Exploration of E-government and Public Crisis Management Mechanism based on Data Mining Algorithm

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Abstract

Under the background of information network, E-government system provides an efficient and personalized service process for wide range of public and enterprise. In particular, the application of new information technology such as big data provides a more efficient and effective way for public emergency management. In this paper, the author analyzes the exploration of E-government and public crisis management mechanism based on data mining algorithm. In the management stage of public crisis, we can adopt quantitative analysis method, select and evaluate the resources by using network information mining, and then provide solutions to the current crisis management problems and take more effective measures.

Keywords: Public crisis management, E-government, Data mining, Public service

1. Introduction

In the economic globalization, information networking, social complexity and deteriorating natural environment under the background of public crisis has been from the very state of the incident into frequent normalization, become an unavoidable challenge in public management [1]. In recent years, public crisis events occur frequently, and expand the trend of public crisis. Management has become an important function of the government, can effectively deal with all kinds of unexpected crisis, and it is an important indicator to measure the management level of the government. Therefore, strengthening the construction of public crisis management, mechanism of public crisis management, to enhance the ability of the government to deal with public crisis, timely and effective handling of all kinds of unexpected public crisis events become an important issue facing the government management [2-3]. Data mining technology has become a very powerful tool to improve the competitiveness of the organization and organizational performance and service level [4]. In many fields such as electronic government public management, government performance management and public crisis management, also be the introduction of data mining technology, data mining technology into the field of public management is the need for government decision-making, can provide technical support for government information sharing is an important guarantee of government information.

The exploration of constructing public crisis management mechanism in China is an urgent need for the creation of a harmonious society [5]. All kinds of crisis events occur frequently, disrupt the normal social order, disrupting the normal life of the public, has hindered the rapid development of economy, damage to the tall image of the government. This shows that the public crisis facing the challenge of coordinated development I let the country's economy and society [6-7]. Obviously, this and the requirements of building a harmonious society are completely inconsistent. Therefore, only to speed up the establishment of public crisis management mechanism, establish suitable for China's scientific and effective public crisis management mechanism, to effectively respond to emergencies, to achieve comprehensive, coordinated and sustainable development goals,

in order to provide a good environment for long period of stability and build a harmonious society [8-9]. The exploration of constructing public crisis management mechanism in China, is the transformation of government functions, improve the ruling ability and credibility of play an important measure to build a service-oriented government[10]. China's transformation of government functions is slow, management offside, absence of widespread and not in place of the phenomenon, which led to China's public crisis management ability is not strong, in the rush to deal with emergencies. Therefore, it is a pressing matter of the moment to establish a set of suitable for China the public crisis management mechanism.

2. Data Mining

Data mining is a new technology developed in recent years, its content involves the field of artificial intelligence in machine learning, knowledge discovery in the field of database and data warehouse, OLAP, multi-dimensional database etc., is considered to solve the current enterprise information systems generally facing the data. Rich and poor knowledge is one of the most effective means. Data mining is the non-trivial process of extracting the information and knowledge hidden in the data from the data set, but it is potentially useful information and knowledge. Data mining can not only learn from existing a lot of incomplete, noisy, fuzzy and random data knowledge, and be able to find new knowledge of the unknown, the knowledge can be understood, and is convenient for storage and application, this knowledge can be used in information management, query response, decision support, process control many other fields. In a word, based on data mining is mining instead of experts which are implied in the knowledge from large amounts of data, it makes data storage technology into a more advanced stage, not only the use of the database storage function, historical data query and identification. What is the answer? And identify potential links; the historical data, a lot of important information hidden behind, and this information is the whole character of data description and prediction of development trend, which has important reference value in the decision-making process, which can nicely support people's decision.
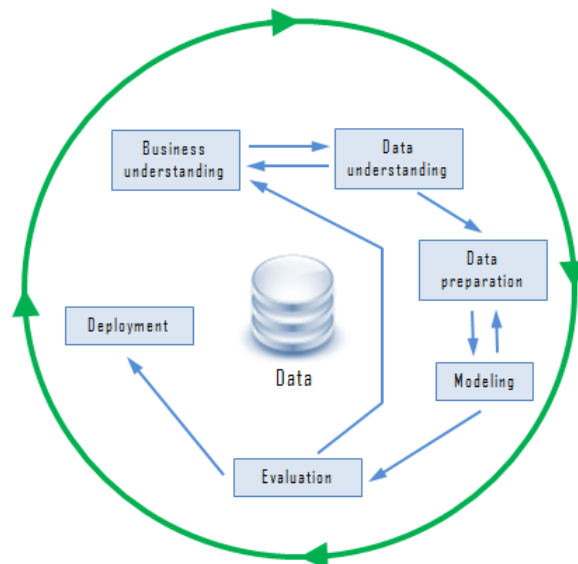

