The Integration of New Media Communication and Social Network Based on Computer Technology

Yujia Han[1,a,*]

[1]*Department of Media and Communication, Tongmyong University, Busan, 612022, Korea*
[a]*hanyujia629629@gmail.com*
[*]*Corresponding author*

Keywords: Computer Technology, New Media, Social Network, Integration Mechanism

Abstract: In the era of new media, social network, as a new mode of communication, has gradually become an indispensable part of people's daily life with its unique advantages. The integration of new media communication and social networks makes information dissemination faster, user interaction more frequent and social behavior more convenient. This integration not only brings convenience in information dissemination, but also provides new opportunities and challenges for the development of social networks, so this paper studies this. This paper mainly uses hierarchical analysis and survey methods to analyze the ratings of experts and the shortest paths of different algorithms in social networks and information dissemination. The survey results show that the centrality of the platform reaches 6.91, indicating that in information dissemination and social networking, it is necessary to strengthen the provision and improvement of the platform in order to meet the needs of users.

1. Introduction

The rapid development of new media has brought about earth-shaking changes in people's entertainment methods. On the Internet, information can be unrestricted by time and space. With the emergence and popularization of mobile terminal devices such as smartphones and tablets, information transmission on the Internet has become increasingly popular. People use computer-related technologies to disseminate real-time news and other information through the Internet, and can also communicate and discuss during the dissemination process. This is the basic manifestation of the integration of new media communication and social networks.

With the development of Internet technology, new media communication has become one of the important ways of information dissemination. New media communication refers to the way of providing information and services to users through digital technology and network technology, using various terminal devices. Social networks are user-centered social platforms based on Internet technology and user needs. Hanane Amirat et al. proposed a rule-based sequential recommender system that addressed the main drawbacks of sequentially exploratory POI proposal methods by considering temporal and social impacts of short-term recommendations [1]. How to create a recommendation algorithm that provides products based on people's individual needs and preferences on social networks is an important research topic. Nasim Vatani et al. proposed a

probabilistic product recommendation algorithm based on personality perception and social network trust [2]. Monika Singh said Twitter is an open application programming interface and is vulnerable to fake accounts. Fake accounts are mainly used for advertising and marketing, defaming individuals, harvesting consumer data, driving traffic to fake blogs or websites, sharing false information, online fraud and surveillance. To select an appropriate subset of features from the original feature space, he used feature selection techniques such as information gain and correlation [3]. This paper conducts a fusion analysis of new media communication and social networks from a computer perspective.

First, this paper describes the characteristics, existing problems and categories of new media, and then uses the expert scoring system to conduct a comparative analysis of the influencing factors of information dissemination. Secondly, this paper discusses the rise, role and improvement measures of social networks point by point, and then conducts experimental simulation and theoretical elaboration on the application of computer technology in social networking and information sharing. Finally, this paper summarizes the results of new media communication and social network integration through data comparison and discussion.

2. New Media Communication and Social Networks

2.1. New Media

New media has become the main channel for disseminating information in today's society [4-5]. Compared with traditional media, new media has a wider scope, faster dissemination speed and stronger interaction. New media is an exponential traditional media, including online media, mobile media, digital TV, digital movies, etc. It is an information dissemination model based on digital and network technology, which is characterized by real-time, fast dissemination speed, wide dissemination range, interactivity and multimedia. It can quickly deliver information, promote interaction between users, and provide personalized services. However, the spread of new media also brings problems, such as difficulties in ensuring information quality and protecting user privacy.

Social media is one of the most important communication channels of new media, through which users can receive and share information. A news website is a professional platform for distributing news and other information through which users can receive the latest news and information. Digital advertising is one of the main forms of new media advertising, including banner ads, keyword ads, video ads, etc. Digital TV and digital movies can provide a variety of program content, including news, entertainment, education, etc. [6-7].

20 new media scientists and operations experts evaluated the relationship between factors affecting information dissemination. This paper rounds the average of these expert evaluation results and converts it into a direct impact matrix. The results are shown in Figure 1.

