



# Research on the Impact of Digital Information Communication Channels on General Service Motivation and Work Performance in the Context of Artificial Intelligence

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## ABSTRACT

This research examines the efficiency of general services in data transfer during the big data era. It analyzes data propagation characteristics and illustrates the attributes of data propagation in general services. A prediction model for general service motivation and performance optimization is proposed based on the general service motivation theory with its accuracy and convergence compared to typical cases. The study explores the influence mechanisms and improvement theories of commuting motivation and performance, integrating these into a unified model. Finally, recommendations are provided to enhance the motivation and work performance of general staff based on data transmission and motivation improvement analysis. In conclusion, the modeling process of the Prophet prediction model is pre-processing, data set partition, selection of seasonal and holiday items in the model, the fine-tuning of model parameters, and setting of model parameters. In the case of limited machine learning training, the Prophet prediction model proposed quickly achieves low exponential error, the Prophet prediction model error is relatively small, and the algorithm has high prediction accuracy. The Prophet prediction model has lower MAE values (average absolute error) on different datasets and smaller errors compared with the other two algorithms, indicating that the algorithm has a certain accuracy. General service motivation, as an internal motivation to motivate individuals to serve and safeguard general interests, can encourage government workers to contribute more to themselves. Therefore, general service motivation positively affects not only task performance but also situational performance.

**Keywords:** Artificial Intelligence, Digital Information Communication Channel, General Service, Work Performance, Prediction Algorithm.

## INTRODUCTION

With the rapid development of big data, artificial intelligence and various communication technologies, we are accelerating into the digital age. In the field of government governance, digitalization is gradually becoming an important way of transformation for governments around the world (Abdelhalim & Abbas, 2021). This transformation has brought unprecedented efficiency and vitality to administration, provided room for better optimization of general services, and created many opportunities for general participation (Bortolotti & Biggeri, 2022). With the needs of ordinary people becoming increasingly diverse, the social general services provided by the government are difficult to meet the needs of the citizens (L. Chen, Zhen, Dong, & Xie, 2023). Therefore, it is

increasingly urgent to accelerate the transformation to a service-oriented government, change the concept of government service, and improve the ability and level of government service. This also puts forward new requirements and challenges to government performance management. In this realistic background, how to better play the role of government civil servants and improve the work enthusiasm of grassroots civil servants (Li, Liu, Zheng, Tang, & Yi, 2021) is the key problem to face. For example, in the process of social security and medical and health management, the government can analyze the data of social security information, the distribution of medical resources and the epidemic direction to optimize the allocation of social security and medical and health resources and improve the level of medical services for the whole people. General information, as a general social resource, connects all aspects of social life and regulates social activities and general behaviors. The main problem that general information service needs to solve is the effective allocation of resources and services between user groups, with a focus on the general universality and the satisfaction of basic general information service needs.

In recent years, a lot of research has been done on the application of new artificial intelligence such as big data in daily life. Z. Chen, M. Zhang, and J. Zhang (2024) proposed that strengthening the application of big data technology in the funding education of colleges and universities will help to build a timely, comprehensive and dynamic university funding management system, which is of great significance to the realization of precise funding for college students and the maintenance and promotion of educational equity. In large data under the background of funding education in colleges and universities on the basis of new opportunities, put forward from transformation funding education idea, accurate identification of funding work object, reasonable optimization of funding education work path and improve the funding education work security mechanism, etc., under the background of large data funding education work innovation, aims to build accurate funding work innovation path, improve funding education work effect in colleges and universities. T. Wang and Y. Wang (2024) proposed that common prosperity is the due meaning of realizing common prosperity, an important feature of the great rejuvenation of the Chinese nation, and is also General Secretary Xi Jinping's innovative judgment on common prosperity in the new era. Our country is currently in a digital society important transition, with digital fu spirit life common prosperity in promoting the development of a spiritual life of high quality, meeting people's spiritual life new expectations and promoting the new era of network moral construction at the same time, still faces the public reality social responsibility, digital barriers intensified by enabler development imbalance and digital algorithm damage information society diversified development, and many other ethical difficulties. The collision between digital technology and real social ethics needs to be solved urgently. Therefore, it is of great benefit to explore the realistic path of digital enabling spiritual life and common prosperity from the ethical perspective, which is to help network moral governance and enrich the Marxist theory of comprehensive development of human beings. W. Sun (2024) proposed that in the process of promoting the modernization of procuratorial work, "digital procuratorial work" should be taken as a paradigm for in-depth research and practice. The paradigm of "digital procuratorial" is born due to the background of the "digital China" strategy and "digital transformation". Although it still faces difficulties such as low data quality, few data sources and not advanced technology, this paradigm shows the prospect of business enabling integration, the improvement of comprehensive social governance ability, and the prospect of intelligent reengineering of procuratorial business. "Digital procuratorial" paradigm practice from digital can assign business, data to strengthen supervision, digital scientific management, through big data, artificial intelligence technology construction unified procuratorial business data analysis processing platform, landing the procuratorial digital application scenarios, thus more widely promote quality of procuratorial work, realize the modernization of procuratorial work with Chinese characteristics, service guarantee city digital transformation. The above literature has studied the application of artificial intelligence in the daily service process, but does not explain the specific ways and impact range of improving the general service motivation and efficiency.

In order to study the efficiency of general service in general data information transmission in the era of big data. Based on the analysis of general data and data propagation properties, this paper expounds on the characteristics of data propagation in general services. Based on the general service motivation theory, the prediction model of general service motivation and performance optimization is proposed, and the accuracy and convergence of the prediction algorithm are compared with typical cases. Based on this analysis, the influence mechanism and improvement theory of commuting motivation and performance are analyzed, and the model of commuting motivation and performance improvement is integrated. Finally, according to the data transmission and motivation improvement of general staff, suggestions are put forward to improve the motivation and work performance of general staff.

## METHODOLOGY

### Analysis of General Data Characteristics

#### Basic Concepts of General Data

The concept of general data originates from government data, but its scope is higher than government data. General data includes government data and, in addition to government data, includes other entities involved in general management and general services. Among them, the subjects of general management functions include the National People's Congress, judicial, supervisory, administrative and other state organs; other organizations with comprehensive management functions, such as trade unions, women's federations, the Communist Youth League, etc. The general service functions of the central government include general service operating units such as water supply, power supply, gas supply and general transportation; general service organizations such as education, health and social welfare (D. Ma, Zhou, Song, & Dai, 2021). It can be seen that the subjects of general data are more diversified than those of government data, which undoubtedly expands the general access basis of general data resources, further promotes the open development of general data, and protects the general interests (C. Ma, Dai, & Zhou, 2021). General data are usually more lenient than government data.

