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Research on Application of character recognition technology in production and management of electric power enterprises

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Abstract. In the steady development of social economy, the electric power enterprise of our country faced with higher and higher energy consumption requirements, obtained excellent results in the technology theory innovation, gradually transformed the traditional management mode restriction, began to discuss how to quickly, promote the electric power enterprise to realize efficient management. As an important field of pattern recognition application, character recognition technology is applied in the management of electric power enterprises, which can dig more valuable content in depth on the basis of scientific processing of data information. Therefore, on the basis of understanding the current situation of production and operation of electric power enterprises, according to the basic concept and application field of word recognition technology, this paper studies how to apply word recognition technology in the field of production and operation of electric power enterprises, and puts forward corresponding management measures of electric power enterprises in the new era.

Keywords: Text recognition technology; Electric power enterprises; Production and operation; Pattern recognition; Multi-source data fusion.

1. Introduction

In the rapid development of national economy, the electric power enterprises as an important pillar industry of national economic construction, along with the comprehensive reform of power industry technology, how to use artificial intelligence, cloud computing, Internet and other advanced technological concepts to apply innovation, is a main issue discussed by current scientific research scholars. At present, China's power supply is relatively sufficient, the actual quantity of power generation presents a downward trend, the demand of the power industry is too lag, and the application efficiency of power plants continues to fall. From the overall point of view, the operation and management benefits of electric power enterprises are not ideal, especially in the gradual advance of the electric power marketization transaction, continue to improve the market competitiveness of enterprises, effectively control the cost of electric energy, occupy a dominant position in the marketization transaction, and become the focus of the current electric power industry managers.[1.2.3]

State grid corporation since 2013 province tube industry organization construction unit business application platform (hereinafter referred to as the SG - NC system) and the collective enterprise controls system (hereinafter referred to as the control system) gradually achieved its staff, subject, fundamental data such as assets, credentials to standardise, takes a fiscal integration, engineering, accounting, budget control, material management, and other fields to carry out the deepening application, Digital system as an important support strength, witnessed the company province tube industry reform and standardize the management of the fruitful results, under the current dual change management and technical situation, the function of the system coverage there is insufficient,

can't meet basic unit application, an urgent need to base on the existing system function expansion and structure upgrade, through data sharing accommodation, strengthen data applications, Enhance the ability to assist decision-making and analysis, and form a new generation of information system for provincial administrative industrial units. The structure of the digital system is shown in FIG1 below:[4.5.6]

