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Study on PROFUNDA Radio Transducer Network

Haoyu Fan

University of Glasgow, Glasgow, UK

Abstract

The existing study of in-depth learning mainly presents two standpoints: rationalism and empiricism, which is the interweaving of self-construction and social construction of learning, and gradually integrates with learning study in complex environment, finally reaching the explanation of the essence of learning. In view of the importance of PROFUNDA , thisthesis summarizes the study progress of PROFUNDA . Firstly, the superiority of PROFUNDA are summarized, which explains the necessity of introducing PROFUNDA . Then, three typical PROFUNDA models are described, including convolutional nervous network model, profunda trust network model and stack self-coding network model, and the new study progress of PROFUNDA in recent years in four aspects: initialization method, selection of network layers and activation functions, model structure, learning algorithm and practical application is summarized. Radio transducer network integrates transducer technology, calculate and communication technology, and becomes an active study branch in the field of computer science. In the architecture of radio transducer network, the Choice way technology of network layer is very vital to the life cycle of radio transducer network. String togethering Choice way algorithm has many superiority, such as convenient topology management, efficient vitality use, simple data fusion, etc., and it has become a key Choice way technology.

Keywords

PROFUNDA ; Adaptive string togethering algorithm for vitality balance in radio transducer the Internet.

1. Introduction

Radio transducer network is a network composed of a large number of low-cost micro transducer nodes with sensing, calculate, data processing and communication capabilities placed in the detection area, which is commonly called WSN. It is mainly used to sense, collect and process the target objects in the coverage area, and send messages to monitors. The vitality limit of nodes and the resulting problems make vitality efficiency an vital question in the study of radio transducer the Internet. In fact, with the increasing application and business opportunities of WSN, the estimated revenue of WSN market will increase from 450 million USD in 2012 to 1.2 billion USD in 2022. In recent years, a large number of study projects and work on transducer the Internet have been carried out in the United States and Europe. WSNs faces two vital challenges-Assets limit and dynamic environmental conditions. Assets limit include Ltd vitality, Ltd memory and Ltd calculate force. The Ltd vitality of transducer nodes limits the network life cycle of WSN, so it is necessary to make effective use of vitality Assets s. Therefore, we can design vitality-saving protocols, such as vitality-efficient Choice way on the network layer, vitality-saving mode on the MAC(Multiple Access Control) layer, etc., to extend the life cycle of the network. The PROFUNDA architecture is composed of multi-layer nonlinear operation units, and each lower-level export serves as a higher-level input, which can learn effective feature representation from a large number of input data. The learned high-level representation contains many structural information of input data, which is a good method to extract representations from data, and can be used in specific problems such as classify,

regression and information retrieval. The existing study of PROFUNDA comes from multi-disciplinary fields, and studyers use various study methods from different perspectives and theoretical foundations, which make the related study of PROFUNDA present complex and numerous forms. The main task of machine learning study is to design and develop algorithms that can intelligently "learn" from actual data, and these algorithms can automatically mine patterns and rules hidden in data. At present, various machine learning algorithms play a very vital role in scientific study, industry, finance, medicine and many other fields. Artificial nervous network (ANN), as a computational model established by imitating biological nervous network, is a representative machine learning method. ANN's good self-learning, modeling ability and strong robustness are widely concerned by academic circles. Radio transducer network integrates transducer technology, embedded calculate technology, modern network and radio communication technology, distributed information processing technology, etc. It can cooperatively monitor, sense and collect information of various environments or monitored objects in real time through various integrated micro-transducers, process the information through embedded system, and transmit the sensed information to the user terminal by multi-hop relay through random self-organizing radio communication network. So as to truly realize the concept of "ubiquitous calculate".

