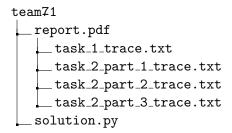
MDL Assignment-3

Vikrant Dewangan, Roll No.- 2018111024 Mohammad Nomaan Qureshi, Roll No.- 2018111027

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1 File Structure



2 Problem Statement

Given coefficients of vectors corresponding to over-fit model, apply Genetic Algorithm (G.A) to reduce over-fitting.

Input:

$$\begin{split} \bar{v}_{overfit} &= [-0.00016927573251173823, 0.0010953590656607808, \\ &0.003731869524518327, 0.08922889556431182, \\ &0.03587507175384199, -0.0015634754169704097, \\ &- 7.439827367266828e - 05, 3.7168210026033343e - 06, \\ &1.555252501348866e - 08, -2.2215895929103804e - 09, \\ &2.306783174308054e - 11] \end{split}$$

Given a query server to allow for submission of weights (w_i) , the following is returned for each query -

$$M.S.E = \frac{\sum_{x \in data} (y - f(x))^{2}}{N}$$

where f(x) is calculated using the weights submitted $[w_1, w_2 \dots w_{10}]$ -

$$f(x) = \sum_{i=1}^{10} w_i \cdot x_i$$

Output: A set of weights $[w_1, w_2 \dots w_{10}]$ corresponding to best-fit under the conditions-

$$|w_i| \le 10$$

3 Algorithm Definition

Genetic Algorithm consists of 4 steps -

- 1. **Initialisation of Population**: Each generation contains 5 vectors.
- 2. Fitness Function
- 3. Selection
- 4. Reproduction
- 5. Convergence