Figure 1. Data Mining

The process of data mining is the process of human-computer interaction by a plurality of steps are connected to each other, repeatedly, a complete data mining

process including problem description, data selection, data preprocessing, data conversion, running data mining algorithm and the evaluation results. As shown in the following figure:
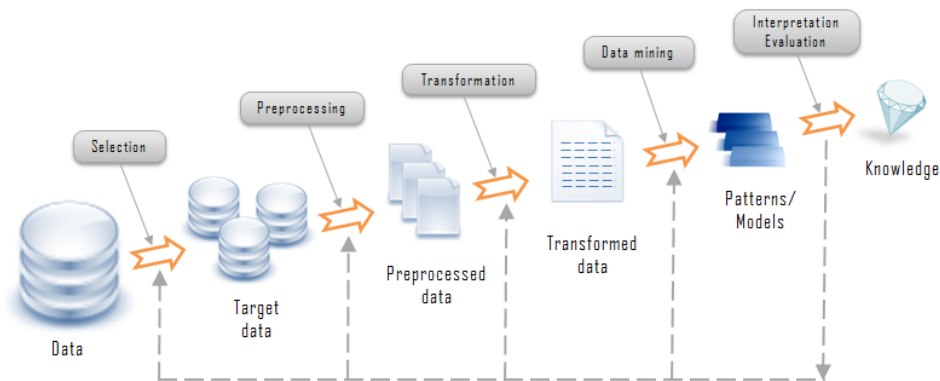

Figure 2. Data Mining Process

The task of data mining is to discover patterns from a large number of data in order to help managers obtain a variety of knowledge required for decision making. In most cases, users do not know what kind of valuable information and knowledge, data exist therefore, data mining system should be able to find a variety of search and target mode of knowledge, to meet user expectations and the actual needs. The data mining model can be divided into descriptive model and prediction model, the descriptive pattern is to make a statement about the rules exist in the data, or data according to the similarity between the data packet; and a predictive model can be based on the existing data set, the predictive value of the data item of some unknown. The functional patterns of data mining mainly include association rules, generalization patterns, classification patterns, clustering patterns, time series models and outlier patterns. Data mining is a large amount of data from the database in the extraction of implicit, previously unknown and valuable knowledge, models or rules of the non-trivial process, as a decision support process, mainly is the artificial intelligence, machine learning and statistics based on the technology of highly automated analysis of government data, make the inductive reasoning from, identify potential patterns, predict behavior, help decision makers to formulate effective strategies. Data mining methods and techniques used in dozens of them, from different angles of data mining, the main statistical analysis method, decision tree method, neural network method, case-based reasoning method, genetic algorithm and rough set.
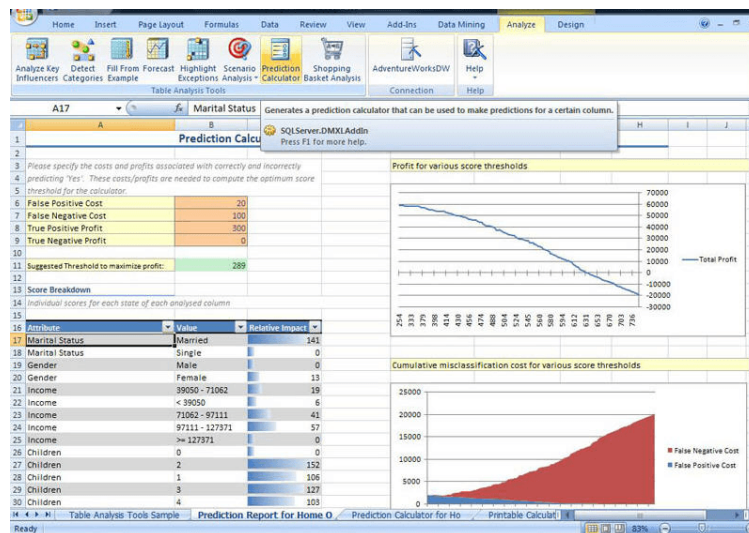
Figure 3. Data Mining Software