#### General Data Feature Analysis Method

General data feature analysis refers to the exploration and interpretation of features in a dataset to better understand the data. Usually include statistical metrics, visualization and model analysis. To identify the challenges and risks associated with digital technology, the following methods can be used:

**Data visualization:** Use various charts and graphics to display data features to help identify associations and trends between data and reveal potential challenges and risk factors.

**Statistical analysis:** Use statistical methods to describe and infer the data, such as mean, variance, correlation analysis, etc., to further understand the data characteristics and possible problems.

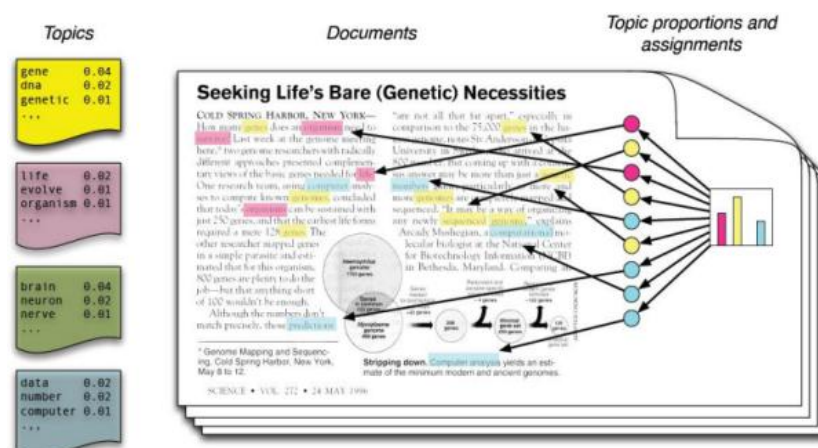
**Machine learning model:** Using the machine learning algorithm to model and predict the data, discover the hidden patterns and rules behind the data, and it is used to identify potential challenges and risks.

**Risk assessment:** formulate risk assessment indicators and methods, conduct quantitative assessment of data characteristics, identify potential risk factors, and take corresponding measures to manage and respond.

**Data security:** strengthen data security management, ensure the integrity, confidentiality and availability of data, and prevent the risks caused by data leakage and abuse.

#### Application Status of General Data

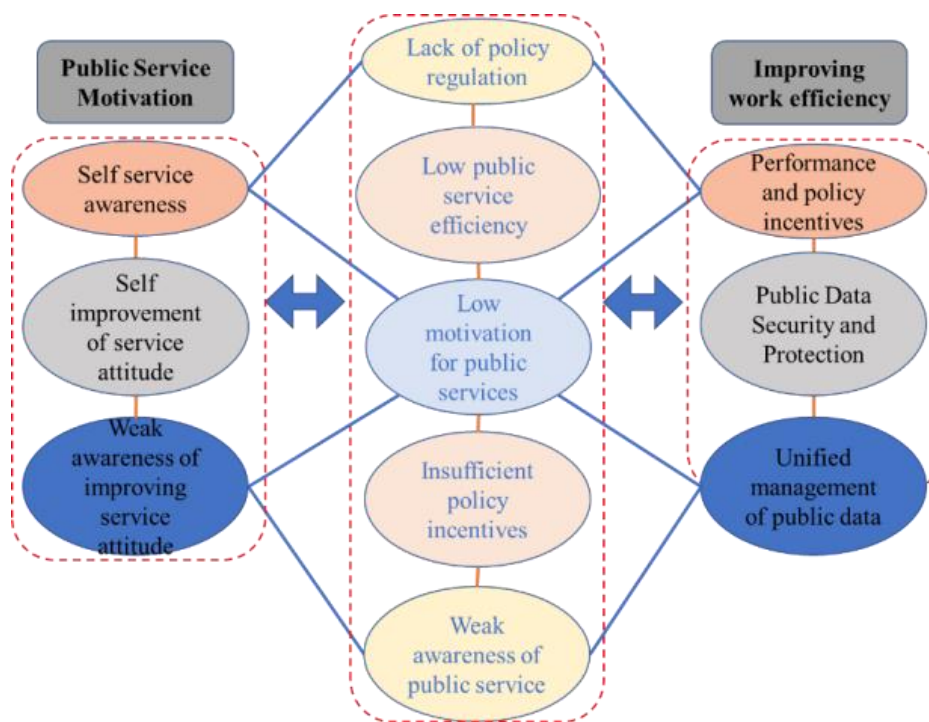
According to statistics, only a few provinces and municipal governments such as Guizhou province and Shenyang city have issued government data opening policies. Their implementation is weak, and some policies do not specify the degree of openness (Mishra, Chen, & Rani, 2023). In the existing general data management policies, there are relatively comprehensive provisions on directory management, precise opening level, and data open security responsibility (Osintsev, Rakhmangulov, & Baginova, 2021). At the same time, the regulation of opening is the principle, non-opening is the exception. The source and distribution channels of the general data information are shown in **Figure 1**.



**Figure 1.** Sources and Distribution Channels of General Data Information

### Characteristics and Challenges of General Data Dissemination

The development of digital technology also faces some new challenges and problems, and there are also potential risks to the impact of urban general services. Some cities have also encountered outstanding difficulties and bottlenecks in exploring digitally integrated services, which affect the service motivation and work performance of public officials. Digital technology is in the hands of a few leading enterprises and platforms, and "one hegemony over the world" and "winner-takes-all" are not conducive to consolidating the foundation of comprehensive urban services. Technology monopoly is a common form of monopoly in the market (Pamucar, Žižović, Biswas, & Božanić, 2021). While increasing investment in research and development and promoting technological progress, some leading enterprises constantly rely on digital technology and scale effect to form a market monopoly. This monopoly is not conducive to technology diffusion and increases the cost of technology application in urban general services (L. Sun, Li, & Zio, 2021). Digital patented technology in the private sector serves general interests and requires government decision-makers to balance commercial interests with general goods, which is not conducive to accelerating the promotion and application of digital technology in urban general services. While supporting general urban services, digital technology also faces data security, data abuse, data leakage risk and other issues (Schiavone, Leone, Caporuscio, & Kumar, 2022). The improvement strategies for general services and general data management are shown in **Figure 2**. While improving the efficiency of comprehensive urban integrated services, it may also leak citizens' privacy and government confidential information, resulting in general information security risks (Shie, Lee, Yu, & Wang, 2021).



