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Research Article

Application of Image Recognition Algorithm Based on Partial Differential Equation and Wavelet Transform in the Intelligent Linkage System of Government Urban Public Management

Xinyu Xu

College of Computing, University of Leeds, Leeds, West Yorkshire, UK

Correspondence should be addressed to Xinyu Xu; sc20xx@leeds.ac.uk

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In the Internet age, social needs have become more diverse. The private sector has achieved great success in integrating resources to provide services to customers thanks to technological breakthroughs such as mobile Internet and big data, while the public sector has become even more dwarfed. The public sector urgently needs new theoretical support to integrate administrative resources more effectively, so as to provide the public with one-stop, holistic and seamless services as a whole. The "holistic governance" theory effectively responded to the abovementioned problems and gradually condensed the consensus of the academic and practical circles and became the most influential theory. The method of mathematical modeling is used to combine the improved wavelet domain Wiener filter and the comprehensive model of partial differential equations. This paper proposes an image recognition algorithm based on partial differential equations and wavelet transform. The algorithm uses weight coefficients to organically combine high-order partial differential equation models, retains the advantages of the second- and fourth-order partial differential recognition models, effectively improves the ability to maintain image edge detail information, and achieves better recognition results. This article starts with the description of the fragmentation of a street's grassroots governance and sorts out the process of implementing overall governance with the "big linkage mechanism" as the main carrier. Due to the limitations of research ability and objective conditions, this article intercepts the "cross-section" of the big linkage mechanism in a certain street to demonstrate it and analyzes this "cross-section" more thoroughly. The experimental results of the data show that the image recognition algorithm based on partial differential equations and wavelet transform is effective and practical in the intelligent linkage system of the government urban public management.

1. Introduction

The partial differential equation is a classic theory in mathematics, and its origin dates back to the 18th century. But it is difficult for us to obtain analytical solutions for general differential equations, so we adopt the method of discretization of continuous problems, and through numerical analysis methods, we obtain its numerical solutions. The focus of the work of processing images with partial differential equations is on the establishment of image description models, and subsequent solutions are not so difficult [1, 2]. The method of processing images by partial differential equations is continuous and integral. It corrects the gray value of a certain pixel in the image as a whole, which is determined by the gray value of the surrounding pixels. Moreover, the development history of the theory of partial differential equations is quite long. Now, its solution and numerical analysis theory are quite mature, so the calculation is very convenient, which can greatly improve the speed of image processing and analysis and enhance the accuracy and stability [3]. The generation of wavelet analysis is a process of "application-theory-application," also known as multiresolution analysis.

Wavelet analysis is the crystallization of multidisciplinary theories such as functional analysis, harmonic theory, numerical analysis, approximation theory, and time-frequency analysis. It proposes an adaptive time-frequency localization method, which can automatically adjust the time-frequency window, and can focus on any details of the signal period

and frequency band [4]. It is called the "microscope" and "telescope" in mathematics. It is a further development of Fourier analysis and a hot spot in the international academic and engineering fields in recent years [5]. The reform of grassroots social governance is generally divided into two aspects: urban grassroots governance and rural grassroots governance from the spatial dimension. The research of this paper is mainly through the selection of a section of the grassroots street, combined with the empirical analysis of the overall governance theory, so as to see the innovative practice as a super-large city in the process of constructing the overall government [6]. After several years of operation of the urban grassroots large-scale linkage mechanism, relatively obvious results have been achieved, providing an effective path choice for the innovation of the comprehensive governance mechanism at the grassroots level in large cities [7].

This paper proposes a P-M&LLT partial differential synthesis equation. This comprehensive method is to combine the P-M equation and the LLT equation using weight coefficients. This comprehensive model maintains the advantages of the two partial differential models and can process the image according to the different characteristics of the image. Third, use mathematical models to combine the improved wavelet domain Wiener filtering with the P-M&LLT comprehensive equation. The mathematical model method avoids the grayscale effect of partial differential equations and restrains the Gibbs effect of the Wiener filtered image. The image recognition and edge and detail protection capabilities are improved, and the reconstructed image recognition effect is better, and the calculation time is reduced. The large linkage mechanism of X Street not only achieves full coverage of the communities and streets in the jurisdiction in physical space but also realizes the functional integration of law enforcement agencies across the line. Such integration not only eliminates the blind spots of urban management but also constructs the basic unit of urban management, in fact, providing a basis for standardized and refined management. Based on the full coverage grid, it facilitates the government's management activities. On the other hand, it also improves the convenience of public service provision, which is conducive to the government's further equalization and standardization of public services.

2. Related Work

In the development of image processing, mathematics has always played a pivotal role and permeated all branches of image processing [8]. Since the 1980s, nonlinear science has gradually penetrated into image processing methods and has achieved fruitful results. In particular, image processing methods based on partial differential equations have become a hot spot in image research in recent years [9].

With the improvement of the wavelet theory, its application fields have become more and more extensive. In the field of image recognition, the application of the wavelet theory for image recognition has attracted the attention of many experts and scholars and has achieved very good results [10, 11]. Valandar et al. were a few of the earliest researchers engaged in the application of wavelet in signal processing. It established a fast wavelet transform algorithm, which was used in the decomposition and reconstruction of signals and images and then used Lipschitz exponent to characterize the singularity of the signal [12]. Another contribution is to use the different performances of signal and noise on various scales after wavelet transform and propose a signal recognition method using the wavelet transform modulus maximum principle. This is the most classic method of wavelet recognition [13].

Speaking of the application of partial differential equations in image processing, the roots of its ideas can be traced back to the work done by Gabor, and the substantial leap is due to the introduction of the concept of scale space [14]. The scale space expresses a group of images on multiple scales at the same time, and their contribution largely constitutes the basis of partial differential equations for image processing [15]. The multiple scales of the image are obtained by Gaussian smoothing. The image scale can also be obtained by using the classical heat conduction equation to evolve the image. Related scholars have proposed that the heat conduction equation is not the only equation that can form a scale space [16]. In fact, all evolution equations that satisfy the maximum value principle can define the scale space, and the maximum value principle is the mathematical expression of the causality criterion. Related scholars proposed a nonlinear diffusion model (P-M diffusion) based on the heat conduction equation [17]. In order to effectively preserve the characteristic information such as the edge while smoothing the image, a nonlinear function whose spread function changes with the change of the local properties of the image is used to achieve shocking results. However, the P-M model lacks the corresponding mathematical theoretical basis for the existence and uniqueness of the solution, and it is essentially ill-conditioned.

