Cuckoo search

cuckoo search is based on the algorithm that some species of cuckoo lay their eggs in other birds nest to increase their chance of survival. They do this by using an algorithm called levy flights which helps them to find solution space. here eggs refer to solutions and nests refer to solution space

Application

The application used here is health care industry where the main goal to minimize patient time and maximize resources

implement Traffic management

Pseudocode:

step 1: Initialise random values

function cuckoosearch(num_nests, nests)

num_nests = initialise (nests)

step 2: We initialise the first solution as the best solution then we keep on checking if that solution improves

step 3: Run the loop for multiple times

for iterations in max iterations

we have to check if the new solution found is better than the previous solution

if &fitness(new solution) > fitness(previous solution)

best_solution = new solution

step 4: we evaluate the fitness

step 5: we keep running this for many iterations and In the final tenth iteration we update the best solution

→ minimise travel time of traffic congestion

→ traffic lights - result

traffic lights / shorter travel time

→ Just like cuckoo after changing traffic light timings - we check if new set of timings is better

Time Complexity

Best case is when initial solution is close to optimal solution

T: no of iteration — O(T×N×D)

N: population size — O(50×10×3)

D: number of intersections — = O(1,500)

When all signal timings are 0 seconds

Worst case: when all signal timings are 60 seconds

It is when there are all possible iterations done but still not able to find a good solution, when there is a highest possible travel time

if there are 5 intersections

then worst case is 300 seconds

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