**Figure 2.** Strategies for Improving General Services and General Data Management

At the same time, government departments may face issues such as the uncontrolled direction of online general data, disorderly expansion of platforms, and AI ethics, posing new and higher requirements for government general services (Tan, Zhu, Palomares, & Liu, 2022). Many urban general services, such as updating urban infrastructure, allocating medical and educational resources, providing services for mobile populations, ecological environment governance, and cultivating social organizations, are facing deep-seated adjustments in interest relationships (Tang, Liu, & Wang, 2023). Some involve basic institutional arrangements for urban control, and these development challenges require continuous acceleration of reform and breakthroughs in urban management systems and mechanisms. Digital technology is at the level of "Dao" in urban governance. The uneven development of digital technology has exacerbated the "digital divide" in some fields and the gap in urban general services (Vahidinia & Hasani, 2023).

There is a viewpoint that the differences caused by the digital divide are becoming the "fourth largest difference" in China after the "three major differences" of urban-rural differences, industrial and agricultural differences, and brain-body differences (M. Wang, Wu, Li, & He, 2021). The digitization of urban general services

not only fails to narrow the gap between groups but also to some extent expands the gap (T. Wang, Cao, & Hussain, 2021). Taking the epidemic period as an example, there are many difficulties for older people in using digital technologies such as mobile phones, computers, and apps, which affect medical treatment, transportation, and elderly care, and also limit the elderly group's access to essential general services. The low integration of digital technology as an important production factor affects the effectiveness of digital technology. As the main body of urban general services, the government is both a user of service data and a producer of digital resources (Z. C. Wang, Ran, Chen, Yang, & Zhang, 2022). Various government departments have a large amount of digital resources, which creates conditions for urban managers to provide general services (W. Wang, Ding, X. Liu, & S. Liu, 2022a).

### General Service Motivation Theory

The general service incentive theory is put forward through the reflection of the "economic man" in the new comprehensive management movement. Economists assume that employees in the organization consistently maximize their own interests, and that their actions are based on their own interests (W. Wang, Jiang, Han, & Liu, 2022b). The general service is motivated by focusing on the altruistic tendencies of the employees. The general sector is of a general nature and primarily provides general services. Therefore, compared with the private sector, employees in the general sector are more focused on doing meaningful things in general and realizing their own value. Until the concept of general service motivation is proposed, it does not explain the willingness of civil servants to provide general services to others (Zhang, Ma, Liu, & Xu, 2022). The general service motivation theory holds that motivation has a significant influence on a person's behavior. The data conversion pattern in the general service motivation is shown in Figure 3. At present, some grass-roots civil servants in China have the phenomenon of low sense of service and a weak sense of responsibility. This study selects the theory of general service motivation and the general service motivation as the main theoretical basis for constructing the theoretical framework of this paper, analyzes the current situation of the general service motivation of grass-roots civil servants and its influence on work performance, and accelerates the construction of grass-roots civil servants.

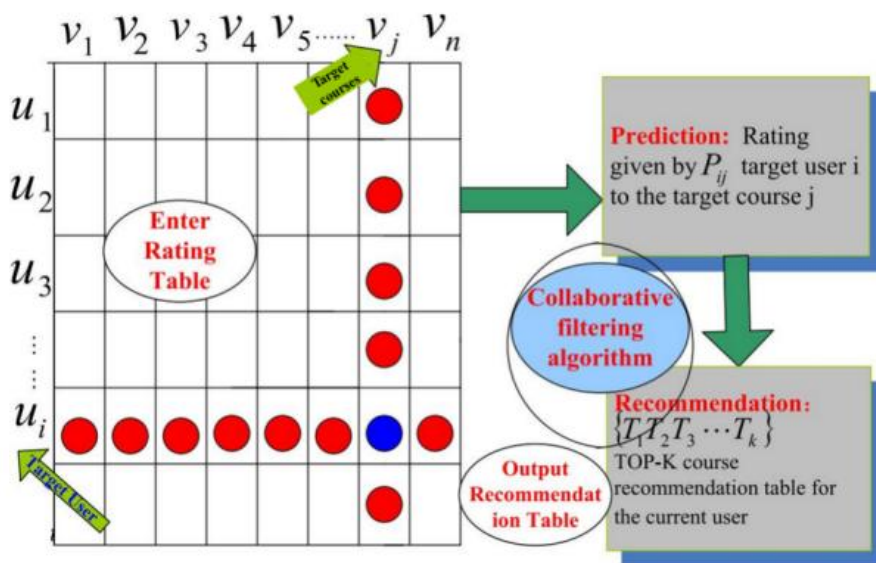


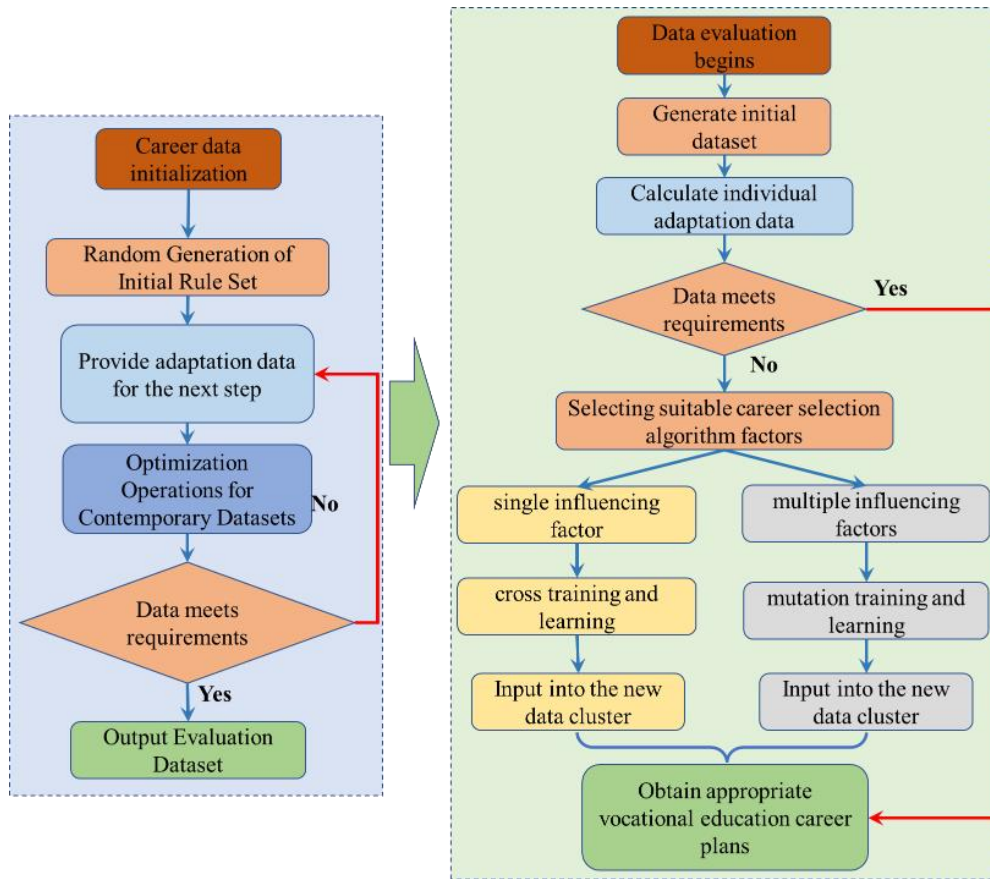
Figure 3. Data Transformation Patterns in General Service Motivation

