SHAMANTH- K. MURTHY

I N D E 3

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Teacher's Date Page S. No. Title Sign / No. Remarks 24/10/24 Genetic Algaithm 07/11/24 Particle Swam 14/11/24 And Colony 4 21/11/24 Cuckoo Search 5 28/11/24 G Rey Wolf Optimizer 18/12/24 Parallel Cellular 7 18/10/04 Optimization via gene Expression

1) Genetic Algorithm

The has a population where each individual supresents a possible solution of a given problem.

It is based on Darwin's evolution ideas where each individual is considered as a chromosome and each bit as a character & random mutations or crossovers are done to find the best fit wolution.

Application: complex optimization publims like traveling valuman, neural network et.

2) Pso

This algorithm is based on cooperative behaviou.

animals like brids, ants or fish, by imitating

Their collective behaviour.

-> It consists a particles representing a wolution to a problem. These explore the volution space by adjusting based on experience & success of others.

Applications: Newal network training, alistic bution.

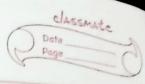
3) And Colony Optimization.

shortest path between good assure & nest & adapting to change in environment.

The three main school used are preference be pathy with high phenomene level, higher rate of growth of amount of phenomene on whothe gath, tead.

mediated wolution among anti.

All and construct a solution & then phenomore trails are updated baxal on the quality of solutions found.



-> genetic algorithm ()

Anitialize population (size, max, min)

Jar i in xange (size)

p1, p2 = exclude posents (population)

child = crossover (p1, p2)

child = mutate (child, max, min)

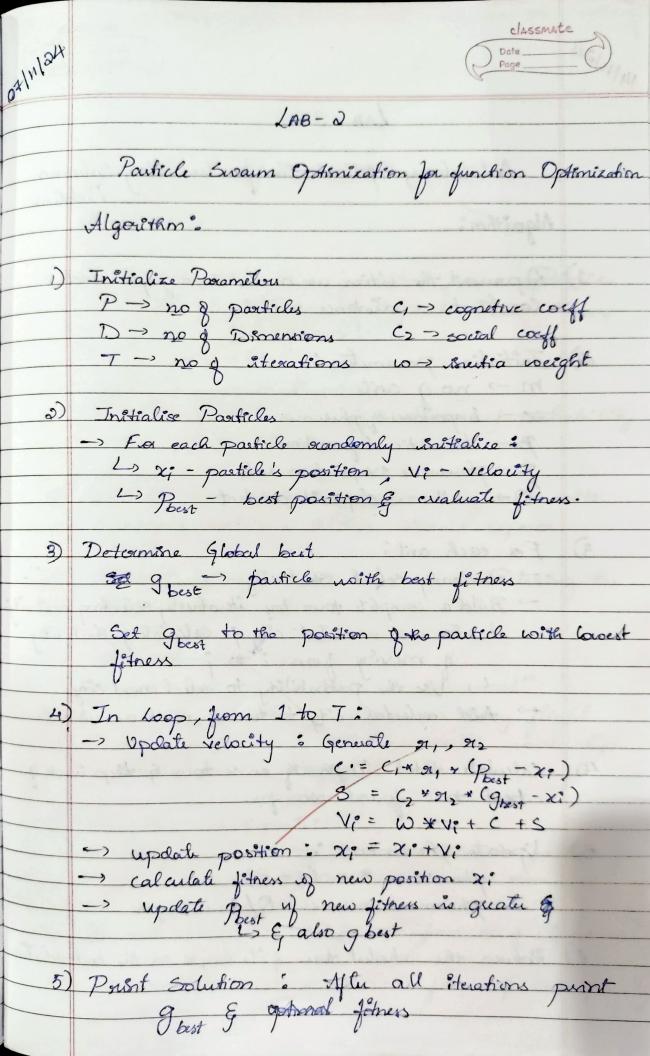
neur population apprend (child)

but solution = population [np. asg max (fines(ppulat))]

setun but solution, fitnes (but solution)

Best x: -9.9130010 Maximum (x): 98.0725)

Joseph Jan



LAB-3

Ant Colony Optimization for Travelling Saluran Problem Algorithm:

- 1) Represent the cities as nocles in a graph and construct a distance matrix
- D) Initialize parameter: m -> no g ants & -> importance of phenomene B-> hervistic information P -> pheromone evaporation rate Q-) " deposit constant
- 3) For each ant:

 - -> Randomly select start city

 -> Build a complete town by iteratively sclecting next is

 L.> For each unvisited city; calculate perhability

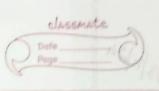
 a moving from i to;

 L.> Use the probability to select next city

 -> Add relected city to tow & mark as visited.
- 4) Calculate total length is each town & keep trackif best town found so far.
- 5) Update Theromones:

 Thurmones * = (1-9)

 Thurmone-melease = Q/4bur-length
 - 6) Retween the shortest town & its length as the best adult



LAB-4

Cuckoo Search

Algorithm:

- 1) Define the dojective function f(x) to extirmize f bounds of search space χ_{min} , χ_{max} .
- Initialize parameters:

 n -> no g nests Pa -> discovery perhability

 max no g i terations
- 3) Generale an initial propulation of nests with random positions within search space.
- 4) Evaluate fitness withen of each nest using the objective function.
- 5) Generale new solutions:

 -> For each nest, generale new cool?

 Xnew = Xmen + step size × Levy fleght

 -> Levy flight is a random walk with step

 sizes from a Lévy distribution.
 - 6) Abandon coorst nuts:

 -> Using probability Pa, abandon a faction of worst nest & replace with new ones.
 - 7) Repeat osteps 4-6 for osperified no gituations
- 2) Retwen the nest with best fitners & coxusponchy

no d cells, guid size, dimensions, bounds

3) Initialize population with unitial positions of all cells

Evaluate Fitness for each cell & put it into

5) Identify the neighbours using Moore neighbourhood

6) Updale each cell's solate by copying the position of its best neighbour

7) Main/Algorithmi: Punt the best solution & its fitness.

5) for dx on [-1, 0, 1]:

for dy on [-1, 0, 1]:

of dx == 0 and dy == 0:

continue.

nx, ny = (x+dx) 1. gord or.
neighbours. append (nx* gord ozetny)

18/19/24 LAB-7 Optimization via Gene Expression Algorithm Algorithm: 1) Define the objective function $f(x) = \sum x_i^2$ D) Initialize parameters:

no of genes bounds mutation rate
crossover rate, no of generations 3) Generate a population P with G genes each χ_{ℓ}^{j} - jth gene of ith sodividual 4) Evaluate fitners using the objective function (cx) 5) & Fi(ter the population with lower fitner values 6) Choose two paints at a time & perform 7) Introdue variability in Afspring by randomly aftering gives. 8) Combine the offeroungs to the new population 9) Output the genetic sequence with two best