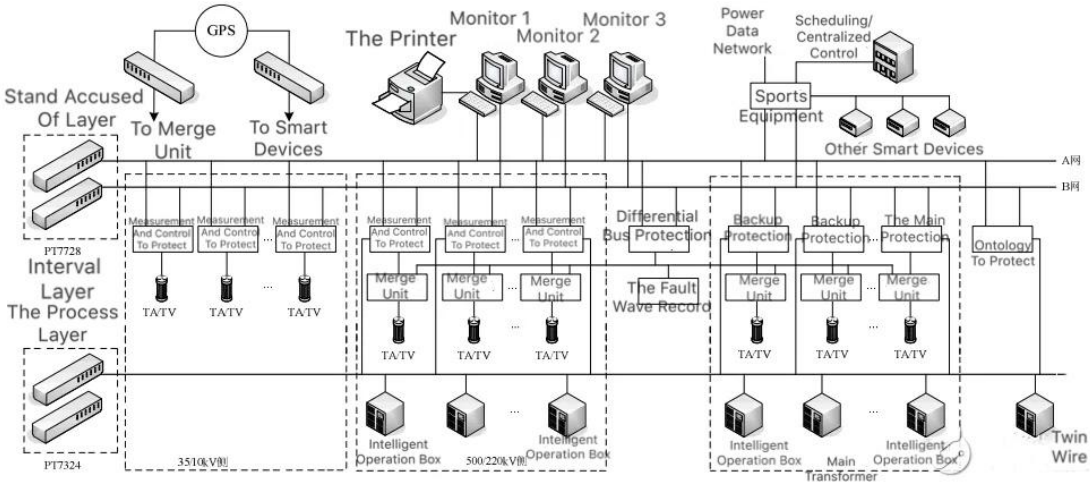

FIG. 1 Structure diagram of digital system

Province tube industry unit of a new generation of information system (hereinafter referred to as a new generation of information system) is organized by ministry of its unified enterprise management of the construction of the digital application platform, the original SG - NC system and control system on the basis of construction, to carry out the function extension, architecture, upgrade and connecting the paradigm shift, adopts the "strategic + financial" business controls new way of thinking, Combined pipe industry reform, the management of the new situation, is focused on the province tube industry core business, covering company headquarters, the province industry management, tube industry unit, the four levels of the project, the in application integration, data management, implement "a data source, a line of business", the company province unified tube industry application of core enterprise resource management system, By means of "process optimization" and "digital drive", the digital transformation of business management of provincial industrial units is realized, and the compliance management ability, enterprise management ability and risk control ability of provincial industrial units are further promoted. According to the work schedule and priorities of anhui electric power in charge in accordance with the unified headquarters requirements, complete province tube industry unit of a new generation of information system construction of financial management modules, including SG - NC function perfect, tax management function extension (headquarters project has micro service architecture was used to construct the tax administration system, and realize the function of the ticket of make out an invoice), mobile reimbursement APP construction of three parts, Organize pilot verification and application.[7.8.9]

Under the background in the era of big data, intelligent recognition technology as an important product of the development of science and technology, is widely applied to various fields of social life, because the electricity field operation risk index is higher, so using intelligent recognition technology to conduct a comprehensive control, can quickly discover hidden safety problems, and can improve the standard and normative power on-site. Along with the continuous improvement of intelligent technology in our country, the functions of the power intelligent system are optimized. Therefore, the current production and operation personnel of the power enterprise begin to combine

the practical work content, and deeply discuss how to make reasonable use of character recognition technology.

2. Method

2.1 Technical Analysis

Power resources as the foundation of national economic development, power distribution is an important link in the power system to directly connect with users and distribute power to users. Whether the state of power distribution equipment is normal directly affects the quality and safety of power consumption of the whole system, so it is very critical to ensure the normal operation of power distribution equipment. In the traditional sense of the distribution equipment monitoring method mainly choose the way of artificial inspection, inspection department staff on a regular basis for distribution equipment, instrument and so on carries on the data read and record the judgment, although the practice operation is very simple, but it takes a lot of time and energy, and unable to guarantee data integrity and fairness of the information, can not be real-time warning of potential risks.[10]

Multi-source fusion data acquisition technology is based on artificial intelligence and machine vision as the core of power distribution equipment monitoring to provide data support, the specific structure is shown in Figure 2 below. Nowadays, power enterprises have many types of distribution equipment and complex application scenarios, which leads to high redundancy of actual monitoring data. Intelligent analysis and data processing are the main problems that limit the application effect at present.