## RESULTS

### Algorithm for Predicting the Development Direction of General Data

The Prophet algorithm has high accuracy for data with solid periodicity. Therefore, in the direction prediction section of general data, a Prophet prediction model is established based on the characteristics of general data directions. The preprocessed 38-hour general opinion data is movement-fitted to calculate the hourly general data prediction value within 10 hours. The Prophet algorithm overlays the direction term, season term, holiday term, and error term through an additive model, improving the interpretability of the data. The data preprocessing and optimization process of the Prophet algorithm model is shown in Figure 4.





**Figure 4.** Data Preprocessing and Optimization Process of Prophet Algorithm Model

$$y(t) = g(t) + s(t) + h(t) + \varepsilon_t \quad (1)$$

Where  $g(t)$  is the direction term,  $s(t)$  is the seasonal term, and  $h(t)$  is the holiday term,  $\varepsilon_t$  is the error term. By analyzing the direction propagation characteristics of general data, the direction period is fitted with piecewise linear functions to provide the direction of general data and the seasonal period is equipped with Fourier series to provide the periodicity of general data. After an emergency occurs, the overall direction of general data shows an upward direction, and the hourly growth rate of general data varies at different time points. Therefore, a piecewise linear function is selected as the direction fitting function, and the direction term is represented as:

$$g(t) = (k + a(t)^T \delta)t + (m + a(t)^T \gamma) \quad (2)$$

When predicting the direction of general data for unexpected events, it is necessary to fit their periodicity. The time when users browse information is usually concentrated in periods such as 9:00 to 12:00, 15:00 to 17:00, and 20:00 to 24:00. During the above period, the direction growth rate of general data will generally be higher than other times, showing cyclical changes. To fit the periodicity of the data, the seasonal fitting function uses the Fourier series to approximate the periodic attributes. The processing mode of occasional data fitting is shown in **Figure 5**. The seasonal term can be expressed as:

$$s(t) = \sum_{n=1}^N (a_n \cos(2\pi nt/p) + b_n \sin(2\pi nt/p)) \quad (3)$$

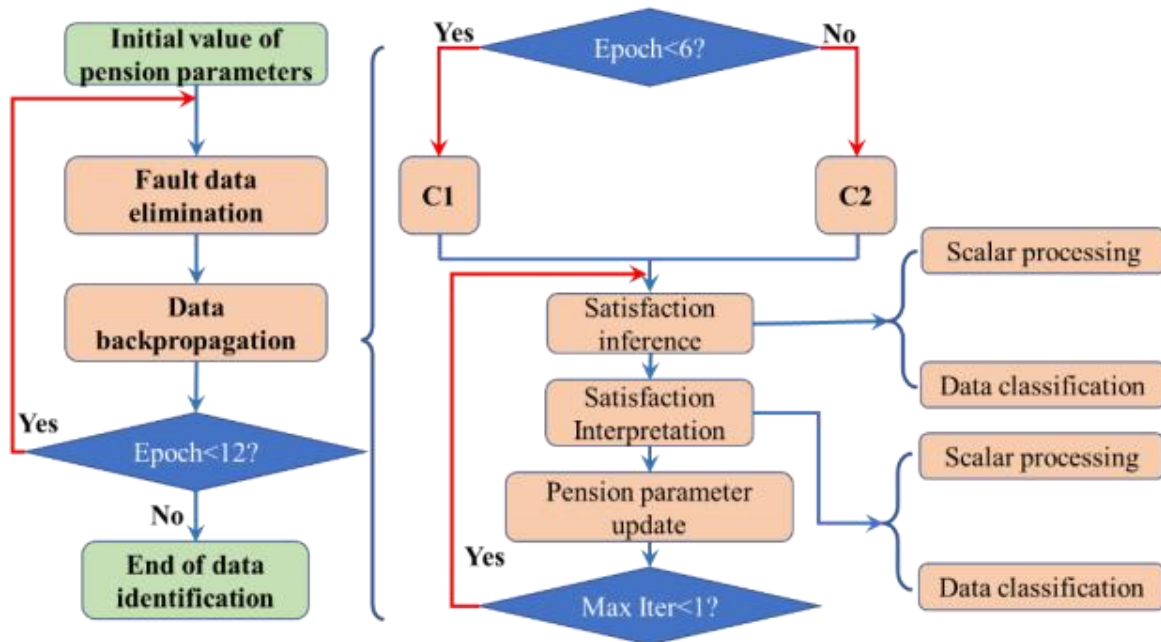


Figure 5. Periodic Data Fitting Processing Mode

Compared to weekdays, there has been an incredible increase in the direction of general data growth for crises during traditional festivals. To better adapt to the direction of general data on crises, traditional Chinese holiday dates are added to the holiday item, which is represented as:

$$h(t) = Z(t)\kappa = \sum_{i=1}^L \kappa_i \cdot 1(t \in D_i) \quad (4)$$

The modeling process of the Prophet prediction model is as follows: (1) Data preprocessing. Using the logarithmic function transformation method to preprocess general data direction observations and map them. (2) Dataset partitioning. Divide the preprocessed general data direction observations into a training set and a testing set in an 8:2 ratio to train the Prophet prediction model and evaluate its performance. (3) Selection of seasonal and holiday items in the model. The collected data are all general safety crises that have occurred in China in recent years, and the direction of general data mainly has periodic changes within a day. Therefore, the time in the holiday item is all traditional holidays in China, and the seasonal item is set to daily seasonality, that is,  $P=1$ , to fit the seasonal direction of general data for crises. (4) Fine tuning of model parameters. Use the grid parameter search method to search for critical parameters such as direction points, seasonal factors, and holiday-influencing factors in the model. Use the average absolute error as the evaluation indicator to obtain the best parameters. Considering the long running time of the grid parameter search method, the optimal average parameter value is used as the Prophet prediction model parameter. (5) By setting the model parameters and fitting all the observed direction values of sudden events, the standard data direction curve and predicted values are obtained, and the predicted results are denormalized for risk assessment of sudden event general data. The modeling process of the Prophet prediction model is shown in Figure 6.