The theoretical basis of the partial differential equation image processing method is that the image is represented on multiple scales at the same time, usually through Gaussian smoothing. Later, the classical thermal diffusion equation was used to evolve the image, which can prove that it is equivalent to Gaussian smoothing. The basic criterion for forming the scale space is as long as the maximum principle is satisfied. This shows that the heat conduction equation is not the only partial differential equation that can form a scale space. Many equations have been proposed, of which the PM model is the most representative. The diffusion coefficient of the equation can be improved by using a diffusion function based on the image gradient that can protect the edges. Since then, many research topics have been introduced, because the existence and uniqueness of the mathematical solution of the most common PM model cannot be guaranteed.

Relevant scholars discussed in detail the development process of the theory of holistic governance, the topic of organization coordination, and the significance and inspiration of the new Durkheim theory and explained the value of the theory of holistic governance in depth [18]. He believes that holistic governance emphasizes the integration of government organizations, citing the analysis framework of the new Durkheim theory and organizational sociology, and the three concepts

of fragmented government, thorny issues, and coordination are important foundations for understanding holistic governance. Researchers believe that the idea of holistic governance is based on the reflection on the practice of new public management, focusing on the overall operation of internal government agencies and departments, and advocating that management should move from decentralization to concentration, from parts to whole, and from fragmentation to integration [19]. But the realization of this holistic governance still depends on an appropriate organizational carrier, especially the development of information technology. Related scholars believe that the fragmentation and decentralization of public governance is the fundamental reason for the inequality of basic public services such as education, medical care, social security, infrastructure, and labor and employment between the urban and rural areas and regions [20]. Drawing lessons from the theory of holistic governance, they construct a new rural public service system with the "service triangle" as the macropurpose [21]. They provide public services according to the strength of farmers' needs; implement government-led, market-operated, and socially coordinated service policies; establish an integrated service network of "cities, counties, townships, and villages"; and create a "cross-border cooperation" public service organization culture [22].

3. The Establishment of an Intelligent Linkage System for Government Urban Public Management

3.1. Constructing a Public Support System Support for the Intelligent Linkage of Government Urban Public Management. A certain street is now in the stage of social transformation, and various social public emergencies are in a stage of frequent occurrence. In the comprehensive intelligent linkage system for public emergencies, the resources of a certain street government are very limited. The social mobilization is also difficult to reach every corner of the society at the grassroots level. Therefore, the importance of cultivating a community-based emergency mechanism is highlighted. Many countries in the world that have been successful in the field of public emergency response have relatively developed community self-government emergency response mechanisms, which are basically community public security plans implemented jointly with the community, the police, and the public to realize mutual guardianship. Although China's community awareness is not as strong as abroad, basically every city in China has residents' self-government committees, community party branches, and other institutions. A certain street can be the first in the country to establish community autonomy in line with certain street conditions. The emergency response mechanism expands the participants in the emergency response of public emergencies, thereby forming an efficient and integrated emergency response network.

The existing intelligent linkage system for public emergencies in a street lacks professional training for related disasters, weak crisis awareness, and serious lack of crisis education. For promotion, it highlights the necessity for the transition period. With reference to the model of the crisis management learning system, a postlearning system for public emergencies in Guangzhou is constructed. Figure 1 shows the governance of social-technical emergencies under the government urban public management system.

3.2. Constructing the Network System Support of the Government's Urban Public Management Intelligent Linkage System. The early warning mechanism is the warning light of the chain reaction of the emergency system, and its smooth operation provides the basis for the effective operation of the entire emergency management. On the one hand, it eliminates public emergencies in the embryonic stage and prevents the outbreak of crises; on the other hand, it has won precious preparation time for the later specific emergency work to control the situation in time and minimize the damage. To a certain extent, early warning can highlight its importance more than the handling of a specific public emergency. Figure 2 shows the structure of the emergency linkage early warning organization system for government urban public management.

The government module is mainly based on the Municipal Emergency Interaction Office as the core, relying on the existing command center system and emergency command center of a certain street, strengthening the special information detection system and information sharing platform of each emergency function department, and giving full play to the consultation and information sharing of the expert team. The social organization module mainly uses the existing nongovernmental organizations, various community residents' committees, and related enterprises and institutions in a street, as well as the news media module, social public module, international organization, and other modules to integrate various possible public emergencies. The hidden danger factors of the incident are reflected in the government module in the shortest time, and the root causes of public emergencies can be eradicated from the source between the two, and then, the goal of resolving the incident in the most embryonic stage is achieved. Common coordination mechanisms in the government process are shown in Table 1.

4. Image Recognition Mathematical Model Based on Wavelet Transform and Partial Differential Equation Synthesis

4.1. Numerical Solution of Partial Differential Equations. Most partial differential equations have no analytical solutions. Numerical solutions are usually used to solve the problems of partial differential equations acutely. There are many numerical solutions for partial differential equations. The most commonly used method is the finite difference method. Finite difference refers to the use of the ratio of the difference between the function values of two adjacent points and the distance between the two points in a certain variable direction to approximate the partial derivative of the function with respect to the variable. The commonly used difference forms are forward difference, backward difference, and center difference. In the one-dimensional case, the first-order partial derivative algorithm is defined as follows:

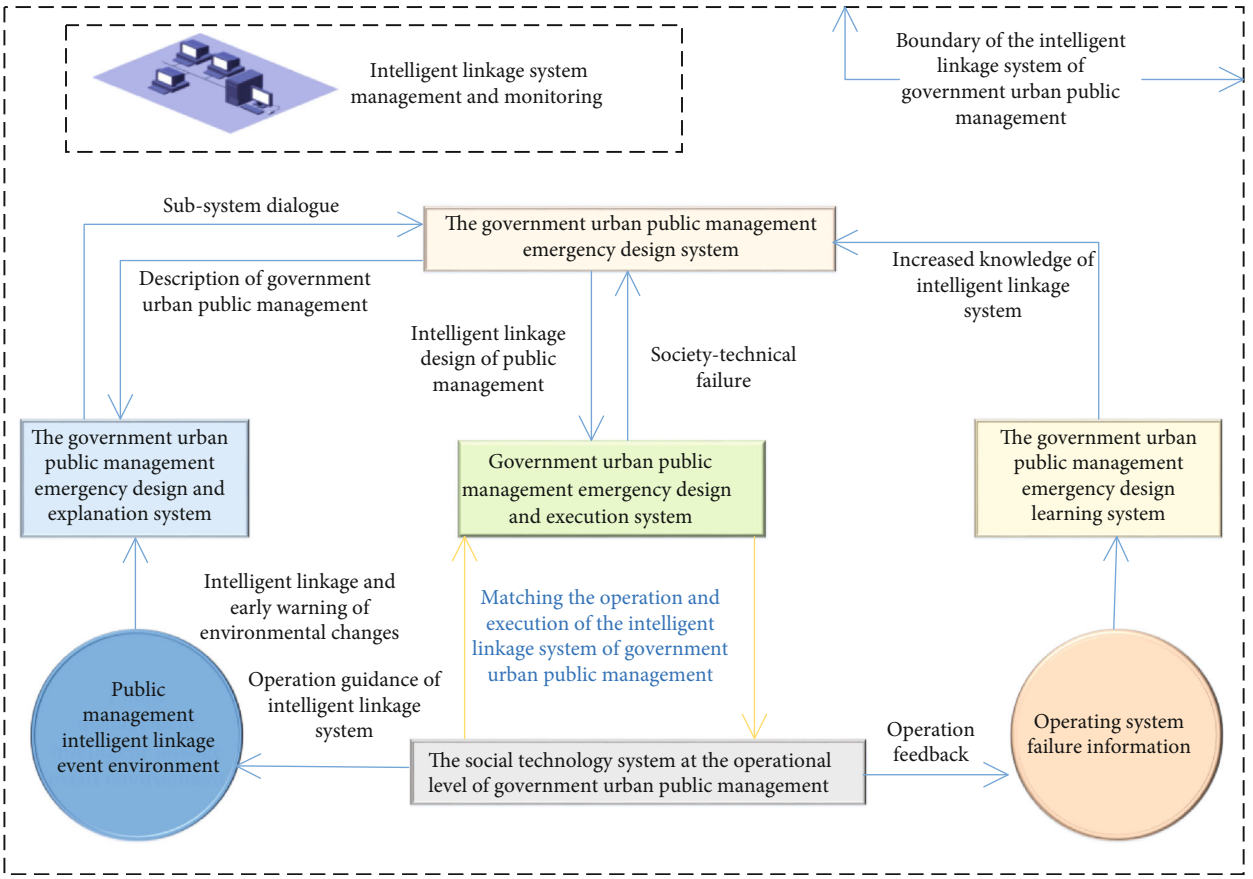

Figure 1: Intelligent joint governance of social-technical emergencies under the government urban public management.

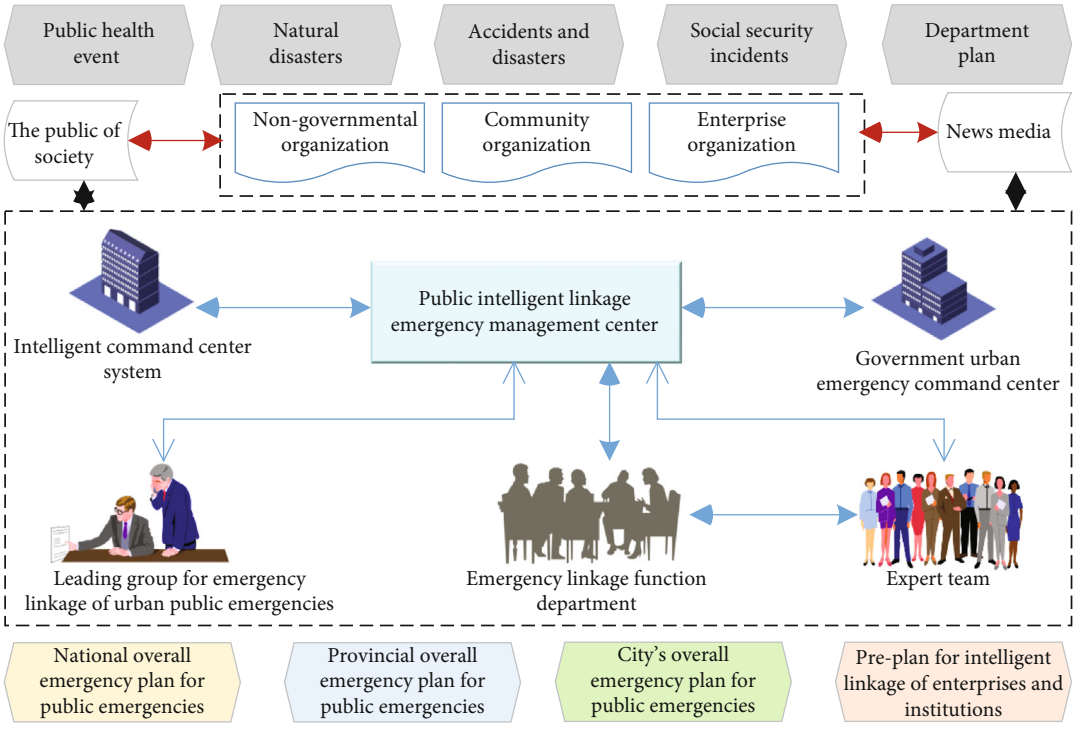

Figure 2: The structure of the government's urban public management emergency linkage early warning organization system.

Table 1: Common coordination mechanisms in the government process.