3. The Application of Data Mining Technology in the Field of Public Administration

3.1. E-government in the Field of Public Administration

E-government refers to the modern information and communication technology by government agencies, breaking the boundaries of the administrative institutions, improve the administrative organization, restructuring of public administration, government office of information technology, e-government business process information, a process of extensive, efficient and personalized service for the public and enterprises. Its core content is that the government's management and service with the help of the Internet to build a spanning time, place, Department, and customer satisfaction oriented government service system. Over the years, the government has accumulated a wealth of data assets. But the use of frequency, efficiency is very low, far from decision-making, forecasting, did not give full play to its due effect. The technology of data mining is a comprehensive technology developed to meet this need, it includes statistics, machine learning, artificial intelligence, database, knowledge acquisition, pattern recognition, distributed multimedia environment intelligent agent. In e-government rational use of data mining technology can effectively to government departments. The application of data mining in e-government is the classification, clustering, association analysis, forecast the four technology index to government departments, effectively integrate the internal information and external information of government departments, government departments to make better and more effective information released to the public that they want to get better.

Because of the realization of the government departments of office automation, will produce a large amount of data collection and analysis, if the scientific and effective of these data, the key factors can influence the work of government departments, and provide an effective basis for the decision of the government, to help government departments to improve the level of government information, promoting the informatization of society as a whole. Integrated query, data mining has been widely applied in the electronic government in economic analysis, forecasting, early warning, risk analysis and early warning, quality supervision and monitoring and decision support system, it provides an intelligent and efficient online government for the public. For example, almost every government website is similar.
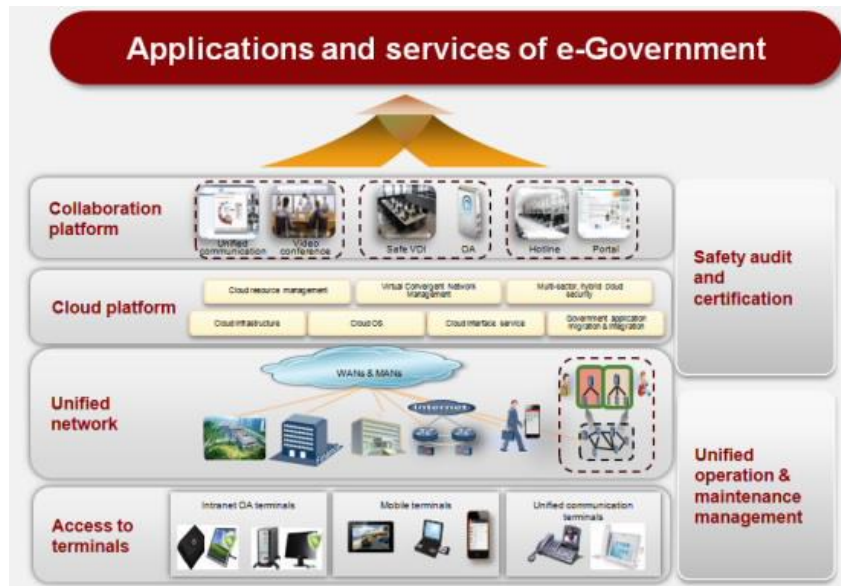
Figure 4. E-government System

The column, which is a good way to understand the needs of the public, but from the website of the survey results, the conclusion remains mostly on individual problems for the total, the proportion of simple analysis for. For example based on the analysis and research of the association rules and decision tree of the two commonly used data mining technology, the association rules Apriori algorithm and decision tree ID3 algorithm is applied to the analysis of e-government data, establish an analysis system of e-government data based on data mining. Using data mining technology to build an online system can effectively collect, monitor and analyze the public mass data, extract the useful information, the people's Government of e-government is ecru, e-government built public demand for led. The network data mining technology is introduced into the e-government, which can greatly improve the intelligent level of the whole e-government system.

