Study on Image Classification Method Based on Small Sample Learning

Dongxue Wang [*]

SEGI University, Kuala Lumpur, Malaysia
wangdx@hnjd.edu.cn*
* corresponding author

Abstract

Image classification as according to their different features of reflected in the image information, make a distinction between different categories of target image processing methods, and especially for quantitative analysis using the computer, each of the images or image pixels, or regional planning is one of the several categories, in lieu of visual interpretation of the person, It has important practical value for the study of image classification method. However, the current study of image classification method based on small sample learning cannot effectively follow the development needs of society and industry, so it is urgent to carry out effective reform. Based on this, this paper first analyzes the problems existing in the research system construction of image classification method in small sample learning, and then gives the construction strategy of image classification method system according to these problems.

Keywords: Image Classification; Small Sample Learning; Methods to Study

1. Introduction

With the continuous development of the social economy, all industries in China are facing the key tests and challenges of transformation and upgrading as well as the adjustment and optimization of industrial structure. As an important way to promote the professional technology required by data operation and social development, it is of great practical significance and value for researchers to build a scientific and reasonable image classification system on the basis of small sample learning [1]. And image classification according to their different features of reflected in the image information, make a distinction between different categories of target image processing methods, and especially for quantitative analysis using computer technology, the study of the relevant classification method to promote the development of image data and image matching technology and social industry demand, And it is of great practical significance to promote the high level and high quality development of image related technology products.

At present, there are still many deficiencies and problems in the construction level of the research method system used by most groups in the processing of image data, which is embodied in the dislocation and disconnection between the methods and technologies adopted, the quality of image distinction and classification and the actual needs of the society and the industry. This dislocation and disconnection lead to the enterprise in the product image processing classification at the same time, the related RESEARCH and development departments or institutions can not reach the expected image processing effect and other problems [2]. Therefore, in the small sample learning under the premise of technology research method to classify image faintly in the process of expanding, especially to explore, develop a new form of the process of image classification methods should focus on from the aspects are shown in figure 1 below, to build a perfect classification data research system lay a solid foundation.
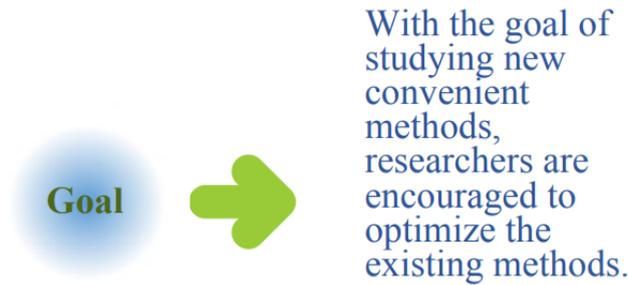
With the goal of studying new convenient methods, researchers are encouraged to optimize the existing methods.

Goal

Figure. 1. The focus of the development of the image classification data research system

In addition, image classification technology as one of the image technologies commonly used in all walks of life processing, and different enterprises based on the difference of their product positioning and characteristics, there are a variety of types in the existing market economy [3]. However, although different image classification techniques should pay different attention to the key points, but some of the basic mass and energy formulas needed to process data are universal, such as the kinetic energy theorem:

$$W = \frac{1}{2}mv_1^2 - \frac{1}{2}mv_2^2 \qquad (1)$$

Although the application of image processing technology of the basic formula of the differences between species, but the enterprise research department in image classification method research is not effective to create their own characteristics and brand, lead to image classification method under the small sample learning research gradually show the trend of homogeneity, the lack of its own core competitiveness. In this context, as a complex system engineering in intelligent analysis technology under market economy, it is of great practical value to carry out the exploration and research of image classification exploration method breakthrough development system, which needs to build a long term, scientific and benign cultivation system.

2. Literature Review

2.1. The realistic dilemma of image classification system construction in small sample learning

First of all, at present, most enterprises lack the supply of applied talents related to big data technology and image data processing, which is mainly reflected in the fact that most enterprises have a relatively general enrollment level for relevant sub-departments, and it is difficult to find innovative talents with applied literacy. Moreover, the lack of market data resources in these enterprises further aggravates the difficulties of image classification technology. Secondly, the research of image classification methods is faced with the realistic dilemma of the disappearance of financial support, rights and interests protection and other structures, which is mainly reflected in the continuous decline of employment rate of employees in the research direction of most image classification methods [4]. As a result, the classification direction is gradually at a disadvantage and gradually surpassed by other industries. The main reason for the present situation of structural loss of protection such as financial assistance and rights and interests of these enterprises is that the overall planning of the image classification method research system does not match the social needs, and the training orientation of professional talents does not adapt to the social needs.