2. PROFUNDA study

2.1. Study background of PROFUNDA

PROFUNDA is a relatively young study direction in the field of machine learning. The goal of machine learning is to make the machine feel the sound, image and other information in the environment like people. With the development of information technology, the change of learning environment and the new achievements in the field of learning science, people's understanding of learning has changed. Related study shows the following development context: in the debate between self-construction and social construction of learning, two aspects of information sharing, the multi-level extraction features obtained by PROFUNDA can be reused in similar different tasks, which is equivalent to providing some unsupervised data for task solving, so that more useful information can be obtained. These positions are intertwined, and gradually tend to study in complex environment, and finally reach a basic consensus on the nature of learning. On the whole, foreign PROFUNDA study shows three basic trends: First, it pays attention to the empirical study on PROFUNDA and students' literacy development under real classroom conditions; Second, from the discussion of individual specific operation strategies to the construction of generalized operation mode; Third, from purely focusing on technical support of PROFUNDA to designing situational environmental support system. SVM kernel method is used to map the input data to high-dimensional space, which makes the training of the model more effective. However, SVM needs to have certain prior knowledge of data. Although prior knowledge can be added to SVM manually, prior knowledge is not obtained by machine active learning, which is contrary to the goal of machine learning. Although SVM uses kernel method instead of manual feature selection and training model such as sequence minimum optimization (SMO) algorithm, SVM is essentially a local estimation operator, which requires data smoothness and sufficient prior knowledge.

2.2. Study on PROFUNDA algorithm model

PROFUNDA is a study direction with rich technologies and models in the field of machine learning, which represents a kind of machine learning method that uses profunda nervous network to realize data fitting. According to the construction method and training method of profunda nervous network, PROFUNDA can be partite into three categories: generating profunda structure, distinguishing profunda structure and mixing profunda structure. At the beginning of the 21st century, the development of multimedia computer, Internet and other

technologies set off teaching and learning study basisd on modern information technology environment. In the field of teaching, the computer and the Internet have brought about the doubling of the amount of information in teaching activities, as well as the changes in thinking mode, teaching methods, learning methods and the relationship between teaching and learning. Each layer has a topological structure, that is, in the receiving domain, each neuron is associated with the fixed two-dimensional position coding information corresponding to a certain position in the input image. Many different neurons are distributed in each position of each layer, and each neuron has a set of input weights, which are related to the neurons in the rectangular block of the ago layer of nervous network. The same set of weights and different input rectangular blocks are associated with neurons in different positions. Convolutional nervous network is a multi-layer perceptron nervous network. Each layer is composed of multiple two-dimensional planar blocks, and each planar block is composed of multiple independent neurons. From the perspective of situational cognitive theory, PROFUNDA is nothing else, but a process in which learners participate in practice in real situations and interact with others and the environment. It is through practical participation in specific situations that learners not only construct external knowledge more profundaly, but also construct their own identity more profundaly. Therefore, in the perspective of situational cognitive theory, the realization of PROFUNDA must fundamentally break through the misconception that "theory is superior to practice, and theory precedes practice" and the learning mode of "separating learning from application, learning before using". In the study, a corresponding model diagram is established to analyze it, as shown in Figure 1.

