CS4013/5013 Assignment 2

Fall 2025

Colby Frison — OUID: 113568816

Task 1: Hill Climbing Local Search Algorithm

(1) Figure 2: Error vs Search Round

The following figure shows the convergence of the hill climbing local search algorithm. The x-axis represents the search round and the y-axis represents the error $er(w)$.

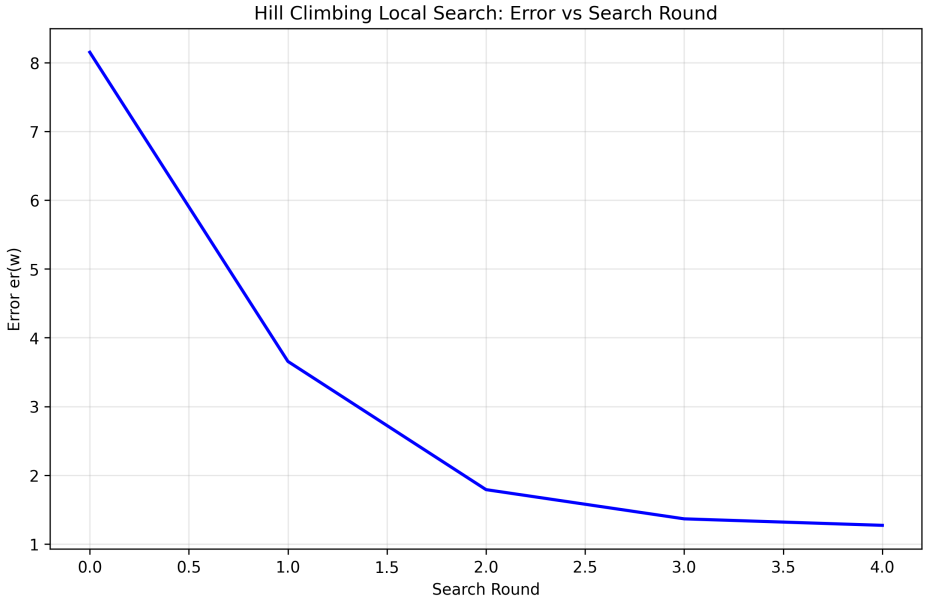

Figure 1: Error $er(w)$ versus search round for hill climbing local search algorithm

(2) Optimal Solution

The optimal weight vector w and corresponding error $er(w)$ returned by the hill climbing local search algorithm are:

$$w = [1, -1, 1, -1, 1, 1] \tag{3}$$

$$er(w) = 1.2713864306784661 \tag{4}$$

Task 2: Genetic Algorithm

(3) Figure 3: Error vs Generation

The following figure shows the convergence of the genetic algorithm across generations. The x-axis represents the generation number and the y-axis represents the error $er(w)$.

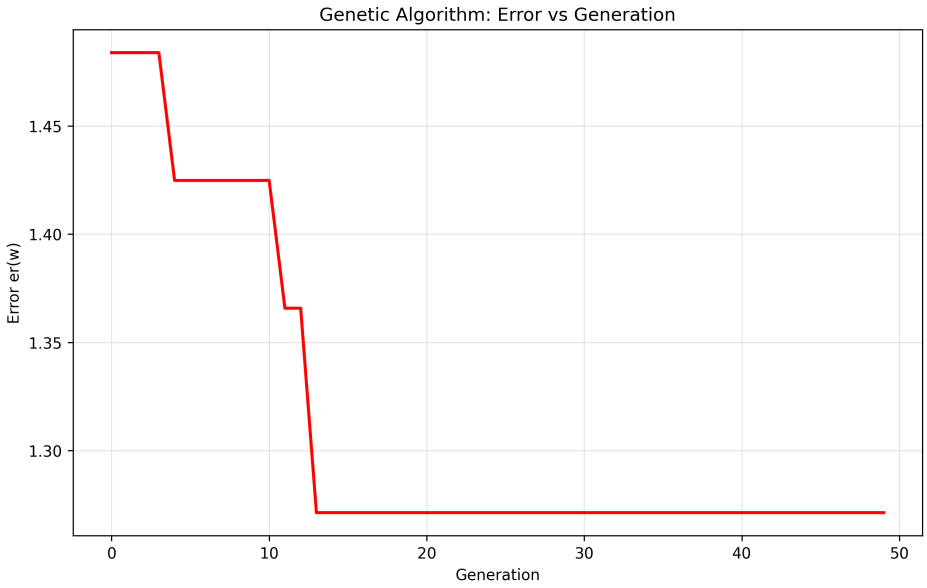

Figure 2: Error $er(w)$ versus generation for genetic algorithm

(4) Optimal Solution

The optimal weight vector w and corresponding error $er(w)$ returned by the genetic algorithm are:

$$w = [1, -1, 1, -1, 1, 1] \tag{8}$$

$$er(w) = 1.2713864306784661 \tag{9}$$