3.2. Government Performance and Public Crisis Management

Government performance management refers to the government in the process of actively fulfill the responsibility of the public, based on the emphasis on internal management and external effect, quantity and quality, economic factors and political factors, ethical norms and rigid flexible mechanism of unity, get the maximization of the public output. Data mining technology in the government performance evaluation of the application effect is very significant. If there are appropriate data and measurement standards, it is possible to assess the performance of the government project. It is very useful to use data mining to evaluate and improve government performance, especially when a large number of service objects or a large number of service projects are organized by government organizations. In addition, performance management, key performance indicators (KPI) is a bridge linking government goals and employee behavior, is the key to performance management. At present, the method of determining KPI in performance management is as the benchmark method, the key analysis method, the balanced score card method. At the same time, some indicators of change, may be the result of a comprehensive role of multiple factors. When the key index value changes, analysis of the changes in which factors lead to changes in key indicators, resulting in a large degree of change, which is conducive to the government to formulate measures to solve the problem. Therefore, the contribution rate is very conducive to the government departments to make decisions. The technical key to the analysis of the contribution rate

is to establish the function relationship of the multiple factors to the KPI. In order to solve this problem, we can use regression analysis method. Linear regression is a research on the relationship between a response variable and one or more independent variables, mainly used for the statistical analysis of the relationship between things, the number of changes between the focus on examining the variable, and the regression equation to describe the. This can generate the evaluation index system of the specific evaluation object, and unified management and maintenance of the existing index system, the original index data, the generation index data and so on. At the same time, also can be the evaluation index system by principal component analysis and fuzzy clustering analysis method and generate the evaluation object, you can easily modify the structure of evaluation index system; data mining technology can also be used to extract or build a specific evaluation object with the specified target of evaluation index attribute value.
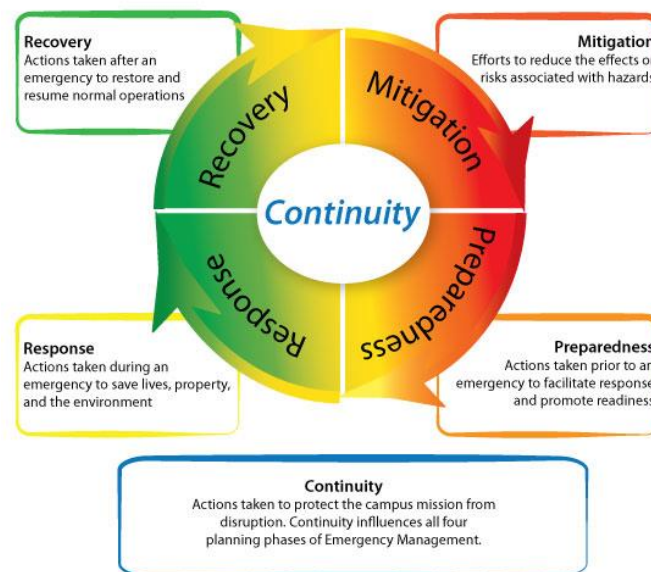

Figure 5. Public Emergency Management

In modern society, the occurrence of public crisis has become a common phenomenon in social life. According to the general view of the international community, the public crisis refers to the sudden occurrence of social life, seriously endangering the social order, causing heavy losses to the community. Public crisis management into five stages according to the time sequence: crisis warning and crisis management crisis stage, preparation stage, identification isolation stage, crisis management, crisis stage and dealing with the aftermath and benefit from the crisis stage. In the public crisis management, due to the causes of the crisis are complicated, variety, is a kind of a lot of uncertain factors of semi-structured or unstructured problem with difficult calculation and evaluation of science, a lot of data, variables and parameters are difficult to quantify, analysis of the traditional methods have many limitations, and analysis the prediction results are not accurate enough, the urgent need for the introduction of other technology and methods to solve the nonlinear problem of data mining provides a strong technical support for public crisis management. Collect the crisis may lead to internal and external information, timely and accurate identification, analysis and control of the crisis, using data mining technology according to the requirements of the user to select the corresponding data set, and data preprocessing, including data cleaning, discretization, generalization, null value estimation and attribute encoding, to establish the corresponding knowledge expression system or decision table of the decision table,

attribute reduction, value reduction and knowledge reduction, the minimum attribute set and minimum set of rules extraction.