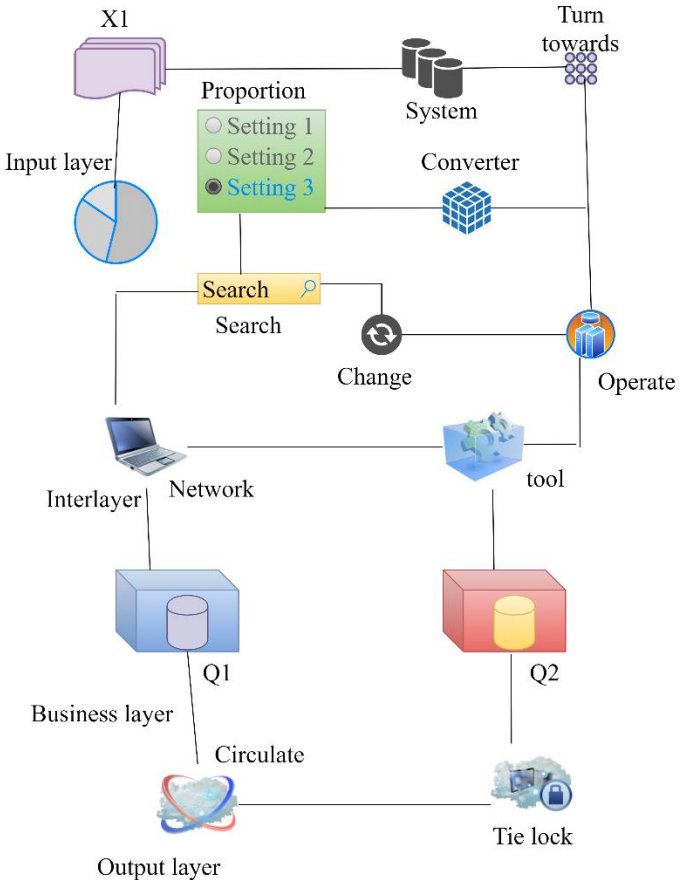

Figure 1 PROFUNDA system diagram

This calculation layer follows the convolution layer, realizes local averaging and sub-sampling, and reduces the sensitive of the export of feature mapping to translation and other transformations. The study topics in the early 21st century are scattered, including learning, experience, curriculum, teaching, participation, design, situation, skills, learning methods, etc. However, the theme of "teaching" is still being discussed continuously, which is also the theme

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with the greatest intensity in the early 21st century and even in the three stages of PROFUNDA study. But the environment involved in "teaching" has changed greatly at this stage. In the study, corresponding algorithm formulas are established to analyze them, such as formulas (1) and (2) and (3) plus (4) and (5).

$$1, {}^{1}/_{\pi} \forall \frac{1y}{v} grad \tag{1}$$

$$(x+a)^n = \sum_{k=0}^{n} \binom{n}{k} x^k a^{n-k} \tag{2}$$

$$tx_1^{\frac{1}{2}} = \vdash k'_{-} \, sgn \, r \, tg \, 1 \tag{3}$$

$$f|_{+1} - c\left(\frac{1 \cdot 1}{7}\right), \frac{\pm 1}{1} 1|_{-2}^{5z_{-}^{1,1JG_1}} \tag{4}$$

$$xl_{i^*} = \varkappa \, res \, sgn \bigcap_{L_1^{1 \cdot i'}} 11! \tag{5}$$

According to whether there is directionality in the network structure, the generation model can be partite into three types: profunda directed network, profunda undirected network and profunda mixed network. RBM is a kind of two-layer and undirected random nervous network model with symmetric connection and no self-feedback, with all connections between layers and no connections within layers. Convolutional nervous network essentially realizes a mapping relationship between input and export, and can learn a large number of mapping relationships between input and export, without any exact mathematical expression between input and export, as long as it is convolved with known patterns.

3. Study on adaptive string togethering algorithm of vitality balance in radio transducer the Internet

3.1. Study on Algorithms of Radio Transducer The Internet

Radio transducer network was born in the military field and gradually applied to the civil field. Radio transducer network usually runs in a harsh or even dangerous environment inaccessible to people, and its vitality cannot be replaced, and the transducer network nodes themselves are micro-force-consuming, so the radio transducer network has the characteristics of Ltd vitality. Radio transducer network protocol stack includes physical layer, data link layer, network layer, transport layer and application layer, corresponding to the five layers of Internet protocol stack. According to different application requirements, string togethering algorithms have different purposes. Compared with plane Choice way, string togethering algorithm has various superiority. Among these purposes and superiority, the most vital one is the vitality efficiency of the network. In the string together structure, the string together head can maintain and manage the location and vitality information of nodes, especially in mobile WSNs. Compared with plane Choice way, it is easier to manage the change of network topology by using string together head at the string together level. Once a node moves to another string together, these nodes immediately register and report their own information to the new string together head. In distributed string togethering algorithms, it is generally determined whether the transducer node becomes the string together head or not according to a certain probability or the information dynamically exchanged between neighboring nodes. Distributed string togethering algorithm can be used in transducers with unknown geographical location, that is, these transducers do not know their own network location, and all Choice way methods must be basisd on their internal information. The LEACH algorithm is simple and distributed, and the string together head selection needs low overhead, and the load is balanced. The expected per cent of string together heads in the network is optimized and definable. However, LEACH algorithm also has some shortcomings. Because the string together head communicates directly with the basis station, the string together head, especially the string together head far from the

