust evaluation mechanism based on the characteristics of complex networks, measures the trust of social network entities based on psychological theory, and studies any evolution model of social network trust based on biological evolution theory. In sociology, this expression is also used to clarify the interpretation and prediction of demographic processes, social mobility, the spread of inventions and technologies, and organizational behavior. The essence of subjective trust is based on belief, subjective, uncertain and ambiguous, and cannot be described and verified in precise language.

When an entity belongs to a higher level of trust, it must also belong to a lower level of trust than other levels of trust. Due to the ambiguity of subjective trust, each sub-set can be described by an interval. Let H_p represent the interval of D_j subsets, so the trust level for entities has the following formula.

$$D_j = \sum_{i=1}^n (H_p \times V_p) \quad (1)$$

Then, the social class regularization term can be constructed according to the social class theory, which can be regarded as solving the following optimization problems:

$$S(r_k) = \sum_{r_k \neq r_i} w(r_i) D_r(r_k, r_i) \quad (2)$$

Since $N > 0$ is specified, the value of k varies greatly. In order to make the change within a reasonable range, the function Tr is defined and always has the same sign as k . Usually, $0 \leq k \leq 1$, according to experience, the Tr function is defined. as follows:

$$T_r = \frac{1}{N} \sum_{i=i_0}^k r_i r_i^T \quad (3)$$

Then, the social grade regularization can be rewritten as:

$$PR(k) = T_r(k) - V_r(k) \quad (4)$$

Therefore, it is necessary to seek a quantitative description mechanism that can reflect the ambiguity of entity trust and has intuitive and concise semantics. When people learn and use norms, people give “intrinsic value” to the norms, making the norms “self-executing” [10]. Acquisition of a norm implies a change in preference, thus showing a change in behavior, i.e. internalization or socialization of the norm. We believe that the social behavior paradigm partly attributed to this can also be called the social psychological paradigm, so that it can include not only explicit behavior events but also implicit psychological processes such as suggestion, imitation, desire and instinct.

4.2 Homogeneity regularization

Complex network is a network structure composed of a large number of nodes and intricate relationships between nodes. Complex networks have many statistical characteristics different from regular networks and random networks, the most important of which are small-world effect and scale-free characteristics. A model usually refers to a set of expected formal statements about empirical consequences-thus the model is a theoretical type-but its scope of application is limited to narrow specific situations. As a cognitive phenomenon, subjective trust is a subjective belief and a subjective judgment of a specific characteristic or behavior of a subject at a specific level. Its essence is subjective and vague and cannot be accurately described and verified.

Since trust is domain-related, users have different trust intensities for the same user in different domains. This paper forecasts trust relationships for Movies, Kids & Family and Books domains in Epinions respectively, and the data statistics in each domain are shown in Table 1.

Table 1 Statistics in various fields

	Movies	Kids & Family	Books
Number of users	3654	2557	2240
Quantity of goods	2137	1587	6514
Number of user ratings	4566	3368	5210
Number of trust relationships	4031	2541	4321

Homogeneity theory holds that users with high similarity are more likely to establish trust relationships than users with low similarity. Definition K represents the homogeneity coefficient of two users S_N and k_i in the same field, which can be regarded as the similarity between users and meets the following conditions:

$$k = \frac{S_N(k)}{\sum S_N(k_i)} \quad (5)$$

Since users with high similarity are more likely to establish trust relationships, users with similar preferences in the same field are more likely to establish trust relationships for commodity evaluation websites. The definition of homogeneity regularization items is as follows:

$$R_i = M_i \sum_{r=1}^{N_r} \hat{R}_{i,r} \quad (6)$$

Suppose that the set of users trusted by user i in the trust network is I , the set of users trusted by user x is β , and β_{xy} represents the number of users trusted by user i . The definition of the homogeneity coefficient is as follows:

$$\beta_{xy} = \frac{I_{xy}}{\sum_{a=1}^{g-1} I_{xa}} \quad (7)$$

Trust groups that are contagious and trust others are more likely to generate trust behaviors among members, that is, those who trust others will have positive externalities for those who do not trust others, making it easier to trust others. They all proceed from the individual level, restore social facts to the individual's psychological or behavioral level, and seek the interpretation of social behavior and even social structure; In fact, this individualistic stance is not only the basic starting point of the social behavior paradigm, but also the basic difference between it and the social interpretation paradigm. Sociology should regard society as a whole and carry out comprehensive research on social problems, which is different from other social sciences that only study a certain aspect of social life. Sociology should regard social life as an external phenomenon and conduct empirical research on it with the principle of objectivity.