- **In recognition of the crisis stage:** mainly for processing, finishing on the first stage of the crisis information by data mining technology in the process of processing to determine the authenticity of the actual information, while using the deviation analysis method to find out and expectations from the data set value of outlier data change significantly.

- **In the stage of management crisis**: it is very important to make decision quickly on the basis of scientific crisis information investigation and accurate prediction. The network information mining technology, case-based reasoning method and decision tree methods provides a new way to decision analysis, we can use the network information mining and evaluation technology, adopt the method of quantitative analysis and qualitative analysis, and the selection and evaluation of mining of online resources, improve the completeness of decision knowledge required for. The scientific decision-making provide a basis; using decision tree analysis method can find some valuable rules, help decision-makers to make correct decisions; can use the method of case based reasoning in case base retrieval. The best case. And, based on past experience in crisis management, provide solutions and measures for current crisis management for decision makers to choose from.

- **In the post crisis stage:** through the use of information technology of data mining, search out the reasons, the crisis management process, and then makes a detailed analysis on the lessons learned, put forward suggestions for improvement in technology, organization management, organization and operation procedure, and the necessary organizational change.
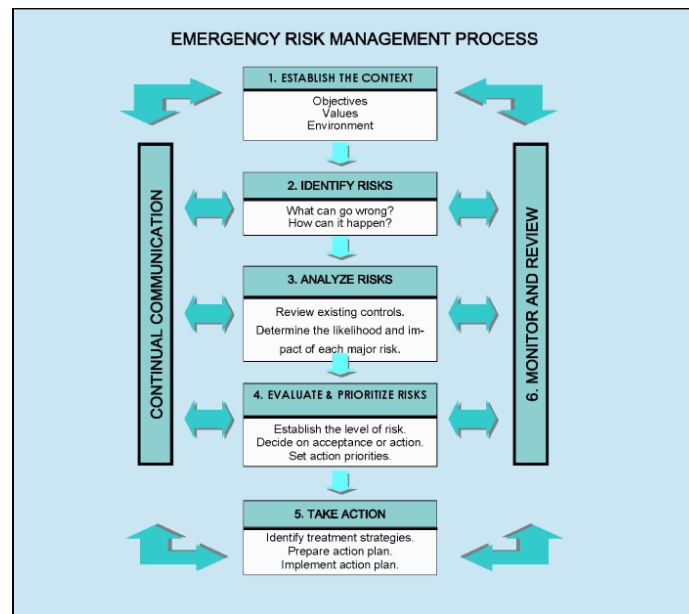

Figure 6. Emergency Risk Management Process

4. The Construction Path of Public Crisis Management Mechanism

4.1. Principle of Construction

Under the high attention of the government, the construction of our country in the public crisis management mechanism has made great progress, it can be said, has

explored some suitable for China's public crisis management methods and measures. But there are still many problems in the public crisis management mechanism, the biggest flaw is the lack of a set of improve the system of laws and regulations, a comprehensive coordination functions of the organization, a crisis management mechanism and overall operation rules. Therefore, a pressing matter of the moment is drawing on international experience, combined with China's actual situation and guiding principles in the construction of public crisis management mechanism, construct a set of suitable for China's relatively perfect public the mechanism of crisis management, only to establish a set of perfect public crisis management mechanism, in order to promote the public crisis management go on a regular, standardized and institutionalized track.

- **People oriented principle:** The right of life is the birthright of people's respect for the right to life, is a basic axiom of human society. Public crisis often give people life and property caused great harm, follow the principle of people-oriented, to protect public health and safety of life and property as crisis management the ultimate goal of the work and the starting point, to maximize the reduction of public emergencies and caused casualties and damage; strengthen security emergency rescue personnel, improve the ability and level of scientific command; give full play to people's initiative; give full play to the important role of the people in the emergency work.