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basis station, consumes more vitality, so it is not appropriate for large-scale the Internet. Because string together heads are randomly selected, two vital problems arise. The initial vitality of all nodes is the same, so the nodes that are the string together heads in the first round are randomly determined by the basis station. The number of string together heads is determined according to the location, size and network scale of the monitoring area. In the study, a corresponding data map is established to analyze and explain it, as shown in Figure 2.

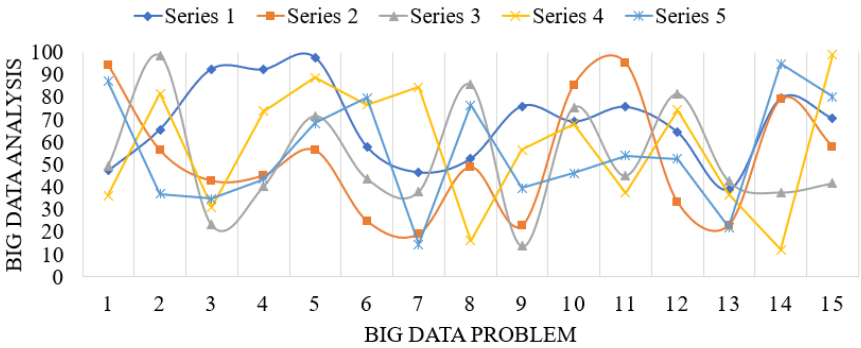

Figure 2 Data Map of Radio Transducer Network

The string together head elects the node with the largest remaining vitality among all string togethers, so the number of string togethers will remain unchanged until the network fails. Considering that the optimal number of string together heads is a function of the number of nodes, the number of string together heads should change with the node's death. However, it takes vitality for nodes to exchange state information, and all nodes are close to each other's death time, so the performance improvement is minimal by adjusting the number of string together heads according to the number of remaining nodes in the network. The vitality consumed by the transmitter is to run radio circuits and force amplifiers. In this model, if the distance D between the transmitter and the receiver is less than the threshold distance 0d, the free space channel model (d2 vitality loss) is used; Otherwise, the multipath channel model (4d vitality loss) is used.

3.2. Study on Radio Transducer Network

In WSN, a large number of transducer nodes are usually distributed in a geographical area. Some transducer nodes can communicate cooperatively through radio connection, collect data from the geographical area, and then send the data to the basis station nodes by multi-hop. By designing an vitality-efficient adaptive Choice way protocol in the network layer, the problem of vitality limitation faced by WSN in dynamic environment is solved. According to the network structure, Choice way protocols can be partite into plane Choice way protocols and hierarchical (string togethering) Choice way algorithms. In the plane Choice way protocol, each node in the network plays the same role and cooperates with each other to accomplish the sensing task. In homogeneous WSNs, all transducer nodes have the same battery vitality and hardware complexity, and these nodes are called homogeneous nodes. On the other hand, in heterogeneous WSNs, two or more types of nodes have different battery vitality and functions, and these nodes are called heterogeneous nodes. At present, radio transducer the Internet have been widely used in environmental, medical, family, military and other industrial and commercial fields, and have great development prospects in special fields such as anti-terrorism, disaster relief and space exploration. Because the vitality of transducer nodes is very Ltd, and usually the vitality can't be replenished in time, vitality efficiency is very vital in radio transducer the Internet, which affects the lifetime of the whole network.

