READING REPORT 3

On the Origin of Deep Learning

UNIVERSITY: University of North Texas
NAME: Sandeep Mandalapu

INFO 5082 Section 020 - Seminar in Research and Research Methodology

DATE: oct 16,2022

On the Origin of Deep Learning

Summary:

In the paper "On the Origin of Deep Learning" is about the deep history of deep learning models which starts from different generations and a complete background of deep learning

Extensive outline:

There are different milestones in the development of the deep learning which starts from the 300 BC in the study of neural network later on this model was developed by different contributors who works on the development of the brain cells and by the end of the century they have proposed a complete deep learning methods.In the beginning they divided into four different major elements that still impacts on DL they are Contiguity, Frequency, Similarity and Contrast.

Convolution Neural Networks(CNN) is one of the deep learning technique used for solving different higher level vision problems which has inspired by the visual cortex. Recurrent Neural Network(RNN) is also a effective DL model which works on the time series. It will collect the parts of different data together using conditional random field. There is an another important model which helps in the development of the Deep learning models that is Optimization of neural networks which refers to constructive network approaches. Out of all there is an another model which is used in detection of instructions i.e., Self-taught Learning (STL)(Sun, W., & Alam, M. 2016)methodology divides the process into few steps. A first Unsupervised Learning which represents features from a vast amount of untagged data .Second stage involves using the newly learned representation to perform the classification problem on labeled data . However, both the labeled and unlabeled data may come from many distributions, but there must be some connection between them.

Limitations and Extensions:

Out of all other machine learning techniques deep learning has its own importance in terms of performance and execution .Every high level analytical problems like image classification and detection were solve using this effective deep learning techniques.

Opinion:

In my opinion, deep learning has a long evolution than any other modern techniques this evolution has different stages where different implementations has taken place. Out of all deep learning technique I prefer CNN as best model in terms of performance.

References:

Javaid, A., Niyaz, Q., Sun, W., & Alam, M. (2016, May). A deep learning approach for network intrusion detection system. In *Proceedings of the 9th EAI International Conference on Bio-inspired Information and Communications Technologies (formerly BIONETICS)* (pp. 21-26).

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A Survey on Deep Transfer Learning

UNIVERSITY: University of North Texas
NAME: Sandeep Mandalapu

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A Survey on Deep Transfer Learning

Summary:

Deep learning is one of the high level machine learning algorithm than any other traditional models. Insufficiency of training data is one of the major problem in the deep learning model to overcome this problem we use Deep Transfer Learning. Where we make different assumptions to overcome this problem.

Extensive outline:

Deep transfer learning knowledge is transferred from source to target by assumption relaxation of both the train and test data. By using neural networks deep transfer learning is categorized into four different techniques they are instances, mapping, network and adversarial based models. In instance based model it used weight adjustment strategy between source and target domain where some instances of source domain is used by target domain. Coming to the second method which maps the source and target data and creates a new data space filled with elaborated elements. In the network based deep transfer learning model reuses the network in the source domain and transfers to target domain as like the neural network. In adversarial based transfer learning used GAN(generative adversarial nets). Here it creates an adversarial layer and filled with the extracted features from the source and target domains. In deep transfer learning we have two types of methodology Homogeneous transfer learning which works for big-data applications. Heterogeneous transfer learning is the scenario where the source and target domains are represented in different feature spaces(Weiss, K., Khoshgoftaar 2016).

Limitations and Extensions:

Deep transfer learning is mostly applicable for image classification where large data is required to analyze and also we can extract features directly from images than manual as traditional machine learning model .By using CNN we can perform tasks on the high level data which can not processed in the traditional models.

Opinion:

In my opinion the author has assumption on the deep transfer learning is correct and I think we can overcome all the problems in the deep learning by using deep transfer learning model.

References:

Weiss, K., Khoshgoftaar, T. M., & Wang, D. (2016). A survey of transfer learning. *Journal of Big data*, *3*(1), 1-40.

Thank You