- **Precautionary principle:** Pay special attention to public crisis work unremittingly, nip in the bud. Enhance the sense of urgency, adhere to the combination of prevention and emergency, the public emergency preparations, namely prevention as the central link of public crisis management. Prevention is not to completely prevent the crisis, but first of all, through a series of early warning mechanism to prevent the occurrence of crisis events, and did not stop when the crisis occurs, it will reduce the losses to a minimum. Promote education and training, improve the comprehensive quality of public self-help, mutual aid and deal with all kinds of public emergencies.

- **Unified leadership principles:** The unified leadership of the supreme command system, establish and improve the classification management, classification responsible, compartmentalization, the emergency management mechanism of territorial management, at all levels of government leadership, implement the responsibility system of administrative leadership, give full play to the role of professional emergency command structure. The purpose of doing so is according to the different management object, different risk grade, grade management by different departments of the government, in order to improve the effectiveness of public crisis management.

- **Principles of scientific norms:** The crisis will break the people's daily behavior, disrupt the normal social order, so the society more than ever need to clear norms and legal norms, whether it is to mobilize social resources, constraints of citizenship behavior, or special treatment under the condition of various interests and contradictions, all need administration according to law in accordance with the relevant laws and administrative regulations. And strengthen emergency management; safeguard the legitimate interests of the public, the standard response to public emergencies, institutionalization and legalization. Modern society is a science and technology and the rapid development of information society, the public crisis management process to make full use of science and technology, the effective use of technology to prevent and respond to crises.

- **Principle of social participation:** Strengthen the emergency response team construction, establish coordination system, fully mobilize and play to the community, enterprises and institutions, social organizations and volunteers of the

role, relying on public power, form a unified command, responsive, full-featured, coordinated and orderly, efficient operation of the public crisis management mechanism.

4.2. Public Crisis Management Mechanism

The sense of crisis is the starting point of crisis management; establish a sense of crisis can effectively reduce the possibility of crisis events. Specifically, the government can take several measures to help the citizens to establish a strong sense of crisis, to solve the public crisis management mechanism in China to build the most when in deep and fundamental problems such as crisis Memorial. On the establishment of crisis events Memorial, the regular release of air defense warning signals and other ways to strengthen the public crisis consciousness. Strengthen crisis management education and training is to obtain knowledge of crisis management, the main way to improve the crisis skills. Our government should strengthen the management of the quality of the national crisis education, establish crisis education mechanism. First of all, should be the crisis of education into the teaching content of school education, strengthen the crisis education for students in primary and secondary schools, the related institutions should also be set up as soon as possible crisis management Physical training professional, the direction of the professional personnel, strengthen the research on the theory and practice of public crisis. Secondly, strengthen the government, enterprises, and other non-enterprise personnel and the public crisis training. The training content, state organs, crisis management training institutions and personnel of non-enterprises can focus on the system. The crisis management method, program control, in order to improve the ability of crisis management