As shown in Figure 1, the platform has the highest centrality, the influence of operating personnel is the highest, and the cause of information is the highest. The identification of key factors mainly refers to the centrality of each factor, because the centrality is positively related to the criticality of a factor, reflecting its correlation with other factors and its relative importance in the system. At the same time, it is also necessary to comprehensively consider the degree of influence and the degree of factors being affected.
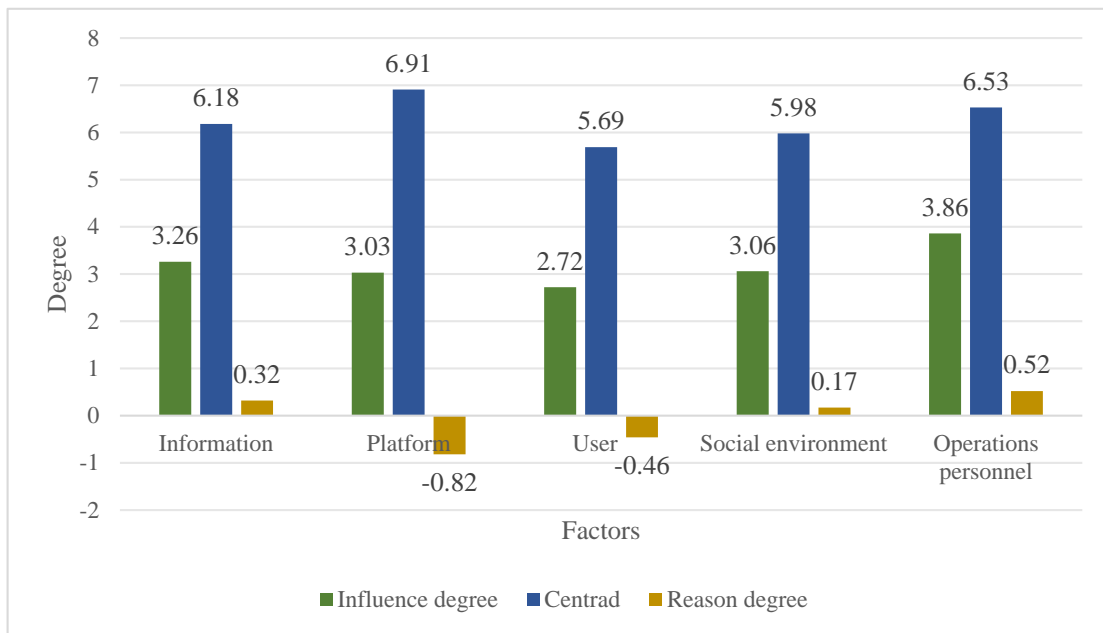
Figure 1: The influence index of each factor

This paper considers the number of push messages (Q1), information richness (Q2), average number of likes (Q3), number of forwards (Q4), uptime (Q5), user satisfaction (Q6), user responsibility (Q7), operational efficiency and stability (Q8), feedback and service speed (Q9) , information delivery method (Q10), information dissemination media (Q11) and information dissemination activities (Q12) as secondary indicators to calculate the entropy value, and the results are shown in Figure 2.

Figure 2: Impact entropy value of new media communication

As shown in Figure 2, the entropy value of the average number of retweets (Q4) is the smallest and has the greatest impact on new media distribution, followed by the legal entropy value of the average number of likes (Q3). This shows that users' perception of information plays a crucial role in influencing new media communication, and users' perception of information spreads information

and forms secondary communication, thereby increasing the impact of new media communication. This also indirectly reflects the fact that new media should focus on information, focus on its positive impact, and guide users to develop good habits of disseminating information.

2.2. Social Networking

Social network is a complex and diverse world, full of interpersonal communication and information flow [8-9]. In this network, everyone is a node connected through different relationships, forming a huge social relationship graph. Social network is a social platform based on Internet technology and user needs [10-11]. The rise of social media began with Facebook in 2005, and since then many emerging social platforms have emerged. Social networks have become an important tool in people's daily lives and work. They not only facilitate communication and information collection, but also provide services to users, such as career development and consumer decision-making [12-13]. Individuals are connected through various relationships, which form the framework of social networks and influence people's information flow and social interaction. Social networks are a way of delivering information. Through social networks, people can easily access and transmit information about news, social media, online shopping, and more. The ease of information transfer allows people to access needed information more efficiently while providing opportunities for various types of cybercrime. On the one hand, social networks expand people's social circle, enabling more people to connect and communicate with each other [14-15]. On the other hand, social networks also have negative effects such as information flood and cyberbullying.

