International Journal of Swarm Intelligence and Evolutionary Computation

OPEN ACCESS Freely available online

Editorial

Introduction to Deep Learning

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DESCRIPTION

Deep learning is an artificial intelligence (AI) function that imitates the workings of the human brain in processing data and creating patterns for use in decision making. Deep learning is a subset of machine learning in artificial intelligence that has networks capable of learning unsupervised from data that is unstructured or unlabeled and it also known as deep neural learning or deep neural network.

Deep learning has evolved hand-in-hand with the digital era, which has brought about an explosion of data in all forms and from every region of the world. This data, known simply as big data, is drawn from sources like social media, internet search engines, e-commerce platforms, and online cinemas, among others. This enormous amount of data is readily accessible and can be shared through fintech applications like cloud computing.

However, the data, which normally is unstructured, is so vast that it could take decades for humans to comprehend it and extract relevant information. Companies realize the incredible potential that can result from unravelling this wealth of information and are increasingly adapting to AI systems for automated support.

DEEP LEARNING METHODS

Various methods can be used to create strong deep learning models. These techniques include learning rate decay, transfer learning, training from scratch and dropout.

Learning rate decay

The learning rate is a hyper parameter is a factor that defines the system or set conditions for its operation prior to the learning process that controls how much change the model experiences in response to the estimated error every time the model weights are altered. Learning rates that are too high may result in unstable training processes or the learning of a suboptimal set of weights. Learning rates that are too small may produce a lengthy training process that has the potential to get stuck.

The learning rate decay method also called learning rate annealing or adaptive learning rates is the process of adapting the learning rate to increase performance and reduce training time. The easiest and most common adaptations of learning rate during training include techniques to reduce the learning rate over time.

Transfer learning

This process involves perfecting a previously trained model; it requires an interface to the internals of a preexisting network. First, users feed the existing network new data containing previously unknown classifications. Once adjustments are made to the network, new tasks can be performed with more specific categorizing abilities. This method has the advantage of requiring much less data than others, thus reducing computation time to minutes or hours.

Training from scratch

This method requires a developer to collect a large labeled data set and configure a network architecture that can learn the features and model. This technique is especially useful for new applications, as well as applications with a large number of output categories. However, overall, it is a less common approach, as it requires inordinate amounts of data, causing training to take days or weeks.

Dropout

This method attempts to solve the problem of overfitting in networks with large amounts of parameters by randomly dropping units and their connections from the neural network during training. It has been proven that the dropout method can improve the performance of neural networks on supervised learning tasks in areas such as speech recognition, document classification and computational biology.

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Received date: June 4, 2021; **Accepted date:** June 18, 2021; **Published date:** June 25, 2021

Citation: Mohammad I (2021) Introduction to Deep Learning. Int J Swarm Evol Comput.10: e225