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Improved Power Factor of Electrical Generation by using Clustering Neural Network

Afaf Ahmed Abed

Technical Institute of Babylon, Al-Furat Al-Awsat Technical University, Kufa/ Iraq.

Abstract-:

This paper offers a process to develop power factor of electrical generation system by mechanically controlling a power system. This presented method of enhancing is based on an clustering neural network. Consequently the CNN achieves sufficiently both quick and sluggish varying load. Normally the presentation of this suggested method was very acceptable to improve power system station as results to optimize power factor robotically. The simulation results have more features with CNN as compared with conventional power factor.

Keywords: active power, reactive power, ; clustering neural network; apparent power; electrical generation system.

INTRODUCTION

In electrical power systems, the power factor improvement is particularly important because it has helped the increased efficiency of power transformer. If the ability to supply power to the load of the transformer is almost full, it will not be able to supply power to the increases electrical load, even if electric power of modifier that is used is not yet full. The power factor development will result in recover the ability and efficiency of the transformer and decrease electric current although consuming the same quantity of power, subsequent in lower cost [1-6]. There are numerous methods to progress the power factor, for example static compensator, fixed shunt capacitor banks [2-4]. The power factor improvement with capacitor bank is found extensively in the manufacturing. Synchronous motor can be enhanced power factor suggestively for the system with simple controlling [5].

Many proposed method used artificial intelligence to c1assifying the system by feed forward neural network [7-8]. However for the ANN adaptive PI controller, their oscillation is far improved, because the proportional (Kp) and the integral (Ki) gains are adjusted instantly by the artificial neural network [9-11].

The power factor is the ratio of the real power with respect to the apparent power in the circuit. When the voltage and current waveforms are not in the same phase means that power factor is less than one [12- 20]. The nonlinear loads causes the distortion wave form of voltage and current at load and the apparent power is bigger than the real power [21-31].

The electrical current is inversely proportional with power factor which mean that low power factor, the system draw high current and will lead the losses is very high which causes the system with low efficiency [32-39]. The aim of active or passive power factor regulation is to stabilize the system performance and to increase the power efficiency [40-41].

MATERIALS AND METHODS

In this develop paper, the power factor is used to minimize the power losses via clustering neural network by increasing the value of power factor, and the losses is decreased to improve the system. The simulation method can be shown in figure 1.

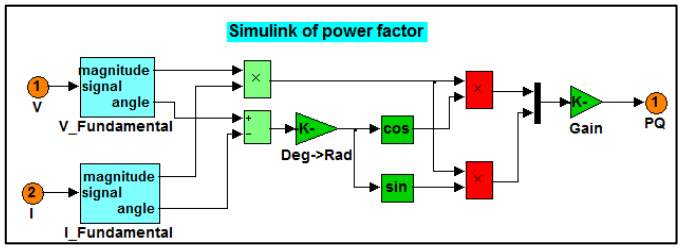


Figure 1: Simulink of power factor

The Clustering of neural network CNN will choice data, generate and training the system, and estimate the performance of this network by using a variability of tools.

Therefore, the SOM neighbour weight distance, and SOM weight position are more synchronized as shown in figure 2 and 3, respectively.

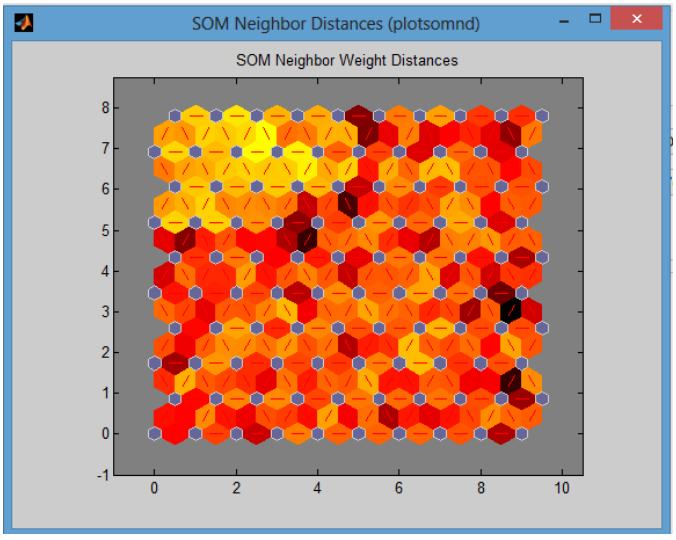


Figure 2: SOM neighbour weight distance.

