American Journal of Information Science and Computer Engineering
Vol. 6, No. 4, 2020, pp. 24-27
http://www.aiscience.org/journal/ajisce
ISSN: 2381-7488 (Print); ISSN: 2381-7496 (Online)

Research on Tight Relationship Based on Social Network

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Abstract

This paper focuses to study the relationship network of different dimensions of students' individual data in school through social network theory, and conduct real-time event trajectory tracking. It takes the correlation degree of college students in school as the research object, and takes the association relationship of different dimensions of data of individual students in school as the target, such as the situation of card swiping in different places, freshmen questionnaire survey, mental health consultation, poverty subsidy, scholarship, achievement, and students' origin, and constructs the close relationship network between them by using social network theory. This paper studies the modeling method, verification method and feature analysis of the closely related network. Through the construction of close relationship network, it provides a more comprehensive and in-depth research dimension for students' intimate relationship, and is conducive to more targeted development of questionnaires and scales on mental health and personality formation, so as to better serve local colleges and universities in-depth understanding and analysis of college students' learning and physical and mental health. According to our feature analysis of the tight relationship network, this paper proposes the modeling method and verification method which provides effective theoretical and technical support for the research on the close relationship formed by college students in school, and provides relevant questionnaires research and scale development provide strong data support.

Keywords

Social Network, Tight Relationship Network, College Students Relationship

Received: September 30, 2020 / Accepted: December 3, 2020 / Published online: December 24, 2020

1. Introduction

College students are in the "early adulthood" of Erikson's eight stages of life development. In this stage, individuals gain shared identity on the basis of self-identity consolidation, that is, to obtain intimacy and overcome loneliness [1-3]. Therefore, good intimate relationships (such as friends, lovers, collaborators, etc.) will have a positive impact on their learning and physical and mental health. The research on this topic mainly focuses on the modeling method, verification method and feature analysis of the tight relationship network,

1) Close relationship network modeling

In the study of network nodes based on traditional methods, only the topological properties of nodes are considered, so only regular networks are modeled and the statistical characteristics of networks are ignored. In fact, through the study of real world system, it is found that a large number of real networks are between regular networks and random networks with some statistical characteristics, namely social networks. Therefore, how to use social network theory to effectively model the network expressing close relationship is an urgent problem to be solved.

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2) Verification method of tight relationship network

In the basic test theory, the significance level α set is not used in the "rejection" hypothesis framework, that is, α is not the posterior probability that the original hypothesis is true [4-5], but that the observed value of the test statistic is the same or more extreme probability than actually observed. Therefore, in this project, multiple hypothesis tests are considered to modify the basic hypothesis test, and the results of binary network projection are statistically verified.

3) Analysis of tight network

Therefore, the connectivity and clustering coefficient of individual nodes need to be relocated. At the same time, according to the principle of degree centrality, different centrality parameters are defined to measure the role of individual nodes in the network

2. Basic Idea

This paper mainly focuses on the close relationship between college students. It intends to study the intimacy network of different dimensions data of individual students in school through the theory of social network, and conduct real-time event tracking. It mainly studies the modeling method, verification method and feature analysis of the intimate relationship network, so as to provide reference for the research on the intimate relationship formed by college students in school At the same time [6-9], it can provide powerful data support for the relevant questionnaire survey and scale development, and can better serve the local colleges and universities in-depth understanding and analysis of College Students' learning and physical and mental health. In this paper, we use different dimensions of data to analyze and study the related factors that have a positive impact on College Students' learning and physical and mental health [10-13], and analyze the construction of tight relationship network. The specific research includes the modeling method, verification method and feature analysis of the tight relationship network [14-15]. This study provides model construction support for the study of the degree of College Students' Association, and provides method support for questionnaire survey and scale development.

1) Close relationship network modeling method

This research focuses on the modeling method of tight relationship network, including the composition type, representation, network characteristics, as well as the suddenness and memory of the network.

2) Verification method of tight relationship network

This research focuses on the verification methods of tight relationship networks, including the basic hypothesis test, multiple hypothesis test correction and the verification method after binary network projection.

3) Analysis of the characteristics of tight relationship network

In this study, we mainly study the characteristics of tight relationship networks, including connectivity of individual nodes, clustering coefficient, betweenness centrality, proximity centrality and eigenvector centrality.

3. Technical Route

In order to achieve the research goal of this paper, we study the college students' close relationship based on the social network theory. Our research method is: firstly, according to the social network theory, based on the previous research results of the project team, we propose a more reasonable modeling method of the tight relationship network; secondly, according to the statistical verification of the tight relationship network, we analyze the basic hypothesis check Finally, the paper studies the characteristics of the tight relationship network, including the connectivity of individual nodes, clustering coefficient, betweenness centrality, proximity centrality and eigenvector centrality, so as to analyze the different degrees of connection among students. In the experimental aspect, we take the tight relationship based on social network theory as the research background, and combine with the data sets published at home and abroad to verify and analyze the performance of the proposed model and algorithm. Specifically,