4.3 Trust relationship prediction model based on sociological theory

This model creates two kinds of connections for each node in the network, one is pure homogeneous connection, the other is weak relational connection. Homogeneous connections are connections from a node to nodes within a grid step. These connections are connections to familiar people. It is a history that more or less systematically expresses the increasing number of viewpoints, frameworks and theories about human society, with more complex and rich contents. Due to the fuzziness of the subject's trust, it is difficult to effectively evaluate the subject depending on a single value. Interval can express the fuzzy relation concretely. Interval is represented by strong cut set. If a strategy requires participants to select only one specific action for each given

information, then the strategy is pure. For example, if you observe that the opponent cooperates, you must cooperate; if you observe that the opponent deceives, you must cheat.

The trust network is constructed for different fields, and B is defined as the trust network, which is expressed in the form of adjacency matrix. The trust network matrix B is decomposed into four low rank matrices, and the trust network matrix B can be reconstructed by multiplying the four low rank matrices. The expression is as follows:

$$B(\vec{X}) = \prod_{i=1}^m (f_i(\vec{X}) - f_i(\vec{X}_w))^{1/m} \quad (8)$$

Where $m > 1$ and $f_i \leq m$. because the rows in the trust network matrix b represent users and the columns also represent users, the characteristics of the rows and columns are the same, resulting in $B = f_i$, i.e.

$$B(\vec{X}) = \prod_{i=1}^m (f_i(\vec{X}) - f_i(\vec{X}_w))^{w_i} \quad (9)$$

By adding social-level regularization terms and homogeneity regularization terms as constraints, a novel model is constructed to achieve more accurate prediction of trust relationships. The model can be seen as formula (10), which can be seen as solving the following optimization problems:

$$B(\vec{X}) = \prod_{j=1}^n u_j(x_j)^{v_j} \quad (10)$$

In addition, if all users are divided into 5 levels, $1 \leq m \leq 5$, then B indicates that the high-level user establishes a trust relationship with the low-level user; if $1 \leq n \leq 5$, then B indicates that the low-level user establishes to the high-level user. Trust relationship. The experimental results are shown in Figure 1. It can be seen that the number of centers where low-level users trust high-level users is significantly higher than the number of centers where high-level users trust low-level users, further verifying that low-level users have established more trust relationships with high-level users.

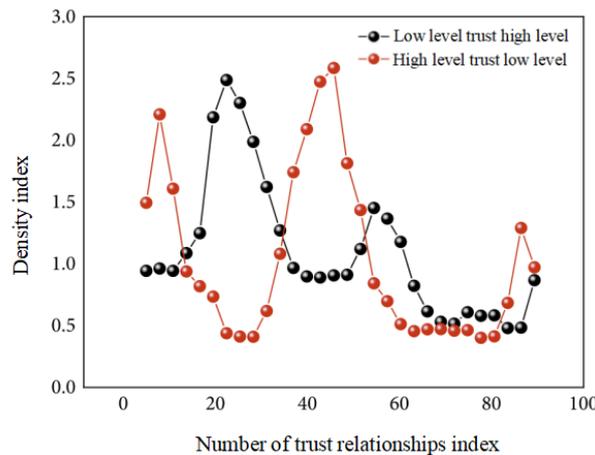


Figure 1 Density evaluation of the number of trust relationships

Although social interpretation paradigm also takes social behavior or social action as its research object, it even thinks that social structure is consciously constructed by people's social behavior. However, the basic explanation factor it seeks help from is not individual instinct or habit, but social interaction between individuals and groups. In the process of practical experience, it is not only difficult to see pure economic, political or cultural phenomena, but also impossible to find out the objective facts and subjective consciousness in the state of separation, which are said by traditional philosophy and empirical science. The “map” of sociological theory looks more like a complex mosaic pattern, which is the accumulation product of the changing process rather than the reasonable accumulation mode. Its coordination mainly comes from the later scholars who are

concerned about the theoretical development mode.

5. Conclusion

Social network is a typical complex network system, each node is connected by one or more specific types of interdependence. And with the evolution of time, there are a variety of complex social activities. Trust is increasing all the time. When it exceeds this range, trust will change or even decrease. When the trust relationship changes, the weight changes accordingly, which avoids the defect that the weight is a certain value in the early trust model. Based on the advantage perspective, this paper studies the social hierarchy theory and homogeneity theory in sociological theory to obtain the development law of trust relationship, and then constructs a trust relationship prediction model based on sociological theory. Because this perspective emphasizes the emotional exchange between people and the understanding and construction of the meaning world, social workers should first learn to listen and listen to the experience of the case owner, the life experience, the meaning world described and their understanding in the social work practice. This method not only effectively solves the problem of data sparsity, but also realizes the prediction of trust relationship for different fields to which users belong. Experimental results show that the proposed method has higher precision than traditional methods.

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