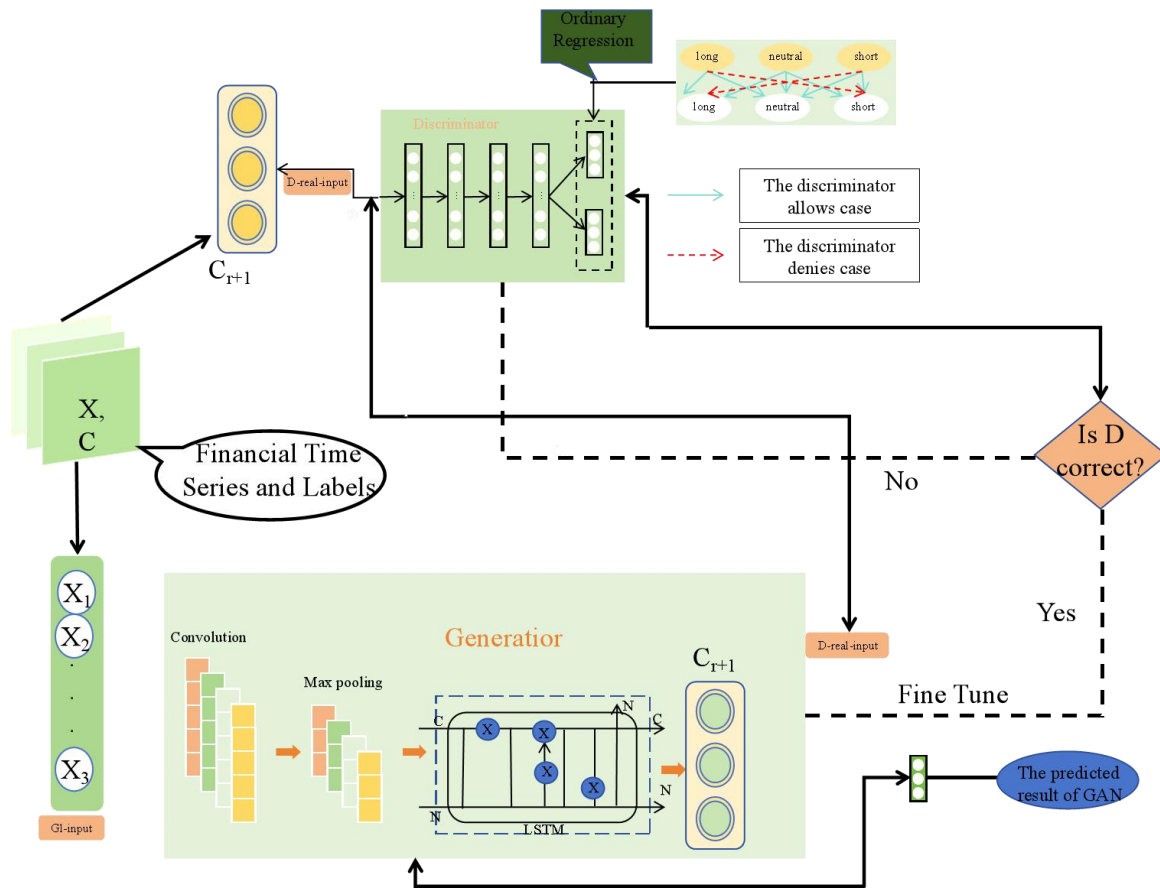


Figure 6. Prophet Prediction Model Modeling Process

**Accuracy and Convergence Analysis of General Service Prediction Algorithms**

To verify the predictive effect and accuracy of the Prophet prediction model on general data directions, this article divided the collected 60 general safety crises into two datasets A and B according to time nodes and compared them using the ARMA algorithm and LSTM neural network. Write corresponding programs in Python language in PyCharm to establish Prophet prediction models, ARMA comparison models, and LSTM comparison models. After the calculation, match and compare the predicted results with the measured ones.

The general system equation for the ARMA model is:

$$y(t) + a_1y(t - T) + a_2y(t - 2T) + \dots + a_ny(t - nT) = b_1u(t) + b_2u(t - 2T) + \dots + b_nu(t - nT) \tag{5}$$

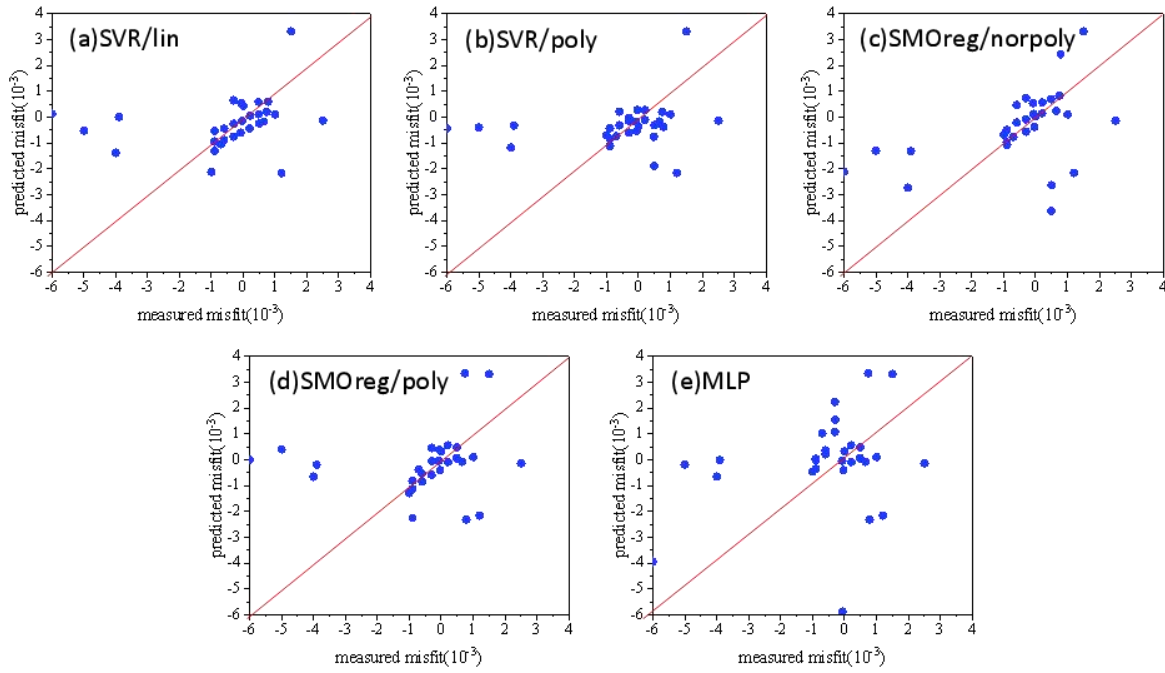
Here  $y(t)$  is the output of the system, and  $u(t)$  is the input of the system

