

Distributed Artificial Neural Network Training With Multi-Agent Technology



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MSc in Artificial Intelligence

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Declaration

I declare that this dissertation does not incorporate, without acknowledgment, any material previously submitted for a Degree or a Diploma in any University and to the best of my knowledge and belief, it does not contain any material previously published or written by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and summary to be made available to outside organization.

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Abstract

With the growth of e-commerce, the size of available data has grown to an incalculable level. It has been an excellent opportunity for companies to leverage those data to derive intelligent information. However, limiting factor is the inability of traditional learning algorithms to process such a large dataset within a reasonable time. Moreover, the data in the e-commerce domain contains many unstructured and unreliable data sources. As a result, the databases are filled with noisy data. On the other hand, the traditional methods do not perform well on noisy data. In order to overcome this problem, distributed machine-learning techniques are becoming ever more popular within the research communities. In this project, multi-agent based distributed computing environment has used for segmenting consumers using Artificial Neural Network (ANN) on e-commerce dataset. Hopfield Neural Network model has used to cluster the customer base in a perspective of marketing segmentation. Data clustering mechanism is implemented with multi-agent technologies on distributed environment. The data partitioning techniques such as modular base approaches have used to process the ANN on distributed computing nodes. Further, multiple outputs are generated by different processing nodes have aggregated by querying the nearest cluster centroid for the given node. The application tasks such as data partitioning, consumer clustering, result combining and, etc. have implemented as agents. Further, the clustering agents are implemented to utilize the capability of heterogeneous computing environment, which has GPU and CPU. Due to the platform independent nature on multi-agent systems, the application can be deployed on a workstation that has various hardware and software configurations while utilizing either GPU or CPU for data computation.

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