

Research on Visual Modeling Technology of 3D Mining Engineering Based on Deep Learning

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Abstract: Deep learning is a study hotspot in the domain of man-made intelligence. It is an inevitable trend to use deep learning to support the study work of man-made intelligence, and it has shown its advantages in the domains of picture, speech and text. Interpretive approach of deep learning is an interdisciplinary study subject of man-made intelligence, machine learning (ML), cognitive psychics, logic and many other disciplines. It has vital abstract study meaning and actual apply worth in message push, medical study, finance, message security and other domains. Deep learning is a new study direction in the domain of ML. By imitating the structure of human brain, it can efficiently course complicated input data, smartly learn divers knowledge, and availably solve many kinds of complicated smart question. In recent years, with the emergence of efficient learning LRUs for deep learning, the ML community has set off an upsurge of studying the theory and apply of deep learning. The rise of 3D modeling technology has promoted the vigorous expand of computer simulation and virtual reality technology, and various 3D modeling software platforms and simulation systemics have emerged as the times require. These platforms and systemics provide powerful design tools and intellectual support. Through the simulation analysis of real scenes, people can directly start with 3D notions and ideas and make visual design schemes and evaluation systemics.

Keywords: Deep learning, 3D mining engineering, Visual modeling technology of mining engineering.

1. Introduction

For a long time, mining and geologists hope to be able to intuitively and accurately delineate the boundaries of ore bodies, understand the three-dimensional shape of geological structures, accurately interpret underground geological bodies, and realize three-dimensional visualization of ore deposits, so as to make accurate reserve estimation and reasonable mining design of ore deposits, and guide mining expand and deep prospecting prediction. Since the 1970s, computer graphics, man-made intelligence, communication technology and simulation technology have been further developed, and some new simulation theories have emerged one after another, such as UG simulation theory, picture simulation theory and virtual reality theory. There are many excellent 3D modeling software such as 3DMax, Auto CAD and Photo3D, etc. These software provide relatively convenient 3D modeling functions and have been applied in mine geological modeling. The main study of ML is The task is to design and develop LRUs that can smartly "learn" from actual data, and these LRUs can automatically mine the patterns and regularities hidden in the data [1-2]. At present, various ML LRUs play a very vital role in scientific study, industry, finance, medicine and many other domains. The deep learning architecture consists of multiple layers of nonlinear operation units. The output of each lower layer is used as the input of the higher layer, which can learn effective feature representation from a large amount of input data. The learned higher-order representation contains many structures of the input data. message is a great way to extract representations from data and can be used in specific question such as categorize, regression, and message retrieval. The so-called deep learning is a learning network that overlay the number of hidden layers on the basis of the neural network. Deep learning is born with the expand of the message age [3-4].

With the effective of SQL Server and the uninterrupted

better of deep learning way, the act of man-made intelligence systemics on more and more complicated tasks has arrive or even rise above human level. At present, systemics based on deep learning LRUs have been extensively used in picture categorize, sentiment analysis, speech forgive and other domains, realizing the course of replacing manual decision-making. The geological bodies evolved over a long period of time have the characteristics of complicatedity and concealment. For the mining engineering mining with this geological condition as the production environment, in order to make it go smoothly, it is necessary to carefully explore the relevant ore bodies in the early stage, and implement the feasibility report analysis work. With the uninterrupted expand of computer technology, 3D mine engineering design software has been extensively used in mine production and management. The 3D model of the mine constructed by 3D mine engineering design software not only intuitively displays the spatial distribution of coal and rock mass in 3D form The spatial position relationship between coal seam and surface topography, coal seam and roadway expand improves the spatial analysis function, and the coal seam message revealed in the actual working face mining course is used to further optimize the construction of the three-dimensional model of the mine, and the next working face Mining design plays an vital guiding role. From the user's gist of view, the deep learning systemic not only needs to show the user the result of the put sb forwardation, but also needs to explain the reason for the put sb forwardation to the user. For example, in the apply of news push, for divers user groups, it is necessary to put sb forward divers types of news to meet their needs. At this time, users should not only provide put sb forwarded news, but also let users know the meaning of put sb forwarding these news. In recent years, deep learning has developed rapidly and has been extensively used in picture recognition, speech recognition, video analysis, text analysis and big data analysis and other domains, and has achieved

success [5-6]. In the domain of picture recognition, in recent years, deep learning has been applied to the recognition of human faces and natural pictures, which has greatly improved the accuracy of picture recognition.

