### **Main Components:**

1. policy(state, info, eval\_mode, params)

A handcrafted policy that:

- Locates the lane in a 13x13 grid.
- Steers towards the closest lane center.
- Adjusts acceleration based on how straight the road looks.
- If eval\_mode=True, loads optimized parameters from cmaes\_params.json (currently unused in logic).

# 2. fitness(params)

Runs the policy on **3 tracks**, returns **negative total distance covered** as the fitness value (CMA-ES minimizes this, hence the negative).

#### call cma()

Runs CMA-ES for a specified number of generations and population size. Trains the parameters to **maximize total distance covered**.

#### 4. main block:

- --train: Runs call\_cma() and saves best policy parameters to cmaes\_params.json.
- --eval: Loads the trained policy and runs it on all tracks, printing metrics.
- --render: Optionally records videos of the runs.

## **Notes:**

- The policy is **heuristic-based**, with room to actually use params (currently they're loaded in eval but not used).
  - cmaes\_params.json is the output of training and input for evaluation.