Name	Main form	Coordination focus
Coordination based on the deliberative coordinating agency	Various leading groups, joint meetings, headquarters	Cross-department, cross-level coordination
Coordination based on information technology	Grid, big linkage, big joint logistics	Coordination of blocks, based on blocks
Coordination based on project system and assessment accountability	Civilization creation, culture to the countryside	Strip coordination, with strips as the mainstay
Coordination based on sports governance	Various types of special rectification	Cross-department, cross-level coordination

$$\begin{aligned} D_x^- u_i &\longrightarrow \frac{\partial u}{\partial x} = \frac{u_i - u_{i-1}}{\Delta x} + \circ(\Delta x), \\ D_x^0 u_i &\longrightarrow \frac{\partial u}{\partial x} = \frac{2(u_{i+1} - u_{i-1})}{\Delta x} + \circ(\Delta x), \\ D_x^+ u_i &\longrightarrow \frac{\partial u}{\partial x} = \frac{u_{i+1} - u_i}{2\Delta x} + \circ(\Delta x). \end{aligned} \tag{1}$$

In the two-dimensional case, the calculation method of the first-order partial derivative is the same as in the one-dimensional case. In general partial differential equations, there will be second-order partial derivatives. To solve the second-order partial derivatives, you can first find the center difference of the two "half-point" areas of the unknown point and then use the difference value of the two half-points to perform the second. The central difference is sufficient, and its numerical form is

$$\begin{aligned} \frac{\partial^2 u}{\partial x^2} &= \frac{2u_i - u_{i-1} - u_{i+1}}{2\Delta x}, \\ \frac{\partial^2 u}{\partial x \partial y} &= \frac{2u_{i+1,j+1} - u_{i-1,j-1} + u_{i+1,j-1} + 2u_{i-1,j+1}}{4\Delta x \Delta y}. \end{aligned} \tag{2}$$

When using the difference method to solve the derivative, it is necessary that the forward difference and the backward difference belong to the first-order accuracy, and the central difference belongs to the second-order accuracy. The accuracy required for time is not high, so the forward difference approximates the partial derivative with respect to time. However, some numerical calculations mostly use the more accurate central difference method.

Several numerical calculation methods for solving partial derivatives in partial differential equations have been introduced above. Here are three commonly used calculation schemes for image processing of partial differential equations:

(1) Explicit scheme: if you know the information value of an image at time n and require its value at time $n1$, then the time partial derivative is calculated in the form of forward difference, and the rest of the derivatives are based on the value at time n. Forward, backward, or center difference operations are performed. This kind of scheme is called an explicit scheme

(2) Implicit scheme: in addition to using the forward difference operation for the partial derivative of time, all variables related to u on the right side of the equation use the value at time $n1$ to obtain a system of simultaneous equations. This scheme becomes implicit scheme

(3) Semi-implicit scheme: in the partial differential equation, the variables related to u on the right side of the equation selectively use the value at time n, while the rest of the variables use the value at time $n + 1$

Among the three partial differential model calculation schemes introduced above, the explicit scheme has the advantages of small calculation amount and high efficiency, but it completely relies on the value at time n, and the algorithm stability is poor. The advantage of the implicit scheme is that it has high stability, but the amount of calculation is too large, so it has not been widely used. The semi-implicit scheme combines the advantages of the previous two, its algorithm stability is better, and the amount of calculation is far less than the implicit scheme, so it is the most commonly used numerical scheme for partial differential image processing models.

4.2. Connection Analysis of Wavelet Transform and Partial Differential Equations in Image Recognition. Wavelet transform has a very strong ability to express image features in the time-frequency domain. It can decompose an image into low-frequency information and high-frequency information in different directions. Because the abrupt edges and noise of general images exist in high-frequency information, and the basic characteristics of images exist in low-frequency information, it is easy to use some models or algorithms to remove the noise in the high-frequency components, while saving local details on each component. In addition, the calculation of wavelet transform is a statically changing calculation method, so its algorithm efficiency is relatively high. But wavelet recognition also has shortcomings. On the one hand, after processing the image information in different frequency bands, there will be false edges in the image after the information of each frequency band is restored to the original image, that is, pseudo Gibbs phenomenon; on the other hand, because of the strong recognition ability of wavelet transform, it reduces image quality.

The design idea of the partial differential equation image recognition model is based on the motion point of view. It transforms the traditional static recognition mode into dynamic processing. This method can effectively smooth and protect the image according to the passage of time, but it is precisely because it is a time-based processing process, so the ability to express the local features of the image in the time and frequency domain is poor. Because the local edge features and noise of the image are basically distributed in the high-frequency area, when encountering the concave edge, the noise in the concave area is difficult to be smoothed, so that a good recognition effect cannot be obtained. It can be seen that partial differential equations are not very effective in dealing with local details and noise. In addition, the algorithm of partial differential equations uses finite difference to approximate discretization. As the model evolves over time, it takes hundreds to thousands of iterations to complete, which consumes computer space and computing time. Therefore, the computing efficiency of PDE is lower than other processing methods.

Both wavelet transform and partial differential equations have their own contributions and shortcomings in image recognition. Therefore, it is possible to use the characteristics of wavelet transform and partial differential equations in image recognition and use a certain method to combine them to give full play to their respective in image recognition.

Most partial differential equations are established in the second-order form. Due to its outstanding recognition ability, the second-order partial differential equations will always turn the gradient area into a flat area, thereby forming a pieced gray area. The recognition result is a segmental constant for the image; that is, blocking effect occurs. The high-frequency coefficients of the image after wavelet transformation completely depend on the selection of the wavelet base. We take the Haar wavelet base as an example, a layer of wavelet decomposition is performed in an $M * N$ image, and its high-frequency components indicate that the image is a constant in the $1/(M * N)$ rectangular area. Therefore, it can be seen that after a layer of the Haar wavelet transform, its high-frequency coefficients are also constant for the image when reconstructing the image, that is, the Gibbs phenomenon occurs. Then, it can be seen from this analysis that the results of the partial differential equation identification method and the wavelet denoising method are equivalent.

Because wavelet transform and partial differential equation methods are inextricably linked in image recognition, it is necessary to use these links to propose a combined algorithm that can simultaneously have the advantages of the above two types of methods and make up for their shortcomings.