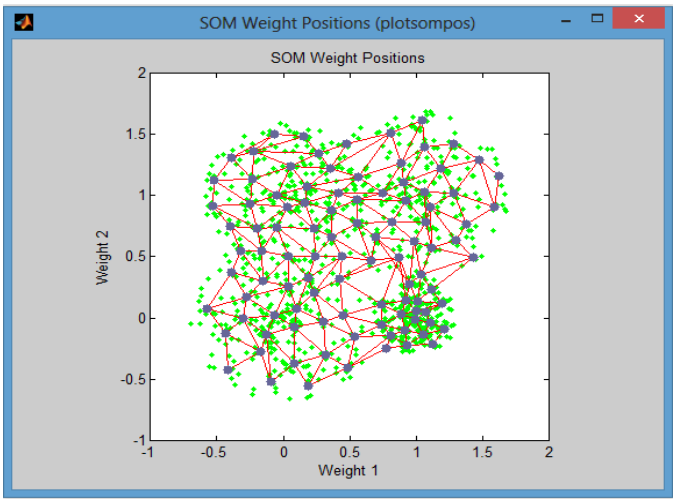


Figure 3: The SOM weight position.

The network is trained and learning with the SOM layer is shown in figure 4. Here, it can be seen that the system is called unsupervised system because the learning is executed by its self in iteration number 200 at time 4 second.

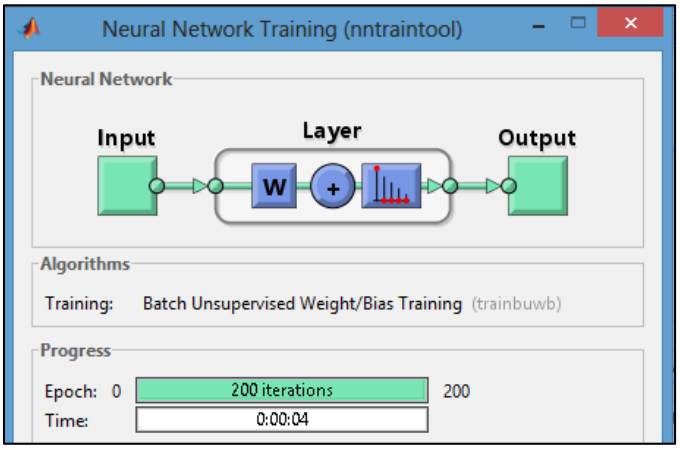
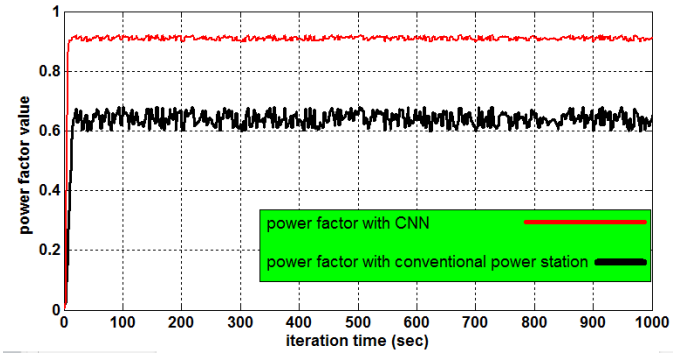


Figure 4: The training behaviour of CNN algorithm

Furthermore, the power factor performance based on CNN is shown in figure 5 which is more sufficient and better than the power factor of the conventional electrical generation system



CONCLUSION

The power system station is enhanced by CNN technique, and the identification of system has been obtainable in this suggested paper. The simulation results presented that the CNN system has the capability to achieve in the target conditions. In the traditional power generation system, the power factor value is low and has ripple while power factor based CNN is almost equal to one with low distortion behaviour. The power station via CNN is prospective method to enhance and control power factor value.

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