The purpose of the exercise is to find out the crisis may need to improve crisis management in the preparation work, establish and maintain cooperative communication channels and reliable emergency personnel, to ensure that the emergency organization of all the familiar and able to perform their duties in the emergency disposal, and improve the comprehensive ability to participate in the emergency personnel, promote the overall social crisis coping ability exercise should be based on the development of the times. The crisis, timely understanding of all possible incidents, especially destructive, soberly treat various events and individual linkage and various extremist organizations may form the society of real-time adjustment, update the content and form of public emergency response strategies and exercises. China has formulated and promulgated a number of the crisis of state laws and regulations. However, on the whole, the legal system is not complete. A basic law support, the legal system has dispersed chaotic characteristics. Therefore, a complete and effective public crisis management legal system should be based on the law of the state of emergency for the foundation of the constitution, the emergency response law for emergency principle, to the laws and regulations of various departments for specific standards in all areas of the implementation of the local regulations, rules and regulations as the supplement.
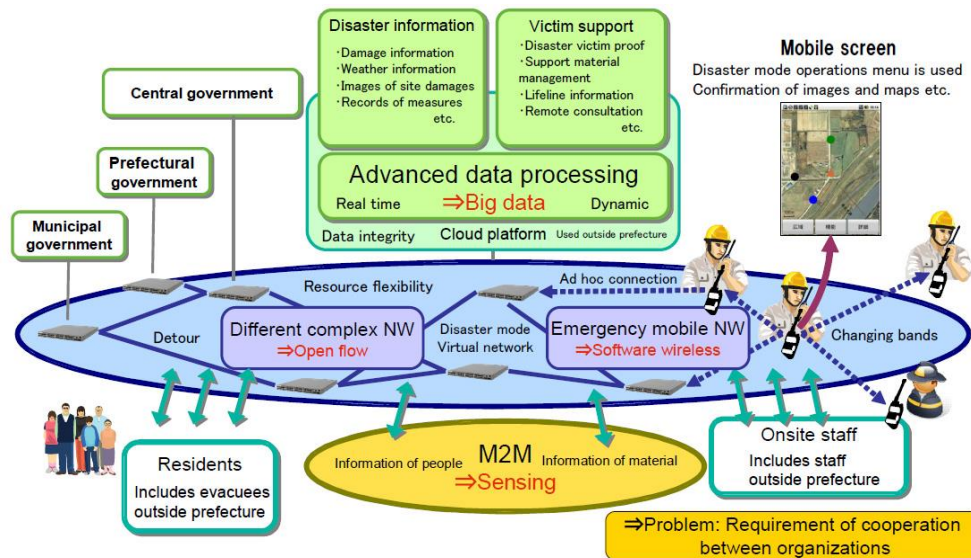
Figure 7. Big Data Background of Emergency Management

Establish the operation mechanism of public crisis management, the crisis comes, the greatest degree of prevention and avoids losses, maintain stable social order. In the context of globalization, China's economic transformation, social transformation under the influence of multiple factors, need to establish a comprehensive and scientific operation mechanism. The operating mechanism of this shall operation, information flow, quick response, strong command, clear responsibility, low cost, this is an urgent need for new form, is also the embodiment of the government for the people.

- **Comprehensive information collection:** Information is the key of crisis management, to prevent the crisis. We should establish diversified channels to collect information, full range, to obtain the required information through a variety of ways, such as the establishment of public alarm system; secondly, to the daily life of all may cause potential threats to the event list, and classified, to consider the possible the consequences.

- **Effective crisis prediction:** The scientific analysis and identification of qualitative or quantitative information collected the degree of harm probability of crisis and may cause, and classified management of every possible crisis, so as to accurately predict the risks and opportunities. For processing, through the collection of information identification, on the one hand to correctly distinguish the crisis with the general social assistance events, on the other hand, to have been identified as signs of crisis information, through processing, can type, the potential crisis in nature, the extent of such to be understood

- **Crisis early warning:** To accurately determine the various indicators of crisis and crisis factors break through the cordon, according to the judgment result, decide whether to issue an alert, issued a warning and alert to what extent way. Early warning information including crisis category, warning level, the start time, may affect the scope, cautionary notes, and measures should be taken and publishing agencies and so on.

5. Conclusions

The sudden public crisis and high uncertainty will always make all kinds of problems in front of us; it will be a challenge to us in different ways at any time. Therefore, the public crisis management is a long-term and arduous task. At the same time, we should

keep pace with the times, should be changed from time to time, pay close attention to the study of the public the mechanism of crisis management, and constantly improve the public crisis management mechanism. Data mining as a new information technology, can from a large number of ordinary data automatically dig out valuable usually more invisible knowledge, meet the cognitive needs, promote the improvement of management, so in biomedical engineering, business management, financial telecommunication achieved outstanding application. The introduction of data mining technology in the field of public administration, as well as the application of other management techniques and methods, is not only feasible, but also urgent. But at this stage, in the field of public management and application of data mining technology has some inevitable limitations, but its benefits in contrast, believe that the application of data mining technology in public management is promising, it can not only improve the government internal management level, for the government to provide public services to the community the capability and performance will also play an important role in promoting.

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