4.3. Mathematical Model Based on the Combination of Wavelet Domain Wiener Filtering and P-M&LLT Synthesis Equation. In this paper, the directional window is used to improve the Wiener filtering in the wavelet domain, and the advantages of the P-M&LLT comprehensive recognition equation are used. According to the respective characteristics of the two methods, a mathematical model combining wavelet transform and partial differential equations is established.

Let the P-M equation be f_1 and the LLT equation be f_2. Using the weight coefficient θ to combine the P-M equation and the LLT equation, the expression of the P-M&LLT equation obtained is

$$u = (1-\theta)\bullet f_1 - \theta\bullet f_2, \tag{3}$$

where

$$\begin{aligned} f_1 &= \frac{\partial u}{\partial t} = \operatorname{div}\left[g(\Delta u\bullet\theta)\Delta u\right], \\ \theta &= \begin{cases} -1, & \Delta u > c, \\ 0.5\sin\left[\dfrac{2\pi\Delta u}{c}\right] + 0.5, & \Delta u \le c, \end{cases} \\ c &= 1.5\operatorname{median}[\Delta u\bullet\theta - \operatorname{median}(\Delta u)]. \\ g &= \left[1 - \left(\frac{\Delta u}{k}\right)^{-p}\right]^{-1},\ p = 1, 2, 3. \end{aligned} \tag{4}$$

It can be seen from the above formula that when θ tends to 1 at the edge and smooth area of the image, the P-M equation f_1 plays the main role, that is, the image is used for identification and edge protection. When in the gradual change area of the image, θ tends to 0, equation LLT and equation f_2 play the main role, that is, to identify and protect the subtle features of the image at the same time.

This paper uses numerical calculation to calculate the P-M&LLT equation. The specific algorithm first calculates the gradient value $\triangle u$ of the initial image and brings it into the weight coefficient θ to find the initial value of θ and then calculates the equations f_1 and f_2, respectively, and the discrete form is as follows:

$$\begin{aligned} u_t &= 0.5\theta\left[\prod_{p\longrightarrow\tau_s}\left(g_p - g_s\right)\left(u_p - u_s\right) - (\theta-1)(1-\Delta u)\right], \\ u_t &= \prod_{k=0}^{3}\left[\lambda(u-u_0) - \Delta^2 g_k\right]. \end{aligned} \tag{5}$$

In the formula, g_s and g_p represent grid point coordinates, and τ_s represents a set of four neighborhoods centered on s point. We substitute the calculated θ into the formula to obtain the image matrix u after the first iteration. In each subsequent iteration, first, we update θ and calculate equations f_1 and f_2, respectively, and then substitute the previous value of θ into it, and iteratively update $\theta 2$ and u until the number of iterations is online or the algorithm converges.

$$U = \theta^{n-1}\bullet f_1^{n-1} - \left(\theta^{n-1} - 1\right)\bullet f_2^{n-1}. \tag{6}$$

In order to combine the Wiener filtering method based on the two-dimensional wavelet domain, we change f_1 as follows:

$$f_1 = \frac{\partial u(x,y,t)}{\partial t} = \operatorname{div}\left[g(G_0 \bullet \Delta U)\right],$$
$$U = (1-u)\bullet\lambda(t) - u'[1-\lambda(t)], \quad (7)$$
$$u' = T(u_0).$$

In the formula, u is a grayscale image, $u(x,y,t)$ is the image at time t, and $g(w)$ is a nonincreasing function. When w is infinite, $g(w)$ tends to zero. $\triangle u$ is the gradient value of the image, which only diffuses in the direction orthogonal to the gradient, and does not diffuse in the gradient direction. T represents the Wiener filter recognition method based on wavelet domain proposed in this paper. Now, let us look at the question about the selection of the spread function $g(\triangle u)$ of the P-M equation. In general,

$$g_k(\Delta u) = \left[2 - \left(\frac{\Delta u}{k}\right)^{-p-1}\right]^{-1}. \quad (8)$$

When inside the image, the recognition process is performed. When the recognition proceeds to the boundary of the image, the function $g(\triangle u)$ tends to 0, so no recognition is performed on the boundary of the image, so that the finally recognized image is as close to the original image as possible. This will not destroy the edge contour of the image.

Because there is no time variable parameter in $g(\triangle u)$, the smoothing effect is not good in the time domain, so add the time variable t to $g(\triangle u)$:

$$g(\Delta u, t) = \left[1 - (x-1)k^{-1}(t)\right]^{-2},$$
$$k(t) = (\alpha - \beta t)^{-1}, \quad (9)$$

where α and β are constants. The gradient threshold $k(t)$ decreases with the increase of time, so only the points that have been smoothed in the original image can be further smoothed, and the points that have not been smoothed at the initial moment will not be processed. Using the above $g(\triangle u, t)$ to replace the original $g(\triangle u)$ can improve the efficiency of diffusion and greatly increase the speed of diffusion.

After establishing the mathematical model, the next step is to analyze how each part of the mathematical model operates and how to function in the process of SAR image recognition. Because the original SAR image contains a lot of noise, the model is in the initial stage of diffusion, and $\lambda(t)$ is about 1, so u should play a major role, that is, the Wiener filter based on the wavelet domain is mainly used for identification. After a period of time, when the edge of the image is reached, $\lambda(t)$ is about 0, and u no longer plays a role. At this time, the P-M&LLT equation starts to play a major role in protecting the edges. When P-M&LLT starts and θ tends to 1 at the edge and smooth area of the image, the PM equation f_1 plays the main role, that is, the image is used for identification and edge protection. When in the gradual change area of the image, θ tends to 0, equation LLT and equation f_2 play the main role.

When the image is closer to the real image, the effect of u should be more balanced at this time, that is, the recognition effect of the Wiener filter in the wavelet domain and the P-M&LLT comprehensive equation is approximately equal until the end of the recognition. Figure 3 is a flowchart of the algorithm for model recognition.

5. Experiment and Analysis

5.1. Experimental Analysis of the Transition from Case Resolution to Batch Processing. The application of information technology to a certain street-level linkage mechanism has indeed greatly improved the efficiency of incident handling and has obvious advantages compared with the original relief methods such as letters and visits. Since the big linkage mechanism and the petition system belong to different categories, it is difficult to compare the two. But if both are used as a response mechanism for citizens' appeals, a simple comparison can be made.