1) Research on the modeling of tight relationship network

This research focuses on the modeling method of tight relationship network. Social network is composed of nodes that represent the elements in the real system and the edges used to represent certain relationships between individuals. Many aspects of human society and nature can be mapped into social networks, such as neural system, computer network and so on. These nodes and their relationship are abstracted as the points and lines in the network graph. It is convenient to compare the differences and similarities of the topological properties of different networks and to establish algorithms to study the topological properties. In this study, we focus on four types of graph, namely weighted digraph, weighted undirected graph, powerless digraph and powerless undirected graph, and design the corresponding adjacency matrix to express them. Furthermore, bipartite network is used to represent the degree of individual closeness. Then, a bipartite graph is constructed by mapping the bipartite network into a specified set. Specifically, by selecting a set from two sets X and y as the projection target set, if there are two different nodes in X and both have connected edges in one of the same nodes in Y, then the two different nodes in X will be set up

connected edges. In this kind of push pair, every two nodes in the same set will perform the above operations, and finally form a single partitioned graph. At the same time, according to the increasing activity level of individual behavior in a short time, the burstiness parameter is defined by variation coefficient to quantitatively describe the distribution of behavior time interval, and Pearson correlation coefficient is used to define the memory coefficient to describe the distribution characteristics of time interval sequence,

2) Research on verification method of tight relationship network

This research focuses on the verification method of tight relationship network. Firstly, the application of basic hypothesis testing method in tight relationship network is studied. The significance level α set in the test theory is not used in the "rejection" hypothesis framework, that is, α is not a posteriori probability that the original hypothesis is true, but that the value of the observed test statistic is the same or more extreme probability than actually observed. Then, we further design a multiple hypothesis test to revise it. In order to solve the problem that null hypothesis is rejected by mistake, Bonferroni method is used to make the probability of false rejection of any original hypothesis less than or equal to α. Meanwhile, Benjamin Hochberg method is used to control the error detection rate. Finally, we use an unsupervised method to verify each edge of the bipartite network projected by the tight relation network. Specifically, the null hypothesis of random connection between set elements with moderate heterogeneity and consistency is introduced. At the same time, in order to test the null hypothesis of the existence of edges, the analytic definition or computable process is used to calculate the p value of each edge of the projection network, and then the Bonferroni correction method is used to modify the statistical significance level of multiple hypothesis tests to obtain the statistically verified weighted network.

3) Research on the characteristics of tight relationship network

This research focuses on the study of the characteristics of tight relationship networks. In order to deeply analyze the characteristics of tight relationship network, we first define the connectivity of individual nodes in the tight relationship network, and then use cluster coefficient to describe the probability that the close relationships among individual nodes are also closely related to each other. The higher the clustering coefficient is, the more exclusive the cluster is, that is, the more homogeneous the association is. Then, according to the degree centrality principle, that is, the greater the degree, the greater the importance of the nodes. We define the betweenness centrality, proximity centrality and eigenvector centrality to measure the role of individual nodes in the network. Among them, the student node with high betweenness center node is the bridge of the tight relationship network, which makes the connection between the student nodes that could not be directly connected. It occupies the key path between many student node pairs. If there is no student node, then its tight relationship network group is difficult to contact with external student nodes. Student nodes with high betweenness centrality will have an important impact on the whole process of tight network. In the tight relationship network, the position of the student node is very special, which will connect the two groups that have no communication. The average distance between the student node with the largest centrality and all other student nodes in the network is the shortest. This kind of student node is not necessarily in the core position in the tight relationship network, and the association with other student nodes is not necessarily the most, but the student node has the best vision in the tight relationship network, and it is easier to understand the situation in the network and the direction of information flow. The centrality of eigenvectors is defined as the eigenvectors corresponding to the adjacency matrix and eigenvalues of the network, and is calculated by greedy iterative algorithm.

4. Conclusion

This paper takes the correlation degree of college students in school as the research object, and takes the association relationship of different dimensions of data of individual students in school as the target, such as the situation of card swiping in different places, freshmen questionnaire survey, mental health consultation, poverty subsidy, scholarship, achievement, and students' origin, and constructs the close relationship network between them by using social network theory This paper studies the modeling method, verification method and feature analysis of the closely related network. Through the construction of close relationship network, on the one hand, it provides a more comprehensive and in-depth research dimension for students' intimate relationship, on the other hand, it is conducive to more targeted development of questionnaires and scales on mental health and personality formation, so as to better serve local colleges and universities in-depth understanding and analysis of College Students' learning and physical and mental health.

Acknowledgements

This work is supported by National Natural Science Foundation of China under Grant No. 61772448, 61402394, Natural Science Foundation of Jiangsu Province under Grant No. BK20191481, China Postdoctoral Science Foundation funded project under Grant No. 2019M660132, Natural

Science Major Project of the Higher Education Institutions of Jiangsu Province of China under Grant No. 17KJA520006, Postdoctoral Research Subsidy Program of Jiangsu Province under Grant No. 2019K123, the Fifth "333 high-level personnel training project" Scientific Research Subsidy of Jiangsu Province under Grant No. BRA2019288, the Open Foundation of Jiangsu Provincial Key Constructive Laboratory for Big Data of Psychology under Grant No. 72591962002G, Six talent peaks project in Jiangsu Province under Grant No. JY-072, 333 high level talent training project in Jiangsu Province, Innovation and entrepreneurship training program for College Students of Jiangsu Province (202010324011Z, 202010324070Y).

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