By monitoring and analyzing user usage in real time, we can understand the problems users face in their daily work and share information with the society in a timely manner. At the same time, big data platforms can also be used to collect a large amount of useful information. The development of social networks makes the dissemination of new media and social information more flexible and open in time and space [16-17]. By analyzing various problems that arise in social informatics, corresponding solutions are proposed.

3. Computer Technology and its Application in the Integration of Social and New Media

3.1. Computer Technology

Computer technology is one of the most important inventions of the 20th century, which has fundamentally changed our lifestyle and social structure [18]. From the earliest vacuum tubes and relays to modern integrated circuits and quantum computers, advances in computer technology continue to update our knowledge. The basis of computer technology is the binary number system. Numbers 0 and 1 allow computers to perform precise instructions and operations. This basic digital system structure is commonly used in a variety of computing devices, from simple computers to complex supercomputers. With the help of the binary number system, computers can quickly perform various calculation tasks, making production and human life very convenient. It not only affects the design and manufacturing of computer equipment, but also promotes innovation and development in various industries. From the financial, healthcare, education and entertainment sectors, the application of computer technology continues to change our lives.

The integration of new media communication and social networks is to achieve actual and effective dissemination of information, user interaction and social behavior. The core of this integration is to use new media communication to improve the user experience and service quality of social networks [19-20]. By analyzing data in social networks, new media can push information more accurately and improve the efficiency of information dissemination. When converting traditional information transmission methods into new media forms, it is necessary to locate and

filter users and transmit digital text, audio, video and other information to users.

Technically speaking, social media platforms such as Weibo, WeChat, and Shimmer, as well as new media technologies such as virtual reality and augmented reality, provide us with faster and more convenient ways to disseminate information. From text, images and video to live streaming, virtual and augmented reality, the continuous innovation of new media technology makes our communication of information more diverse. The popularity and development of social networks not only speed up the dissemination of information, but also make reception more personalized. Each person's preferences, interests, geographical location and other factors can be accurately identified and recommended through algorithms. This personalized recommendation technology has changed the way we consume information. Social networks require users to provide personal information in order to receive personalized recommendations. However, the loss and misuse of personal data has become a global problem. In addition, social networks exacerbate the problem of information overload, making it difficult to filter out truly valuable information.

3.2. Optimization Path Selection Algorithm Based on Multiple Constraints

The integration of new communication media and social networks is based on computer technology, using smartphones and computers as information exchange media to communicate and interact with users through these devices. Users can directly browse various information when using the Internet platform. Computers use wireless communication technology to classify and process different types of message events. Dijkstra's algorithm is an algorithm for finding the shortest path from one vertex to another. The steps to execute the algorithm are as follows: Initializing all nodes as inaccessible state, and select the node with the shortest path from all inaccessible nodes. For this node, checking all unvisited adjacent nodes. After calling and checking all adjacent nodes of the node, mark it as visited until all nodes are traversed, because the parent array contains the shortest path sequence. Finally, the distance from the source node to each node is returned. Dijkstra's algorithm needs to be improved to accommodate calculations with multiple constraints. To improve the quality of path solutions, a two-way selection algorithm with several limitations is needed: reverse search and direct search. The objective function is defined as follows:

$$I(q) \overset{\Delta}{=} \max \left\{ \frac{1-sc(q)}{1-D_{sc}(q)}, \frac{1-tj(q)}{1-D_{tj}(q)}, \frac{1-to(q)}{1-D_{to}(q)} \right\}$$

(1)

Among them, $sc(q)$, $tj(q)$, and $to(q)$ respectively represent the trust, intimacy, and reputation values aggregated on path q. The path quality function is defined as follows:

$$L(q) = \beta * sc(q) + \varepsilon * tj(q) + \lambda * to(q)$$

(2)