From the perspective of the number of incidents handled, a total of 360 incidents were accepted in 2010 when the large-scale linkage mechanism of a certain street was established. During the same period, a street petition office accepted a total of 265 incidents. By 2020, the number of major linkage incidents will be reduced to 270, and the number of petitions will drop to 100. In the same year, the number of major linkage incidents will reach 2.7 times the number of petitions. Figure 4 shows the comparison of the total number of large-scale linkages and letters and visits.

Increasing incident handling capabilities means that more appeals from residents can be met. The shortening of incident handling time means that residents' appeals can be responded to faster. The diversity of interest appeals is the root cause of the "fragmentation" of grassroots governance. First, the long-term failure to respond to and satisfy multiple demands has exacerbated this "fragmentation" predicament.

5.2. Experimental Analysis of the Transition from Static Management to Dynamic Management. The social management mechanism of the original bureaucratic structure emphasizes more hierarchical moderation, while the new public management theory emphasizes the efficiency of public service provision. The interaction of the two brings about a large number of fragmented situations. The accompanying traditional urban management technology is mainly oriented to static social problems. Its information acquisition methods, information processing speed, system feedback, and response mechanisms cannot adapt to various social problems that occur dynamically, and its work efficiency has already encountered bottlenecks.

The sources of events on the X Street Big Linkage Platform are mainly reports by supervisors, collection by villagers, self-received mail from the street, dispatched from the municipal 12345 hotline, and dispatched from the district 962000 hotline. According to the level of event sources, this article divides the first two sources into

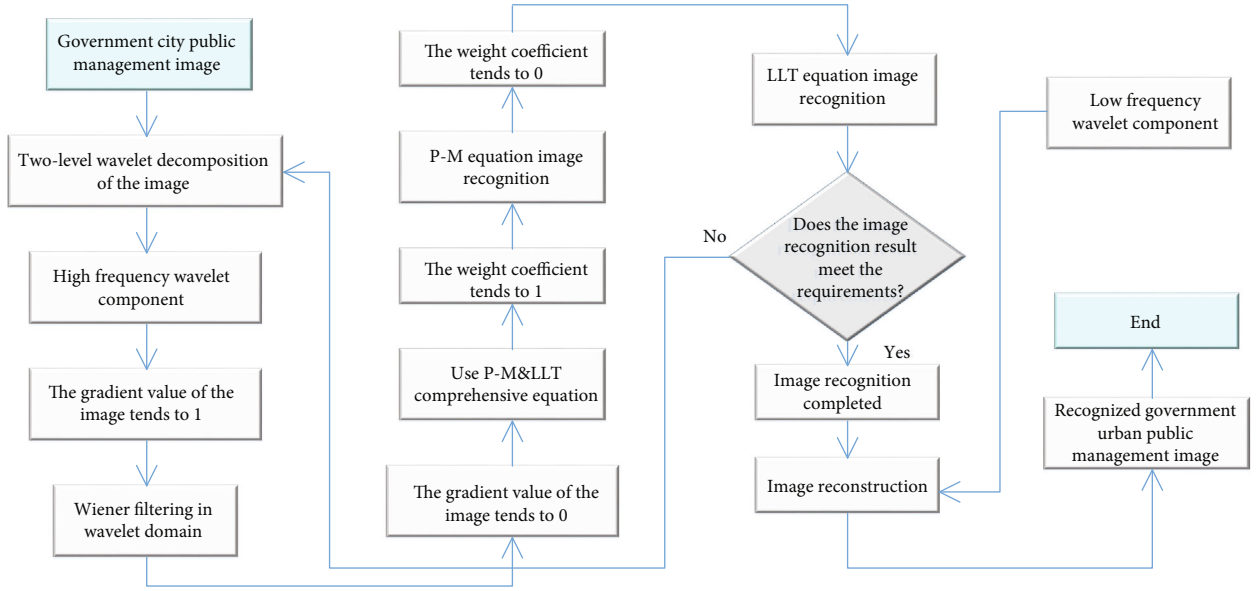

Figure 3: The algorithm flow chart of the mathematical model combining wavelet and partial differential equations.

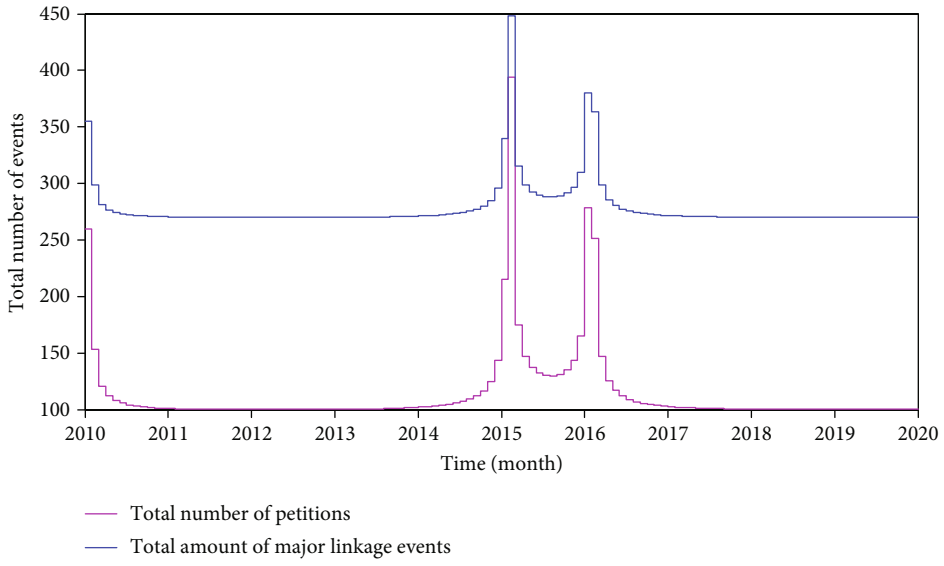

Figure 4: Comparison of the total number of major linkages and petitions.