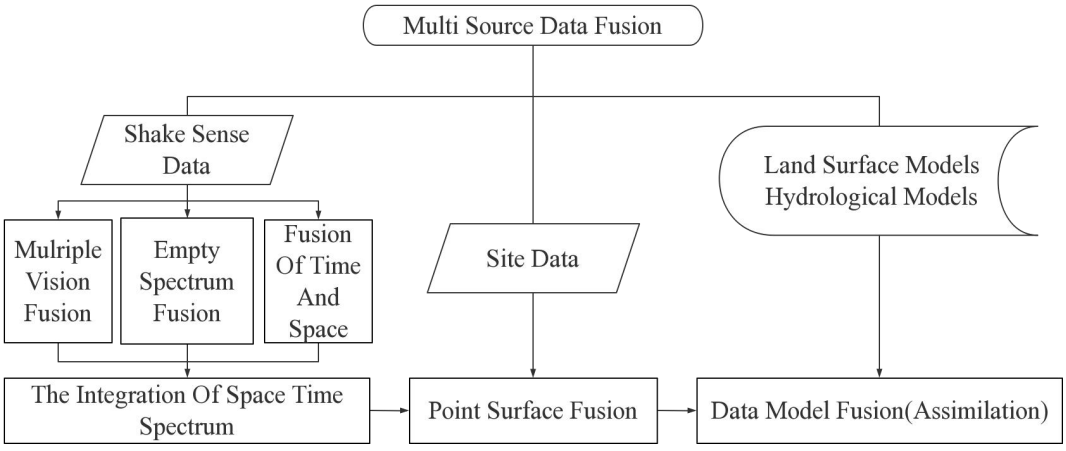

FIG. 2 Structure diagram of multi-source fusion data

There are many localization methods for text detection at home and abroad, such as machine learning, texture feature, edge detection, location of connected regions, etc. The main methods of text recognition include the recognition method based on statistical features, structural character recognition, the combination of statistical recognition and structure recognition, and artificial neural network recognition. At present, although the systematic research on text data recognition methods has begun at home and abroad, there are some problems in the practice and application of power industry, such as low automation level, poor real-time performance and low recognition accuracy.

The text data recognition in the electric power industry mainly has two forms: text information recognition and digital reading recognition of digital display instrument. This paper mainly considers how to use intelligent identification to replace manual information reading in the complex environment of electric power, so as to improve the intelligent level of production and management of electric power enterprises.

2.2 Technical Solution

The text recognition technology studied in this paper integrates visible light imaging, laser power imaging, infrared imaging, global positioning GPS technology, image processing technology, digital photography, measurement and other technologies, and gradually gets rid of the traditional single channel information perception mode. At the same time, the multi-source fusion video surveillance system can quickly grasp the texture information, temperature field data, power data of the monitoring area and target, with high precision, high efficiency and other technical advantages. Combination are shown in FIG3 below to realize an intelligent identification of the text data analysis shows that the specific steps involved in the following: first, from the video monitoring system in power enterprises multi-source fusion, collects and stores video data frames, to get the image enhanced and standardized and processing, scientific annotation to collect images, clear text data in the location and contents of the text data; Second, the labeled pictures collected by the above operation are regarded as data sets, and the Text detection model and Text recognition model are obtained by training and analysis according to the data set of Reading Chinese Text in the Wild. Thirdly, after completing the training of the two models, the video stream in the multi-source fusion video surveillance system should be obtained first, and the real-time frame analysis should be carried out, and then the digital image processing technology is used to preprocess the images, so as to facilitate the subsequent detection and recognition. Fourthly, the image obtained by the above operation is input into the trained text detection model, which is used to detect the text data region in the image, store the location information of the text block, and cut the text data region waiting for recognition. Fifth, the image of the text data region cut by the above operation is accurately input into the trained text recognition model for content recognition, as shown in Figure 4 below. Sixth, it processes the recognized text content, filters out the characters that do not meet the requirements, and uses NLP natural language processing algorithm to predict the missing information, so as to fill in the missing or covered text data information.