Among them, β, ε, and λ are the weights of trust, intimacy, and reputation respectively. In order to improve query efficiency in social networks, reduce search space, and make relationships in social networks relatively stable over a period of time, the Scores value of a certain keyword can be calculated by the following formula:

$$Scores = \theta * \frac{dist(p.loc, h.loc)}{\max dist} + (1-\theta) * Krel$$

(3)

Among them, $dist(p.loc, h.loc)$ represents the Euclidean distance between query positions $p.loc$ and $h.loc$. In communication theory, information dissemination in social networks is

divided into three types: interpersonal communication, mass communication and online communication. Attitudes toward information can be influenced by interpersonal relationships, mass media, and network structures. During the modeling of existing social networks, most people reduce the network to an unauthorized network. This paper discusses the strength of link relationships between nodes by dividing the link relationships between nodes into direct binding relationships and cumulative binding relationships.

3.3. Experiments on Social Network Models

Currently, common modeling methods in computer experiments include analytical modeling, empirical statistical modeling, dynamic system modeling and agent-based modeling. Since the agent-based modeling method focuses more on the characteristics of micro-individuals and provides good compensation for other modeling methods, this paper uses this method to model the information dissemination process in its study. The Sina Weibo data introduced in the experiment was obtained through the open application interface of Sina Weibo. When accessing the application interface, the data will be collected and stored in the database through a breadth-first search algorithm, starting with a specific user, getting their follow and follower lists. Here, considering the case of two-way following friends, and then gradually increase the number according to the user's friends, and continue to obtain their following and fan lists until the number of collected users reaches the desired level. The similarity model proposed in this article is mainly based on the Netlogo platform. Its statistical properties are compared with classical network models and real social networks, including node degree distribution, average shortest path, and clustering coefficient. On this basis, this paper analyzes and verifies the effectiveness and rationality of the proposed model.

As shown in Table 1, actual social networks have shorter average minimum paths and larger clustering coefficients, while scale-free networks have smaller clustering coefficients. Although small-world networks fit these two points, existing research shows that their distribution follows a Poisson distribution, which also does not match reality. The social network similarity model introduced here not only represents a power-law distribution in the degree distribution, but also has a shorter average path and a larger clustering coefficient, which allows it to better reflect what happens in real networks.

Table 1: Comparison of the statistical features of the four networks

Network type	Nodes	Links	Mean shortest path	Cluster coefficient
Small World Network	800	2580	3.07	0.32
Scale-free network	800	2000	3.96	0.05
Similarity based network	800	3360	3.53	0.33
Sina Weibo	30000	281560	4.96	0.21

The relevant situation of the data set in the simulation is as follows:

As shown in Figure 3, in order to evaluate the adaptability of the algorithm proposed here to different network structures, 100, 200, 400, 600 and 800 objects were randomly selected from the dataset as subsets. In the simulated experiment, trust, intimacy and reputation values are randomly generated among the participants. Using the IR-Tree-MBS algorithm, H_MCOP algorithm, and MBS algorithm, the same path query conditions are executed three times on 12 randomly generated subsets, and each query must be repeated three times to determine the average value.
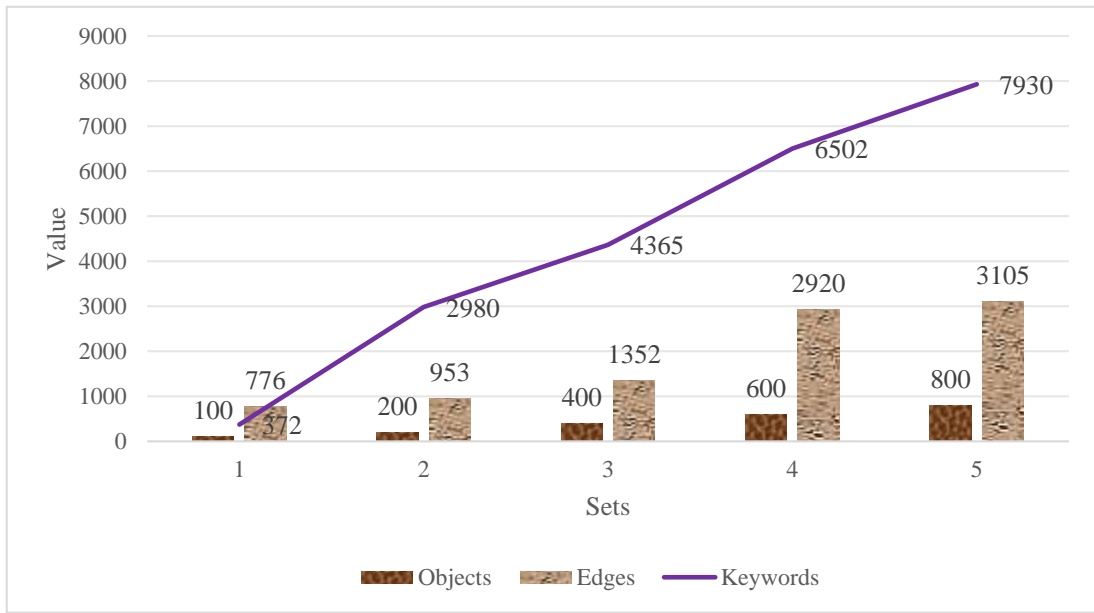
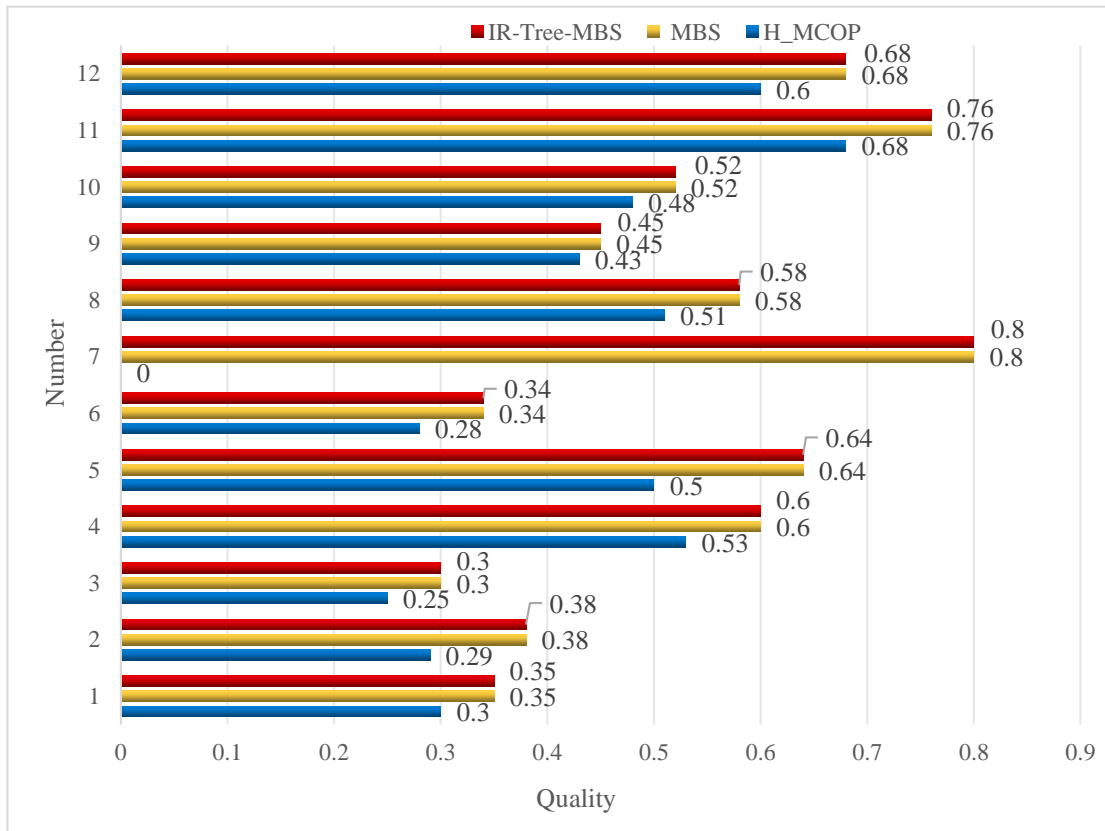Figure 3: Relevant case of the dataset in the simulation

Figure 4: Pathway quality finding results of different algorithms on different datasets

As shown in Figure 4, the IR-Tree-MBS algorithm and the MBS algorithm have similar path query quality because the two algorithms use the same query strategy and the same objective function. The path quality of both algorithms is better than that of H_MCOP algorithm. If the found path has maximum path quality and is a feasible solution, IR-Tree-MBS, MBS algorithm and H-MCOP algorithm consider it as the best path.