"basic-level discovery" and the remaining event sources, such as those dispatched via municipal and district hotlines and inspection channels, are "subordinates from superiors," The long-term case of image recognition from partial differential equation wavelet transform during the statistical period has successfully completed the task of social front-end management and practiced the policy goal of finding and resolving contradictions at the grassroots level. Figure 5 shows the comparison between the image recognition discovery of the partial differential equation wavelet transform of the large linkage event and the proportion of the superior and the subordinate. Figure 6 shows the evaluation of the effect of the masses on the image recognition discovery of the partial differential equation wavelet transform of the large linkage event.

The inspection area of each grid member is smaller than before, which increases the density and refinement of management, and improves the possibility of dynamically discovering and solving problems. With the help of the configured PDA device, it accepts the supervision of the big linkage platform. On the other hand, it can feedback graphic information to the center, which greatly improves the speed of information collection and update and realizes dynamic management. In addition, the work responsibilities of each grid member are standardized, which is conducive to improving the inspection service through a unified training course and is also conducive to improving the fault tolerance of the system, and it is convenient to dynamically adjust the force and improve the flexibility of the system. The most important

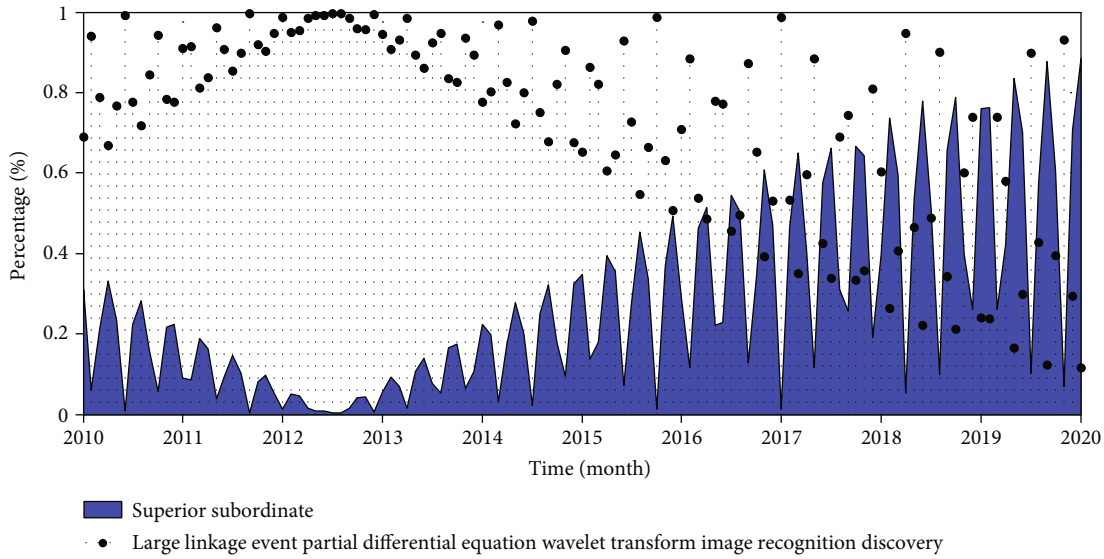

Figure 5: Comparison of the image recognition discovery of the partial differential equation wavelet transform of the large-scale linkage event with the proportion of the superior and the subordinate.

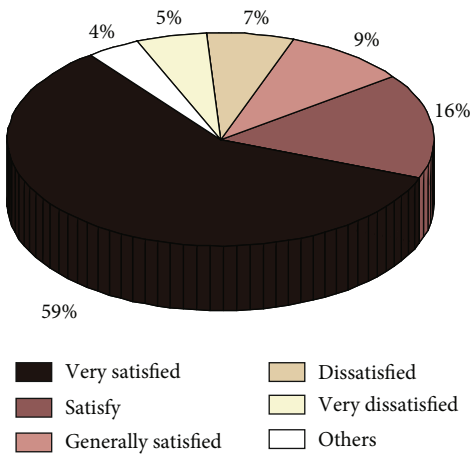

Figure 6: Evaluation of the effect of the masses on the image recognition discovery of the partial differential equation wavelet transform of the large-scale linkage event.

thing is that such optimization is achieved without adding a staff, and Pareto improvement is achieved.

5.3. Experimental Analysis of the Transition from Passive Management to Active Service. Fragmentation divides the government into different units. Although this is in line with the purpose and principles of administrative management, it means that the public cannot obtain overall services and they have to move between different government departments. A large number of barriers between government departments will lead to inefficiency, complexity, and confusion. The report emphasized that the government should pay attention to events in public life, such as job hunting after graduation, pregnancy and childbirth, unemployment, moving, retirement, and application for long-term home care. The government should provide services for events, rather than just consider providing convenience for its own management. This is in line with the government's need to pay attention to public life events. The holistic government should establish a one-stop service mechanism through information technology, and the establishment of these single windows is based on the people's "life events" as the starting point for thinking. That is, the division of government business should be reorganized from the perspective of people's life events. For example, a person's life is actually composed of events such as finding a job, needing money, needing a home, getting sick, and being robbed. From the government's point of view, these events include health care, housing, vocational training, and financial assistance. How to integrate the functions of the government and provide the people with integrated services instead of running around in various ministries and units is the goal pursued by the overall government.

From the comparison of the big linkage mechanism's attention to events and components, it can also be seen that it is increasingly inclined to resolve events rather than repair components. In the comparison results between events on the big linkage platform and component events, it can be seen that most of the current events are event events. Figure 7 shows the comparison between event classes and component classes of the big linkage platform.