2.2. The practical problems existing in the system construction of image classification method in small sample learning

The practical problems existing in the existing image classification method in the small sample learning are mainly shown in the following aspects. First of all, with the continuous improvement of the scale of image data processing requirements in the current economic development, the research on image classification method is gradually popularized and developed [5]. Secondly, most of the image analysis and classification schemes developed by the image analysis and research departments of enterprises have prominent problems such as unclear positioning and unclear objectives, resulting in the lack of its own characteristics of the analysis and processing method system, and

further make the classification technology and method of its research have no competitive advantage and position in the market. In addition, the structure of data and image processing talents cultivated by domestic universities is maladjusted, and the graduates lack practicality and the ability to quickly invest in roles. This is mainly because the relevant courses offered by local universities are too theoretical and too many theoretical courses, resulting in the lack of cultivation of students' practical ability, which is not conducive to the development of students' career and such industries.

2.3. Thinking on the construction of image classification system in small sample learning

At present, the study of image classification methods in small sample learning focuses on the height and width brought by expanding the size of the image database, but ignores the establishment and guarantee of corresponding matching analysis equipment after the increase of the number of databases. For example, with the increase of the number of images, the relevant operational equipment and classification processing experimental equipment for the analysis of image type operation ability are not matched correspondingly, leading to the problems of resource waste and processing technology miscellaneous, or the serious insufficiency of actual research degree [6]. Secondly, most of the existing image classification technology research ignores the personalized needs and features of image data, resulting in the lack of personalized features of the image data after classification and more like a uniform tool processing. In addition, at present, many enterprises lack a unified and correct understanding of the staff training goals. Many enterprises or institutions blindly seek for large, but ignore the construction of basic ability, resulting in the training of technical staff high or low. The inaccuracy of self-positioning of this kind of image classification technology makes it ignore the improvement and guidance of the development direction and analysis level of the personalized image classification, and limits the effective play of the ability of related technicians.

2.4. The root analysis of the mismatch between the overall planning of the image classification research system and the social demand

First of all, the development of image classification methods based on small sample learning lacks the embodiment and representation of innovative connotation, resulting in its development concept ignoring the profound observation and feeling of social and industrial needs. Not only that, the lack of innovation connotation, so that most enterprises and institutions image processing technology construction homogenization problem is more prominent, most of the pursuit of large and complete technology construction while ignoring the construction of their own characteristics and image personalized thinking and the subject status of the mining. Second, a lot of image classification method using existing talent lack of innovation in the work, this kind of innovation is not only reflected in the lack of classification methods, the research goal as well as the processing pattern and so on, but also in the body of the enterprise and employee practices and ability enhancement, and image classification related personnel independent thinking, pioneering consciousness and practice ability, etc [7]. In addition, in the overall planning process of the classification method system, the author neglected some objective problems and phenomena, such as the balance between the socialization of innovation and the personalized needs of customers, the balance between the passive acceptance of enterprises and their main role, the balance between the development of industry under the market economy and the long-term goals of talent training. All these aspects together constitute the root of the problem that the overall planning of the classification method system does not match the social needs.

3. Methodology

3.1. Improve the applied features of new forms of image classification

First of all, in the new form of image classification method applicable to the positioning level, enterprises or institutions should be based on their own conditions and related development needs of society and industry, accurate positioning image classification method of technical construction goals and directions. Secondly, in the development of new forms of image classification method system innovation, on the one hand, we should actively cultivate the theoretical knowledge literacy of relevant employees, improve their professional knowledge reserve; On the other hand, the engineering practice ability of related personnel to process image data should be cultivated, and their comprehensive quality in several aspects as shown in Figure 2 below should be improved [8-9]. In addition, the

