COMPARISON BETWEEN LEVENBERG-MARQUARDT AND SCALED CONJUGATE GRADIENT TRAINING ALGORITHMS FOR IONOSPHERE CONDITION USING MULTILAYER PERCEPTRONS.

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ABSTRACT

Ionosphere is one of layer at Earth's atmosphere. Ionosphere can be described a many layer and have own functional of systems at atmosphere. This paper described the examinations of two training algorithms which are Levenberg-Marquardt (LM) and Scaled Conjugate Gradient (SCG) of Multilayer Perceptrons (MLPs) using MATLAB R2009a. Based on the result, there are concluded that both algorithms were comparable in terms of accuracy and speed. However, the SCG algorithm has shown better advantage in terms of accuracy and speed on the best MLP structure (with 25 hidden units). Ionosphere has a tendency to change due to the influence from the solar activity, which make it important to study the ionosphere layer. Ionosphere has the important effects on the propagation of radio waves links between satellite and ground stations, telecommunications, and guidance and surveillance radars. There are primarily three distinct layers in the ionosphere as like D, E and F layer. Each of the layers has its own significance to the ionosphere. This project described the F2 layer is suitable for high frequency (HF) radar. The F2 region is the most important region for HF radio propagation because it is present 24 hours of the day, high altitude the longest communications paths and reflects the highest frequencies in the HF range. This research also described the design of classification of radar returns from the ionosphere that have been investigated using Neural Network.

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CHAPTER 1

INTRODUCTION

1.1   PROBLEM STATEMENT

In recently the ionosphere is most important in real communication and human being. Ionosphere is the uppermost part of the atmosphere, distinguished from other layers because due to ionization characteristics done by solar radiation. It plays an important part in atmospheric electricity and forms the inner edge of the magnetosphere. It has practical importance because, among other functions, it influences radio the propagation to the distant places on the Earth. The radar data is obtained from John Hopkins university ionosphere database [1]. In this researches, an examination of two popular training algorithms (Levenberg-Marquardt and Scaled Conjugate Gradient) were presented for Multilayer Perceptron (MLP) simulated of received signals. The performance of the training algorithms was tested using the ionosphere database [1]. collected by a system in Goose Bay, Labrador, which consists of a phased array of 16 high-frequency antennas with a total transmitted power on the order of 6.4 kW. The targets were free electrons in the ionosphere. The targets were free electrons in the ionosphere. The database consists of features such as bad and good conditions. The Ionosphere Database has been extensively used in literature as a benchmark for testing the performances of various classification algorithms [12, 13, 16, 17].