

## Chapter 3

# Neural Network for Big Data Sets

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### ABSTRACT

*Machine learning (ML), neural network (NN), evolutionary algorithm (EA), fuzzy systems (FSs), as well as computer science have been very famous and very significant for many years. They have been applied to many different areas. They have contributed much to developments of many large-scale corporations, massive organizations, etc. Lots of information and massive data sets (MDSs) have been generated from these big corporations, organizations, etc. These big data sets (BDSs) have been the challenges of many commercial applications, researches, etc. Therefore, there have been many algorithms of the ML, the NN, the EA, the FSs, as well as computer science which have been developed to handle these massive data sets successfully. To support for this process, the authors have displayed all the possible algorithms of the NN for the large-scale data sets (LSDSs) successfully in this chapter. Finally, they have presented a novel model of the NN for the BDS in a sequential environment (SE) and a distributed network environment (DNE).*

### INTRODUCTION

We have already considered where many big data sets (BDSs) have been generated from. We have already found that: Many large-scale corporations, big organizations, and etc. have been created, built and developed more and more for many years in the world from that lots of economies of countries in the world have been developed in the strongest way for the recent years. Each massive corporation (each large-scale organization, and etc.) has had thousands of branches in the countries in the world. Each branch has had thousands of employee certainly. Therefore, the big corporation could have had millions of the employees in the countries in the world. From its business process, many massive data sets (MDSs) have

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already been generated from the millions of the employees, and etc. certainly. Many hard problems and challenges have been generated and grown from which a lot. For example, these negative problems have been as follows: What are the problems? How to store the MDSs? How to handle the large-scale data sets (LSDSs)? How to extract many helpful values from the BDSs? Whether to necessarily save them or not? Where to store them? Whether to save them for a long time or not? Whether to necessarily store them for a long time or not? Whether to necessarily process them or not? Whether to successfully handle them or not? How long time to process them? How long time to handle them successfully? Whether to extract their significant values? Whether to get successfully their helpful values? And etc.

Besides, many different fields of the computer science have already been developed in the strongest way in the world. These fields such as machine learning (ML), neural network (NN), evolutionary algorithm (EA), fuzzy systems (FSs), and etc. have been very useful for many fields of everyone's life. Their algorithms, methods, models, and etc. have successfully been built, and in addition, they have also been applied to the BDSs. Thus, we have presented many simple concepts of the ML, the NN, the EA, the FSs, and etc. in this book chapter. In addition, we have also displayed a novel model of the NN for handling the LSDSs successfully.

According to our opinion, ML is a sub-area of the AI of the computer science which uses many statistical techniques to allow computers to be the ability to learn with data sets. The ML is also a method of data analysis which automates analytical model building. It is based on the idea which computer systems can learn from many data sets, identify many patterns, and make many decisions with minimal human intervention

NN based on our opinion is a computing system which is similar to the biological neural networks which constitute human brains. It comprises a set of connected units or nodes (called neural network) which look like the neurons in a biological brain. One connection looks like the synapses in a biological brain which can transmit a signal from one neuron to another. Then, one neuron can receive a signal which can process it and in addition, signal additional neurons connected to it.

According to our opinion, EA is a subset of evolutionary computation which is a type of meta-heuristic optimization algorithm. Many mechanisms inspired by biological evolution can be used by the EA as follows: reproduction, mutation, recombination, and selection. Many approximating solutions to all types of problems are often implemented well by the EAs

FS based on our opinion is a control system according to a fuzzy logic (a math system) which can analyze analog input values in terms of logical variables which take many values between 0 and 1.

We have found why these problems and challenges are important.

1. According to our opinion and the reviews which we have already referenced, these large-scale data sets have been needed to store certainly and successfully. Moreover, they must be saved in a time-saving way. Many reasons for these are as follows:
  - a. The big data sets of the massive corporations, large-scale organizations, and etc. have been protected surely. If the massive data do not store surely, they are stolen. Thus, the secrets of the corporations, organizations, and etc. can be exploited for many bad purposes. In addition, the corporations, organizations, and etc. can be crashed.
  - b. They must be stored regularly and fully: When there have any incidents, they can be rehabilitated surely.
  - c. They must be backed up regularly and fully: When there have any incidents, they can be rehabilitated surely.

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