Hochreiter and Schmidhuber first proposed the long-short-term memory neural network (LSTM), which is an improved form of recurrent neural network. After decades of continuous development, the LSTM neural network targets long-term memory and adopts a special "gate" structure, thus overcoming the problems of "gradient disappearance" and "gradient explosion" of conventional RNN neural networks. LSTM neural networks can make more accurate predictions of longer time series due to their unique structural characteristics.

The LSTM neural network structure is to expand the neural network model based on the original RNN neural network. Added input door, output door and forgotten door. After adding three gates, the model is able to solve the problems of gradient disappearance and gradient explosion of RNN in long period sequence prediction.

The distribution of the mismatch between the measured and predicted values is shown in Figure 7.



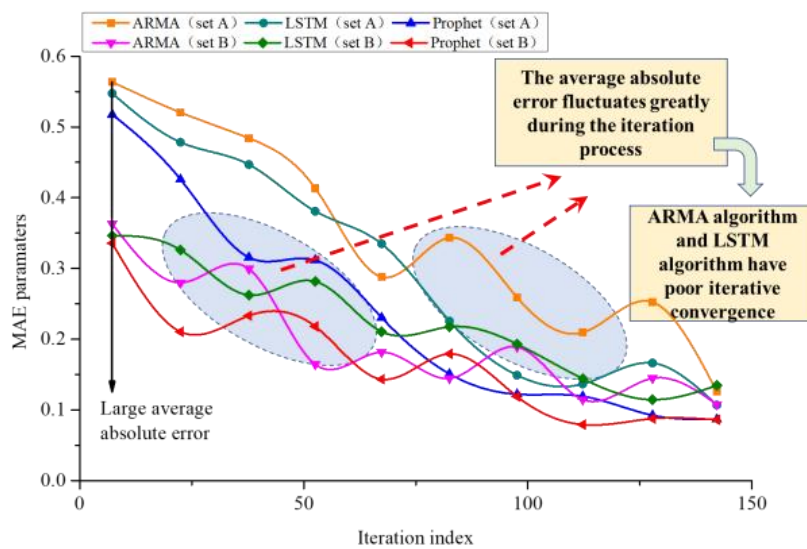


**Figure 7.** Distribution of Mismatch Between Measured and Predicted Values

In general data direction prediction, two models, Mean Absolute Error (MAE) and Mean Square Error (MSE), are mainly used to evaluate the performance of the model. MAE largely reflects the actual situation of predicted values and errors, while MSE chiefly estimates the degree of change in data. Two indicators can be used to describe the error between the predicted and actual values of general data directions. The smaller the value of the indicator, the higher the accuracy of the model's prediction.

$$MAE = \frac{1}{M} \sum_{i=1}^M \frac{|p_i - p_i'|}{p_i} \tag{6}$$

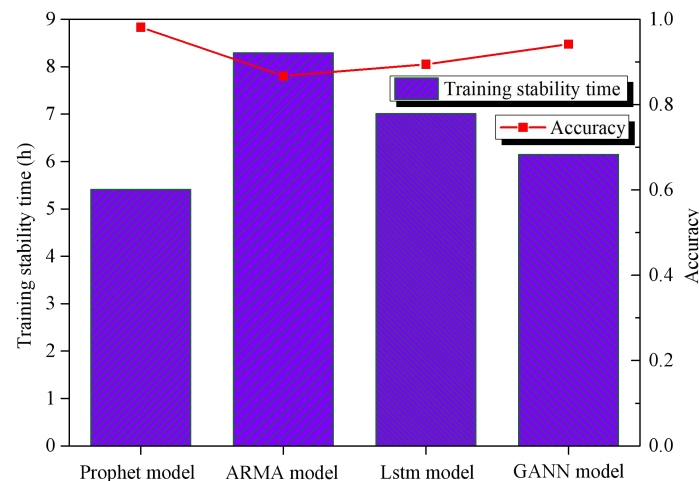
The Prophet prediction model mainly uses the grid parameter search method, with MAE as the evaluation index, to search for essential parameters of each function term in the model. Considering that the parameter search time of this method is relatively long, the average value when predicting the direction of 60 emergency general data is more accurate and is used as the model parameter. Taking the best parameter for finding the change point in the direction term of the model as an example, the parameter search step size is 0.05. The convergence times and MAE value distribution of different algorithm iterations are shown in **Figure 8**.



**Figure 8.** Iteration Convergence Times and MAE Value Distribution of Different Algorithms

Analysis shows that traditional ARMA algorithm evaluation models require 150 degrees to achieve accuracy requirements, while LSTM algorithm evaluation models require 70 degrees to achieve accuracy goals. In the case of limited machine learning training, the Prophet prediction model proposed in this study quickly gained lower exponential errors. When the number of training sessions is small, there is a significant difference between the exponential error of the other two algorithms and the exponential error of the Prophet prediction model in this study.