4. Discussion

New media communication provides users with broader and more convenient ways to obtain information through Internet technology and digital media platforms, and promotes the rise and development of social networks. Social networks promote the in-depth and diffusion of new media communication through interaction, sharing and dissemination.

To enhance the influence of new media communication, we need to insist on content being king and focus on high-quality content creation. New media platforms should advocate original content and provide in-depth and valuable articles, videos, etc. to meet user needs, ensure that the information disseminated is authentic and reliable, integrate into the context of the Internet age, and keep up with the development trend of new media. New media platforms should flexibly use various forms of content expression, such as short videos, live broadcasts, etc., to attract the attention and participation of young users. Giving full play to the synergy between social and new media platforms and users to promote the efficient flow of information. Through multi-party cooperation, we jointly create distinctive and influential content, increase user participation, and optimize and improve through user feedback and other mechanisms. New media should use reasonable incentives to optimize the information environment. For new media communication, a reward mechanism can be established to encourage relevant personnel to actively participate, and pay attention to the internalization and externalization of incentives, so that users can obtain real benefits and benefits. With the help of emerging information technology, this study improves the efficiency of information dissemination, and uses technical means such as artificial intelligence and big data to analyze user needs, carry out accurate push, and improve the communication effect. Emerging platforms such as mobile applications and social media can also be used to expand the coverage and dissemination channels of information.

In order to deal with challenges such as data leakage, it is necessary to strengthen the construction of laws and regulations, protect the rights and privacy of users, and increase the supervision of illegal activities. It is necessary to improve the quality and authenticity of information dissemination, advocate professional, objective and reliable content creation and dissemination, and strengthen the cultivation of media literacy and information literacy. It is necessary to innovate the application of technology and promote the further development of communication methods, such as using artificial intelligence, big data and other technical means to improve the effects of personalized recommendations and precision marketing and provide a better user experience.

5. Conclusion

The relationship between new media communication and social network construction is based on computer technology, and is realized with terminal devices such as smartphones and computers as auxiliary tools. In the process of new media communication, due to the continuous improvement of network technology, information content is becoming more and more abundant. Through the Internet platform, various resources are integrated to form a huge social networking website system and service system, providing users with high-quality, convenient and efficient ways to obtain information. This article analyzes the characteristics of computer technology and thinks about the existing problems in the integration of new media communication and social networks. We need to make full use of the advantages of new media communication and social networks, while focusing on solving existing problems and achieving rapid, effective and credible information dissemination. This requires the joint efforts of the whole society, including the active participation and cooperation of the government, enterprises, media and users.

References

[1] Hanane Amirat, Nasreddine Lagraa, Philippe Fournier-Viger, Youcef Ouinten, Mohammed Lamine Kherfi, Younes Guellouma. Incremental tree-based successive POI recommendation in location-based social networks. Appl. Intell. 53(7). 7562-7598 (2023)

[2] Nasim Vatani, Amir Masoud Rahmani, Hamid Haj Seyyed Javadi. Personality-based and trust-aware products recommendation in social networks. Appl. Intell. 53(1). 879-903 (2023)

[3] Monika Singh, Amardeep Singh. How Safe You Are on Social Networks? Cybern. Syst. 54(7). 1154-1171 (2023)

[4] Badreya Nasser Al-Jenaibi. The Role of Twitter in Opening New Domains of Discourse in the Public Sphere. Social Media on Communications in the Gulf Countries. Int. J. Inf. Syst. Soc. Chang. 11(3). 1-18 (2020)