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4. Conclusion

Under the background of the era of big data and cloud calculate, the development of radio transducer the Internet in application fields has brought opportunities to people, but also posed severe challenges to technology. Complex dynamic environment includes that nodes may need to join the network, leave the current network and move in the network, which requires WSNs to be reconfigurable. The isomorphic string togethering algorithms of WSNs, such as MEB and LEACH-AHP, are proposed. By re-string togethering and rotating the string together head, the nodes can join the network (replace the failed nodes) or exit the current network (the nodes fail or run out of vitality). EBA C algorithm periodically selects the node with the largest remaining vitality in the current round as the string together head in the next round, which not only improves the vitality efficiency and prolongs the lifetime of the network, but also uniformly distributes the vitality consumption of each node and approaches the death time of each node, thus improving the accuracy of the collected data. Comparatively speaking, project-basisd learning relies on project-basisd problems, emphasizing students' study and discovery in learning style, and gaining rational conclusions in learning results. Project-basisd learning relies on project-basisd problems, emphasizes students' exploration and creation in learning style, and emphasizes getting practical works in learning results. As a study field of machine learning, PROFUNDA has attracted more and more attention in recent years, and many scholars have done extensive study on PROFUNDA . PROFUNDA has accumulated a large number of study achievements in the cognitive dimension of learning, and it shows more and more study trends of learning contextualization and cultural orientation. At the same time, from the perspective of complex learning environment, PROFUNDA supported by technology and its evaluation, especially the performance evaluation of PROFUNDA supported by technology, will further fit the connotation of PROFUNDA and help teaching implementation and evaluation.

References

[1] Zhang Q,Yang L T,Chen Z. A survey on PROFUNDA for big data[J]. Information Fusion, 2018, 42(3):146-157.
[2] Zhang Q S,Zhu S C . Visual interpretability for PROFUNDA :a survey[J]. Frontier of Information and Electronic Engineering: English Version, 2018, 019(001):27-39.
[3] KT Schütt, Sauceda H E,Kindermans P J. SchNet – A PROFUNDA architecture for molecules and materials[J]. Journal of Chemical Physics, 2018, 148(24):241722.
[4] Voulodimos A,Doulamis N,Doulamis A. PROFUNDA for Computer Vision: A Brief Review[J]. Computational Intelligence and Neuroscience, 2018, 2018(4):1-13.
[5] Young T,Hazarika D,Poria S. Recent Trends in PROFUNDA Basisd Natural Language Processing [Review Article][J]. IEEE Computational Intelligence Magazine, 2018, 13(3):55-75.
[6] Jia L . Distributed vitality balance Choice way algorithm for radio transducer network basisd on multi-attribute decision-making[J]. Sustainable Vitality Technologies and Assessments, 2021, 45(3):101192.
[7] Ag A,Sh A,Skd B . Distributed on-demand string togethering algorithm for lifetime optimization in radio transducer the Internet[J]. Journal of Parallel and Distributed Calculate, 2020, 141(2):129-142.
[8] Mohamed A,Saber W,Elnahry I. Coyote Optimization Basisd on a Fuzzy Logic Algorithm for Vitality-Efficiency in Radio Transducer The Internet[J]. IEEE Access, 2020, 8(3):185816-185829.
[9] Yuvaraj P,Manimozhi M . Vitality-efficient string togethering algorithm for structured radio transducer the Internet[J]. Iet The Internet, 2018, 7(4):265-272.
[10] Feng X,Zhang H . An Adaptive String together-Heads Rotating Algorithm for the String togethering Choice way in Radio Transducer The Internet[J]. Chinese Journal of Transducers and Actuators, 2018, 31(6):949-956.