For any training set with any sample size, the Prophet prediction model in this study has higher accuracy than other algorithms, and the accuracy of this method is always at a high level on both datasets A and B. The highest accuracy of this method is 94.17%, which is higher than 89.46% of the LSTM algorithm and 90.14% of the ARMA algorithm. At the same time, it can be observed that as the number of sample sets increases, the difference in prediction accuracy between different algorithms gradually decreases. This is mainly because as the number of sample sets increases, the correlation calculation and matching results between samples improve, and the average relative error between algorithm predictions more minor. Therefore, the accuracy of each algorithm has been improved to a certain extent. From this, it can be concluded that the accuracy of the Prophet prediction model in this study is superior to the other two algorithms, and the accuracy can meet the prediction requirements in the case of small data samples. This result indicates the accuracy and reliability of the Prophet prediction model in this study, and the model constructed in this study has certain practicality and practical significance. The stable time and accuracy distribution of different algorithm training are shown in **Figure 9**.



**Figure 9.** Distribution of Training Stability Time Accuracy Between Different Algorithms

Compared with the other three models, the Prophet prediction model proposed in this study completes the model and computational convergence within a training time of about 5.4 hours. Compared to other models, the convergence speed is faster, such as the ARMA algorithm model requiring 8.2 hours of computation time to complete model convergence. The Prophet prediction model proposed in this study not only ensures a faster convergence rate but also has a high prediction accuracy of 98%. Compared with other models, the prediction accuracy of the ARMA algorithm model is less than 90% at this time. From this, it can be seen that the Prophet prediction model proposed in this study has more significant advantages in convergence time and prediction accuracy, and has substantial advantages in large-scale general data management evaluation.

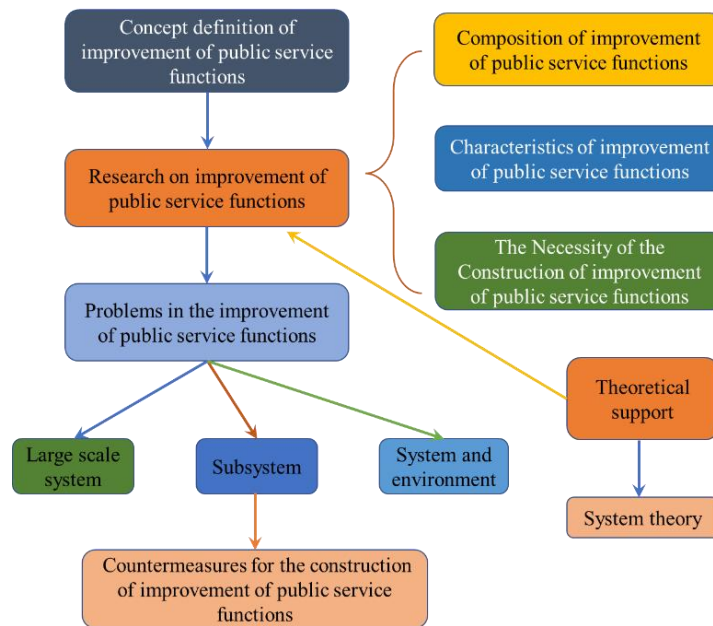
## DISCUSSION

### Motivation and Performance Improvement Models for General Services

#### Motivation and Performance Impact Mechanism of General Services

General service motivation, as an internal motivation for individuals to serve the general interests and safeguard the general interests, can encourage government employees to make more contributions to themselves. General service motivation has three levels: rationality, norm and emotion. Rational motivation is the behavioral motivation based on the maximization of personal utility, normative motivation is the behavioral motivation that strives to meet the standards, and emotional motivation is the behavioral motivation to make emotional responses

to various social situations. Motivation in line with role norms can better encourage individuals to overcome their desires, serve the public, and contribute to themselves, so as to improve their work dedication and interpersonal promotion performance. **Figure 10** illustrates the model of general service motivation and performance impact.



**Figure 10.** General Service Motivation and Performance Impact Model

Values play a crucial role in the formation and performance of employee behavior. When employees feel that the core values advocated by the organization are consistent with their own values, they will devote themselves to the work of the organization, strive to achieve their established performance goals, and constantly improve their performance level. Therefore, when the individual organization matching degree is high, the general service motivation has a significant positive impact on employee work performance. When the individual organization matching degree is low, the general service motivation has a significant negative impact on the employee work performance.

## Suggestions for Digitalization and Promotion of General Services

### The Ethical Mechanism of General Service Data Dissemination

General data ethical standards refer to the principles that general data participants should follow in making moral judgments or evaluations in general data activities throughout the life cycle of general data management. Humanist ethics advocates that the subject of freedom of data and data rights is human rather than data, and "people-oriented" advocates putting human rights first. Human rights specifically include two parts. One is the basic rights. The second is data rights. Data right is the specific manifestation of the basic human rights in the field of data, including the right to privacy, right to informed consent, right to delete, right to carry data, etc.

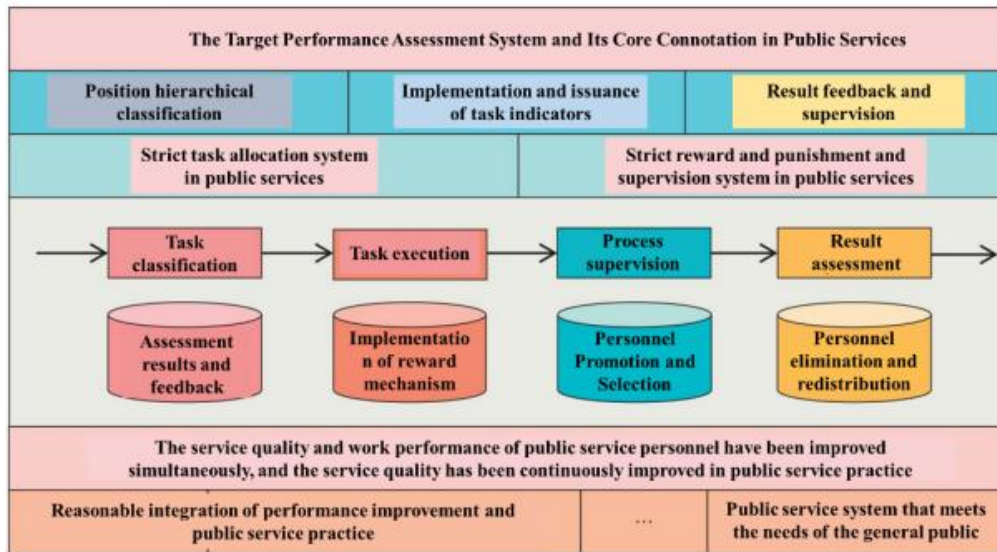
The full life-cycle flow of general data must respect human rights, including respect for users' privacy and information. Users must be informed of the purpose and scope of data collection and obtain their consent, while adhering to the minimum or necessary principle to avoid repeated data collection. The acquisition, sharing and open circulation of general data need to follow the direction of fairness and transparency, and the equitable distribution of benefits and equal opportunities within the society, and to ensure the equal right of the average person to obtain data certification through open and transparent regulations. Ensure the transparency of general information and equal access to various project data through complete, accessible, understandable, easy access to general data resources; clarify and generally disclose the data responsible persons at all stages of the general data circulation process, ensure that the general person has an equal right to know and modify the data circulation process; and promote the training of general data utilization to enjoy the benefits of general data management and disclosure.