Under the big linkage mechanism, all kinds of information at the grassroots level are changing from "passive waiting" to "active discovery." Because the big linkage platform provides far more data accumulation, data analysis becomes possible. Originally, city management was based on the leadership "braking the head." The qualitative decision-making is gradually changed to quantitative decision-making based on data analysis, so as to serve the needs of the masses more effectively; the introduction of rigid mass telephone return visits and satisfaction evaluation mechanism has made the government pay more attention to the results of governance and gradually become accustomed to the satisfaction of the

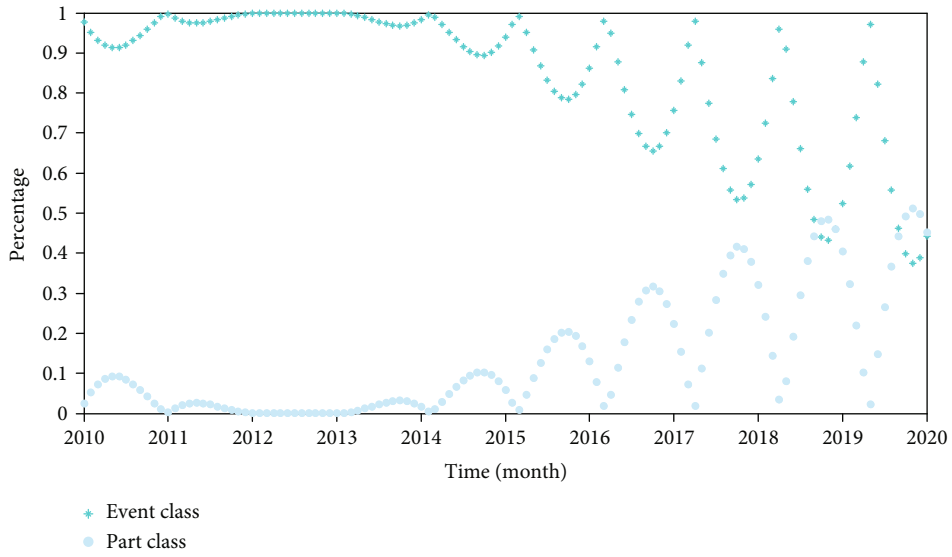

Figure 7: Comparison of simulation of events and components of the big linkage platform.

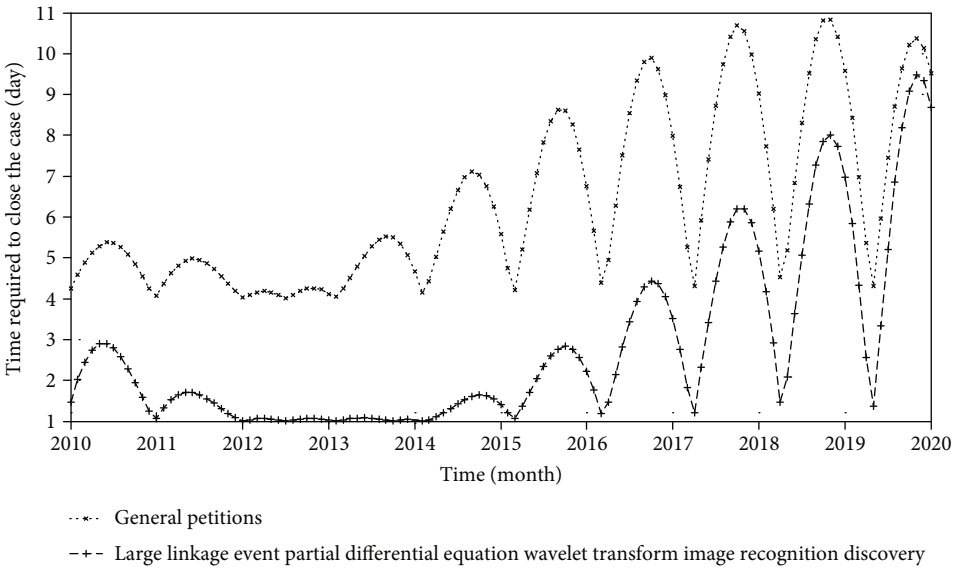

Figure 8: Image recognition based on partial differential equations and wavelet transform, and the time required to close the case of letters and visits.

masses. The vertical cross-level integration based on information technology and trace management of the whole process eliminates the information asymmetry between the superior supervision department and the subordinate operation department, making it possible to normalize.

Through data analysis, it is not difficult to find that the large-scale linkage mechanism has shown strong mass responsiveness in many aspects and is still increasing. This article intercepts the time-consuming data of large-scale linkage platform event processing from 2010 to 2020 and takes the average value on an annual basis. The results obtained are generally optimistic. Figure 8 shows the time required for the large linkage of partial differential equations and wavelet transform to identify large-scale image recognition and the settlement of petitions.

6. Conclusion

By studying the basic concepts of partial differential equations and several traditional partial differential equation recognition models, this paper proposes a P-M&LLT comprehensive equation recognition method. The comprehensive equation uses a weight function to combine the second-order P-M equation and the fourth-order LLT equation. This weight function can be adaptively adjusted depending on the image's own data, so that the numerical calculation is more accurate.

Experiments show that the comprehensive equation retains the respective recognition advantages of the PM equation and the LLT equation. In terms of image recognition, edge protection, or image detail protection, it is significantly improved compared with the separate second-order and fourth-order recognition models. The efficiency of the algorithm is improved, and the visual effect of the image is greatly improved. The organizational structure of the government and society intersects the streets and the villages. Below the streets are the neighborhood committees serving as autonomous organizations of residents (village); above the neighborhood committees are the streets serving as agencies dispatched by the district government. In the governance field, there are many intersecting aspects, including not only social management but also public services, political participation, and pluralistic cogovernance. This article believes that the development of civil society depends on developed public services and an orderly social environment. Government-based efficient governance is not necessarily a good boost for the development of civil society. The separation of government and society does not mean the absence of management, "vertically to the end." In the final analysis, it is only a "return of order" rather than a return of "executive power." The strengthening of government intervention by the large linkage mechanism is actually more reflected in the maintenance of social order and social management. For this aspect, the state has also set up a fundamental follow-up to the rule of law. This article believes that as long as the bottom line of governing the country according to law is not broken, emphasizing efficient and limited government intervention in the grassroots governance process will not bring rigidity. Moreover, this kind of efficient regulatory force will be a help to break the bottleneck of the growth of civil society—the "regulatory vacuum" created by the "fragmentation" predicament of the urban grassroots. It will inevitably bring about the barbaric growth of "disorderly force," which not only causes government failure but also endangers the sound development of civil society.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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