Chapter 1

Introduction

1.1 Motivation

Linking seismic horizon from seismogram is an important task in geophysical data analysis. There exists a considerable amount of work in this area. Huang has used several neural network models to solve seismic horizon linking problem [1], [2]. Faraklioti had use line detection methods to link seismic horizon [3].

From a seismogram, we find out a seismic horizon is composed of peaks. These peaks are considered as several broken line segments. Hence, we regard the seismic horizon linking problem as a line linking problem. In this thesis, we propose two connectionist models for line linking and apply these models on seismic horizon linking. In the first model, each processing element interacts with its eight neighbors. In another model, each processing element interacts over a large neighborhood. After linking process, we want to find out all groups of peaks which composed of every linked pattern. Each group of peaks represents a seismic horizon.

1.2 Structure of the thesis

This thesis contains four major chapters. In chapter 2, the first connectionist model with 1-neighborhood for line linking is presented. It includes a concept of overall methodology, network architecture and two experiments. In chapter 3, two connectionist models with large neighborhood for edge and line linking is presented. It also includes introduction, network architecture and experiments. The seismic horizon linking is presented in chapter 4 which including seismogram preprocessing, pattern search method and experiments for simulated and real seismic data. Finally, we compare the results of two models for line linking on seismic horizon linking problem in chapter 5.