### General Service Motivation and Performance Improvement Suggestions

Strengthen the general service motivation of grassroots civil servants. Through the empirical analysis of

grassroots civil servants, the results further verify the significant impact of general service motivation on individual performance improvement. This shows that it is crucial to cultivate and improve the general service motivation of grassroots civil servants to promote government performance and efficiency. Grassroots civil servants are the specific subjects of government policy implementation, which is directly related to the effectiveness of policy implementation.

Please pay attention to the individual differences of grassroots civil servants. Through empirical research, it is found that among the four main study variables, there are specific differences in personal characteristics such as statistical variables such as gender and educational background. The motivation and performance improvement mechanism of general service personnel are shown in **Figure 11**. Therefore, in the management of grass-roots civil servants, we should pay attention to individual differences, and implement diversified management methods for different individuals.

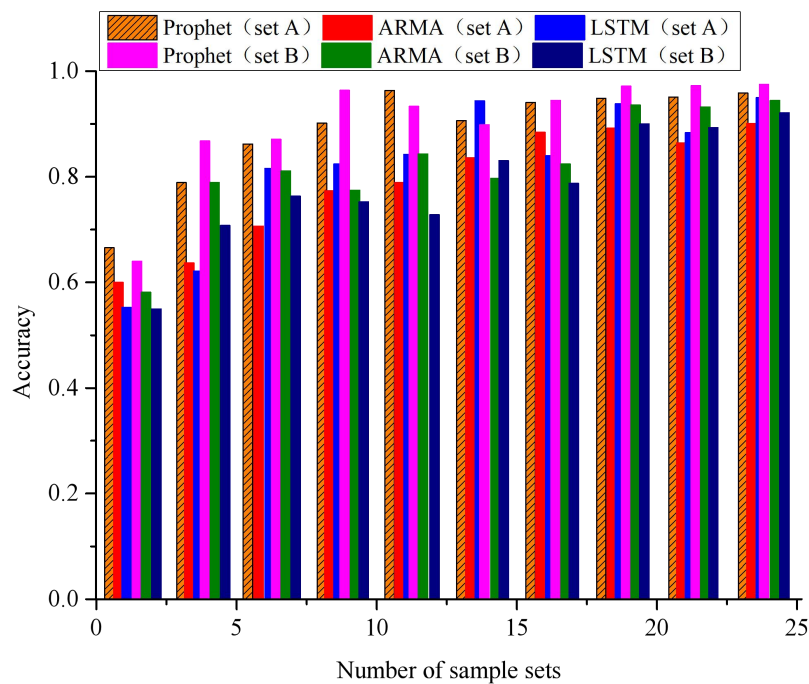


**Figure 11.** General Service Motivation and Performance Improvement Mechanism

Focus on the internal incentive of grassroots civil servants; the incentive mode of Chinese government departments mainly follows the practice of the new comprehensive management movement, and regards grassroots civil servants as rational economic individuals to maximize their own interests. Therefore, at present, external material incentives such as salary, bonuses and promotion are mainly adopted to enhance the work enthusiasm of grass-roots civil servants, promote their work performance, and ultimately improve the government performance. Through empirical research and analysis, the incentive of grassroots civil servants can not only rely on external stimulus, but the internal incentive is more lasting. Therefore, we should pay attention to the internal incentives of grass-roots civil servants. For example, methods such as spiritual incentives and reputation incentive can be adjusted to meet the self-fulfilling needs of grassroots civil servants.

**The Error Difference Analysis of the Three Algorithms**

The main reason is the poor convergence of other algorithms for large-scale and widely distributed multi-source data. When the training number is small, the model is trained with less accuracy, resulting in more significant exponential errors. As the number of training times gradually increases, the exponential error of the Prophet prediction model in this study is relatively small, and the algorithm has a higher prediction accuracy. Compared with other algorithms, ARMA has poor convergence and requires more training times to achieve a certain convergence accuracy. Therefore, the applicability of the ARMA algorithm is not good in the analysis of massive multi-source data. The Prophet prediction model of this study showed low MAE values (mean absolute error) on different datasets. To ensure the reliability and credibility of the obtained results, the accuracy performance of different algorithms on different datasets, is shown in **Figure 12**.



**Figure 12.** Accuracy Performance of Different Algorithms on Different Datasets

## CONCLUSION

This study focuses on the efficiency of general services in public data information transmission in the era of big data. Based on the analysis of general data and data propagation characteristics, we illustrate the attributes of data propagation in general services. Based on the general service motivation theory, the prediction model of general service motivation and performance optimization is proposed, and the accuracy and convergence of the prediction algorithm are compared with typical cases. Based on this analysis, the influence mechanism and improvement theory of commuting motivation and performance are analyzed, and the model of commuting motivation and performance improvement is integrated. Finally, according to the data transmission and motivation improvement of general staff, suggestions are put forward to improve the motivation and work performance of general officers. The study conclusions are summarized as follows:

1. The modeling process of the Prophet prediction model is as follows: according to the preprocessing, data set partition, the selection of seasonal and holiday items in the model, the fine-tuning of model parameters, set the model parameters.

2. In the case of limited machine learning training, the Prophet prediction model proposed in this study quickly achieves low exponential error; the Prophet prediction model error is relatively small, and the algorithm has high prediction accuracy. The Prophet prediction model in this study has lower MAE values (average absolute error) on different datasets and smaller errors compared with the other two algorithms, which indicates that the algorithm has a certain accuracy.

3. General service motivation, as an internal motivation to motivate individuals to serve in general and safeguard general interests, can encourage government workers to make more contributions to themselves. Thus, general service motivation positively affects not only task performance but also situational performance.

## CONFLICT OF INTEREST

No potential conflict of interest was reported by the authors.



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