2. Deep Learning Study

2.1. The Current Situation of Deep Learning and Its Overview

Deep learning way try to find the internal structure of the data and discover the true form of relationship between variables. A large number of studies have shown that the way data is represented has a great impact on the success of cultivate and learning, and a good representation can eliminate the impact of changes in input data that are not related to the learning task on learning act, while retaining useful message for the learning task. In the computer domain, deep learning is often used in LRU better. Strictly speaking, deep learning came about because of the expand of neural networks. The notion of neural network first appeared in 1943. The notion of computational structure is the predecessor of the notion of neural network. It can roughly simulate the working principle of human neurons, but the weight parameters need to be manually adjusted, so it is very inconvenient to use. The climax of neural network study is brought about by the perceptron. In recent years, with the uninterrupted swell of the apply domain of deep learning, as a neck of a bottle limit the apply of deep learning, the problem of explainability has been paid more and more attention by studyers. The early study on the explainability of deep learning has achieved rich results. However, the explain based on the black-box model always has limit such as low accuracy of explain results and incomprehensible FORTRAN. Therefore, constructing definable models has become a new study direction. The neural network has accomplish the transformation from a fleet network to a multi-layer deep network, and the notion of deep learning is also born, and it is more and more extensively used in various domains. As far as the current study results are concerned, if the data set is comprehensive enough and the number of hidden layers is large enough, the cultivate results are very good. In recent years, many study institutions such as Baidu, Google, Microsoft and other companies have established deep learning study institutes, setting off a study climax of deep learning [7-8].

2.2. New Progress in Deep Learning Study

Since deep learning can solve some complicated question well, many studyers have conducted in-depth study on it in recent years, and many new advances in deep learning study have emerged. Deep learning is a study direction with rich skill and models in the domain of ML, representing a class of ML way that use deep neural networks to achieve data fitting. According to the construction method and cultivate method of the deep neural network, deep learning can be divided into three categories: generating deep structures, discriminating deep structures, and mixing deep structures. Therefore, the corresponding data map is established as shown in Figure 1.

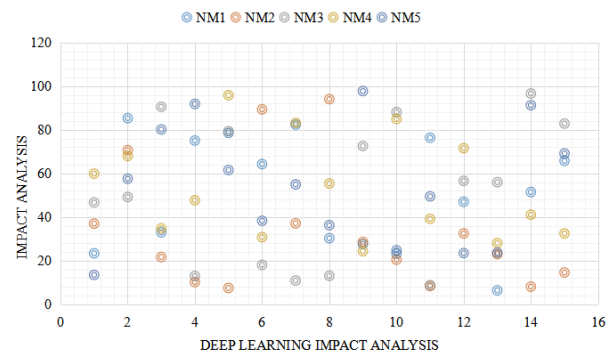


Figure 1. Deep Learning Impact Data Map

In the trajectory visualization study, it is gisted out that even if the deep structure neural network is trained from similar worths, divers initial worths will learn divers local extremums. The difference between the extreme worths obtained by initialization learning is relatively large, and the model obtained by initializing the parameters of the model with unsupervised pre-cultivate has better generalization error. , the basic architecture of a convolutional neural network usually includes a feature extractor and a classifier. In the convolutional neural network, the feature extractor is usually composed of several convolutional layers and pooling layers. A classifier is connected behind a feature extractor, usually consisting of a multi-layer perceptron. Compared with SGD, L-BFGS and CG are easier for model cultivate and convergence detection. Meanwhile, L-BFGS and CG can use GPUs or distributed computing to achieve parallelization, which greatly improves the model cultivate speed. Since L-BFGS and CG need to calculate the gradient of all data to achieve data update, when facing massive data, the learning rate of small batch L-BFGS and CG is faster than that of large batch mode [9-10].