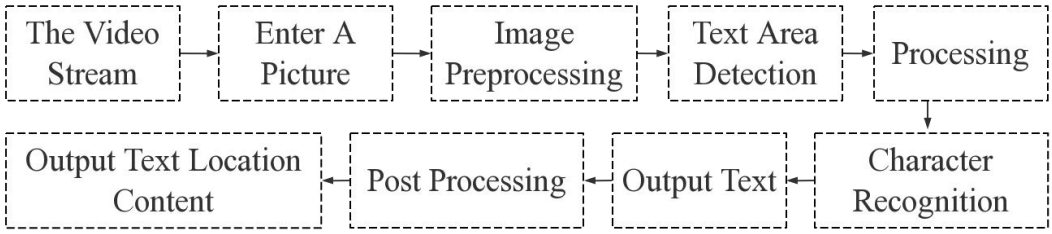

FIG. 3 Method structure diagram of intelligent recognition of text data

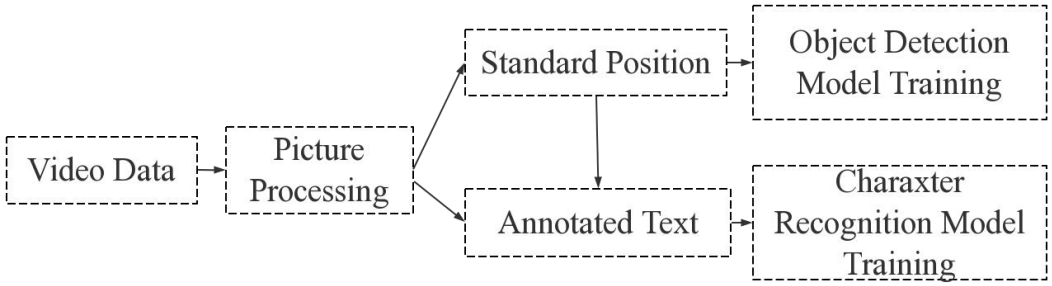

FIG. 4 Structure diagram of text recognition

3. Result analysis

According to the following figure 5 character recognition technology operation process analysis, the application of this technology in the field of electric power enterprise production management, as an important research field of artificial intelligence, can use computer technology to deal with text analysis and deep understanding, there are different identification mode and application principle, its biggest characteristics is a large amount of information and speed of application, Therefore, it can be widely used in electric power enterprises.

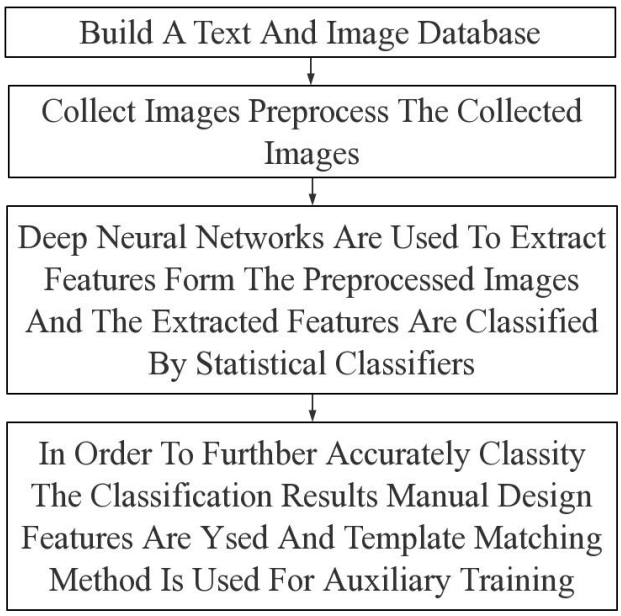

FIG. 5 Operation flow chart of text recognition technology

Therefore, after the reasonable use of the theory of character recognition technology, the production and operation management personnel of enterprises should do two aspects of work: on the one hand, they should actively explore the efficient and accurate operation and management mode, which is also the basic condition for improving the level of enterprise operation and management. Now, the power enterprises of our country are in the important period of continuous reform and development, so we should combine the marketability development demand of power industry, improve the overall management mechanism gradually. At the same time, pay attention to the optimization of internal enterprise resources, scientifically equipped with human, physical, financial and other contents, put forward extensive internal cost control mode, so as to improve the comprehensive management level of the enterprise; On the other hand, we should effectively promote information management. In the innovation and development of modern information technology, the production and operation of electric power enterprises will be affected by the theory of information technology, the traditional management mode has been unable to meet the needs of modern enterprises, so it is necessary to combine information technology to achieve efficient management and effective communication, so as to improve the comprehensive competitiveness of enterprises. Nowadays, the power industry can combine the advanced information management mode cases of other industries for practical analysis, pay attention to the combination of their own business needs, develop a more perfect information management system, in order to improve the level of enterprise management in the comprehensive operation. At the same time, the information system can effectively supervise the execution of the work of various departments, ensure that the work progress is reported back, enhance the linkage between employees of various departments, and ensure that electric power enterprises can have a strong competitive advantage in the increasingly competitive market environment.

4. Conclusion

To sum up, in the gradual improvement of the construction level of smart grid, the production and operation of power enterprises in the future will be innovated in the direction of networking and intelligence, and truly realize the automatic identification and timely alarm of violations. This paper mainly discusses the application of text recognition technology in the field of production and operation of electric power enterprises, and makes clear the intelligent recognition method based on text data, which has a positive impact on the production and operation innovation of electric power enterprises in the future. Intelligent recognition technology effectively deal with the complex electric power operation environment, improve the technology of efficient algorithms, reduce the rate of false positives and non-response rates, to improve the standard of the intelligent application of the electric power industry, reduce the security hidden danger and risk the scene of the homework, ensure the security of the electric power production operation to carry out, have very strong social benefit and economic benefit, Therefore, Chinese electric power enterprises and scientific scholars should continue to discuss the application topic of intelligent identification technology in the electric power industry.

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