[5] Sebastián Valenzuela, Ingrid Bachmann, Marcela Aguilar. Socialized for News Media Use. How Family Communication, Information-Processing Needs, and Gratifications Determine Adolescents' Exposure to News. Commun. Res. 46(8). 1095-1118 (2019)

[6] Xiaofeng Wu. AHP-BP-Based Algorithms for Teaching Quality Evaluation of Flipped English Classrooms in the Context of New Media Communication. Int. J. Inf. Technol. Syst. Approach 16(2). 1-12 (2023)

[7] Xin Feng, Xu Wang, Yue Zhang. Research on the Effect Evaluation and the Time-series Evolution of Public Culture's Internet Communication under the Background of New Media. Taking the Information Dissemination of Red Tourism Culture as an Example. ACM Journal on Computing and Cultural Heritage 16(1). 1-15 (2023)

[8] Alexis Pister, Christophe Prieur, Jean-Daniel Fekete. ComBiNet. Visual Query and Comparison of Bipartite Multivariate Dynamic Social Networks. Comput. Graph. Forum 42(1). 290-304 (2023)

[9] Mustafa Alassad, Muhammad Nihal Hussain, Nitin Agarwal. Developing an agent-based model to minimize spreading of malicious information in dynamic social networks. Comput. Math. Organ. Theory 29(3). 487-502 (2023)

[10] Hatef Fotuhi, Amirhossein Amiri, Ali Reza Taheriyoun. Phase II monitoring of autocorrelated attributed social networks based on generalized estimating equations. Commun. Stat. Simul. Comput. 52(4). 1504-1522 (2023)

[11] Abeer A. Zaki, Nesma A. Saleh, Mahmoud A. Mahmoud. Performance comparison of some centrality measures used in detecting anomalies in directed social networks. Commun. Stat. Simul. Comput. 52(7). 3122-3136 (2023)

[12] Daniyal Amankeldin, Lyailya Kurmangaziyeva, Ayman Mailybayeva, Natalya Glazyrina, Ainur Zhumadillayeva, Nurzhamal Karasheva. Deep Neural Network for Detecting Fake Profiles in Social Networks. Comput. Syst. Sci. Eng. 47(1). 1091-1108 (2023)

[13] Anwer Mustafa Hilal, Aisha Hassan Abdalla Hashim, Heba G. Mohamed, Lubna Alharbi, Mohamed K. Nour, Abdullah Mohamed, Ahmed S. Almasoud, Abdelwahed Motwakel. Spotted Hyena Optimizer with Deep Learning Driven Cybersecurity for Social Networks. Comput. Syst. Sci. Eng. 45(2). 2033-2047 (2023)

[14] José Alemany, Elena del Val, Ana García-Fornes. A Review of Privacy Decision-making Mechanisms in Online Social Networks. ACM Comput. Surv. 55(2). 37.1-37.32 (2023)

[15] Shafiq Ul Rehman, Selvakumar Manickam, Ahmed Al-Charchafchi. Privacy calculus model for online social networks. a study of Facebook users in a Malaysian university. Educ. Inf. Technol. 28(6). 7205-7223 (2023)

[16] Masaaki Miyashita, Norihiko Shinomiya, Daisuke Kasamatsu, Genya Ishigaki. Maximizing External Action with Information Provision over Multiple Rounds in Online Social Networks. IEICE Trans. Inf. Syst. 106(5). 847-855 (2023)

[17] Kamyar Esmaeili Nasrabadi, Azar Kaffashpoor. Discovering the dimensions of e-learning with the role of social networks. Int. J. Bus. Inf. Syst. 43(1). 128-142 (2023)

[18] Taslima Khanam. An optimized artificial intelligence based technique for identifying motor imagery from EEGs for advanced brain computer interface technology. Neural Comput. Appl. 35(9). 6623-6634 (2023)

[19] Fouzi Harrag, Ali Alshehri. Applying Data Mining in Surveillance. Detecting Suspicious Activity on Social Networks. Int. J. Distributed Syst. Technol. 14(1). 1-24 (2023)

[20] Michel Grabisch, Antoine Mandel, Agnieszka Rusinowska. On the Design of Public Debate in Social Networks. Oper. Res. 71(2). 626-648 (2023)