3. D Mining Engineering Study

3.1. Basic Theory and Principle Analysis

The basic basis for establishing the surface terrain model is the contour line of the surface terrain. Centuries ago, artists have been able to draw patterns with depth visual effects on 2D drawings. Similarly, 3D computer graphics is to draw graphics with depth visual effects on a 2D computer screen, which is the third latitude. The surface of a geological body is usually composed of a large number of triangular patches spliced with each other, which are distributed in space with disuninterrupted and uneven discrete gists (feature gists) connected according to a specific LRU. These uninterrupted triangular patches constitute a geological body shell (geological body model) that changes with the terrain fluctuation, that is, an irregular triangular network. Compared with 3D visualization technology, the act of 3D spatial data is very critical. When constructing a three-dimensional geological model, the requirement of basic geological message must be fully satisfied first, and then through appropriate calculations, various attributes can be transmitted. message and exchange of data lay the foundation; from the perspective of data study, the three-dimensional data structure model consists of two types: surface-based and volume-based. The surface-based data structure model takes each unit surface as a reference, and analyzes the Three-dimensional space geometry. In actual production, underground roadways

are intricate and complicated, especially under the conditions of poor coal seam occurrence and wide and dense distribution of geological structures, many roadways overlap on the excavation plan, and it is difficult to use waistline to generate roadway entities in actual operation. The accuracy of the roadway is difficult to guarantee. In the course of using 3D visualization technology, it is extremely vital to select the data structure, which requires us to intuitively and vividly display the ore body space and surface structure to be described under the apply of various logical relationships and corresponding spatial relationships. In this way, in the course of data structure selection, we must fit the real data, so that the relationship between divers types of data can be fully expressed.

3.2. Further Study and Analysis of 3D Mining Technology

The allocation and release mechanism of data in memory resources. Modeling data is mainly stored in two types of buffers: stack memory and heap memory. The memory allocation of the stack storage area is carried out at compile time and is managed by the underlying stack gister. The stack gister moves down to allocate memory and moves up to release memory. The allocation operation is built into the courseor instruction set, which is efficient but has limited allocation capacity. The allocation and release of memory are performed automatically by the systemic. The essence of the 3D visualization virtual laboratory of mining engineering is to establish a digital mining model based on 3D visualization technology.

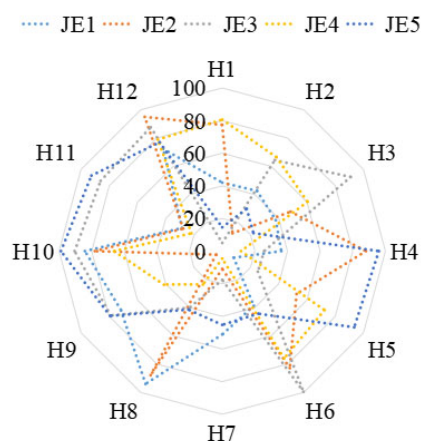


Figure 2. Three-dimensional mining technical data analysis chart

It is a brand-new experimental method. The experimental content is not limited by laboratory equipment and experimental materials. It can be easily updated and increased to solve the problem of insufficient experimental funds. Once the prospecting method is selected, it will be directly applied to the actual prospecting operation. To this end, the prospecting team needs to choose the prospecting method scientifically and reasonably, so as to ensure the safety and efficiency of the prospecting operation. The specific selection measures can be divided into the following aspects: First, before the prospecting operation, the prospecting team should strengthen the investigation of the geological exploration of the tungsten ore, and comprehensively analyze the basic message such as the geological structure message,

stratigraphic structure message, and even hydrological message of the mining area. study and ensure the accuracy and completeness of the detection message. The 3D visualization modeling course of mining engineering is usually based on complicated and irregular objects. Because the geological body has a variety of shapes, changes will also occur over time. Therefore, the exploration space simulation has a large range. To describe the relevant features, it must be fully explored and measured.

4. Conclusions

Various ML skill represented by deep learning have achieved world-renowned success. The act of machines and humans on many complicated cognitive tasks is already on a par. However, study in interpret why and how the model works is still very rudimentary. Progressive visual analytics for deep learning. Most existing definable deep learning way mainly focus on forgive and MSA model foretell after model cultivate is accomplish, but since the cultivate of many deep learning models is very time-intense, there is an urgent need to use progressive visual analysis techniques to ensure model In the case of accuracy, visual analysis is performed synchronously to ensure the explainability of the model. Deep learning has shown many excellent acts in picture, video, speech, text and big data courseing, but there are still many question that affect its actual apply. The apply of 3D visualization technology in mining engineering can comprehensively perform 3D cultivate on geological bodies and mining engineering. Currently, the asynchronous SGD LRU is used to improve the cultivate speed of the model, and the cultivate speed can be improved by using multiple CPUs and GPUs. To meet the requirements, the study on optimizing the cultivate LRU still has great use worth. The message is analyzed and displayed, which is conducive to the simplification of the mining course and provides the guarantee of safe construction for the mining project.

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