construction of the application-oriented feature of image classification method needs to cultivate the engineering practice concept and thinking of enterprises, and help them establish scientific engineering application concept and improve the development level of image technology in the future by improving the proportion of image processing methods in the performance of new methods.
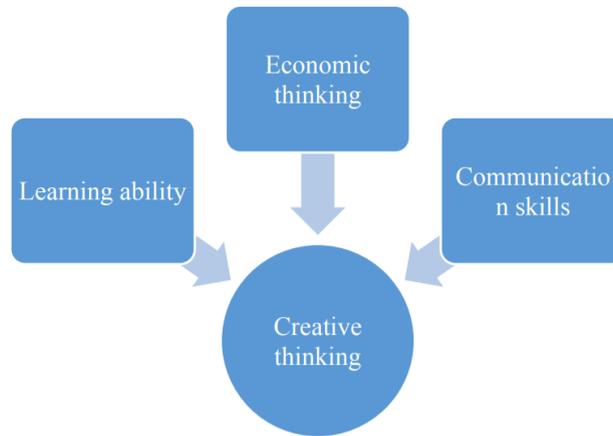

Figure. 2. Architecture of image classification system

3.2. Build up a perfect image classification method researchers training application system

First, in the existing classification method research personnel training goal and the localization level, should be in order to enhance engineering applied in the field of image processing personnel as the goal, to build up the scientific and reasonable top talent training plan, and active in the task and professional Settings into the newest concepts of image technology industry, cutting-edge technology development trend and the development trend of the future [10]. In this way, it can meet the needs of the development of the technology industry and the development of the industry while studying the classification method. Secondly, at the level of building the practical processing system of image classification method, it is necessary to strengthen the evaluation and assessment of the actual classification index of the new method for employees, establish the directional training mechanism of enterprise cooperation platform, and help employees have more opportunities to exploit the specific application of the new classification method. In addition, strengthen the training of applied talents and the improvement of supporting measures, set up organic innovation mechanisms in every link of production, learning and research, promote the integration of theoretical thinking and practical ability of related employees, and ensure the ultimate realization of the goal of image processing talent training.

4. Result and Conclusion

In short, in view of the current small sample image classification method in the study of the construction of research system level there are still many deficiencies and problems, the specific performance in the training of talent and talent approach adopted by the technology and image profiling, classified quality level and the actual demand of social and industry dislocation and disjointed phenomenon, In this paper, through the analysis of the problems existing in the construction of the image classification method research system, the real dilemma and the root of the problem in the image classification method are studied. Then, in view of the problems and the insufficiency of image data analysis, this paper presents the existing image classification technology system construction strategy, which promoted new forms of image classification method applied characteristics, build up the perfect image classification method researchers to develop application system, so as to multi-dimensional and multi-level reached the goal of construction of a variety of image classification method.

References

[1] He Shi, Cheng Jiehai, Wang Shidong, et al. Research on semi-supervised remote sensing image classification based on small sample. Qinghai Science and Technology, 2020, 027 (001): 28-31.

[2] Huang Jin, Dong Kan, Zhu Mingcang. A Small sample learning image Recognition Method based on Attention Neural Network, CN109766942A. 2019.

[3] Song Chuang, Zhao Jiajia, Wang Kang, Liang Xinkai. A Review of Small Sample Learning for Intelligent Perception. Acta Aeronautica Et Astronautica Sinica, 2020, V.41 (S1): 15-28.

[4] Li Hongnan, Wu Lizhen, Niu Yifeng, et al. Metta-Learning Methods for small sample target recognition of UAV. Unmanned Systems Technology, 2019, v.2 (06): 21-26.

[5] Wang Hang, Chen Xiao, Tian Shengzhao, et al.SAR image recognition based on small-sample learning. Computer Science, 2020, v.47 (05): 132-136.

[6] Ren Shengnan, Sun Yu, Zhang Haiyan, et al.Small samples of plant disease identification based on one-shot learning. Jiangsu Journal of Agriculture, 2019, 35 (5).

[7] Zheng Xinyue, Huang Yonghui. Small-sample image classification methods based on VAE and attention mechanisms. Computer Application & Software, 2019, v.36 (10): 174-180.

[8] Liu Zhiyang, Zhao Bin, Cao Chen, et al.The segmentation method of acute stroke lesions based on small sample learning:, CN111079901A. 2020.

[9] Wang Yiding, Hao Chenyu, Li Yaoli, et al.Small samples of Chinese herbal powder micro recognition based on deep learning. Computer Application, 2020, 040 (005): 1301- 1308.

[10] Zhang Jing, Yuan Xiaoguo. Hyperspectral remote sensing image classification algorithm based on small-sample learning. Liaocheng University Journal: Natural Science Edition, 2020 (6): 1-11.