

Attachment: pseudocode implementing the proposed optimization method

CLASS problem

FUNCTION cost_Function_Evaluation (parametersList1)

Forward collision warning, Low visibility, Low audibility, Driver impairment, D,
OP*, LQue , Driver eyes of the road = parametersList1

$k = (\text{Forward collision warning} * 1000) + (\text{Low visibility} * 10) + (\text{Low audibility} * 2) + (\text{Driver impairment} * 20) + (\text{Driver eyes of the road} * 10)$

Comment "evaluates two cost functions f1 and f2 as follows"

$f1 = (\text{forward collision warning} * 1000) + ((k) * (\text{round}(x[1]) * D * 2)) + ((k) * (\text{round}(x[2]) * OP1 * 1.5)) + ((k) * (\text{round}(x[3]) * OP2 * 1)) + ((k) * (\text{round}(x[4]) * OP3 * 2))$

$f2 = (\cos(x[1]) * 5) + (\cos(x[2]) * 4) + (\cos(x[3]) * 3) + (\cos((x[4])) * 2) + (LQue * 2 * ((\cos(x[1]) * 2) + (\cos(x[2]) * 2) + (\cos(x[3]) * 1.5) + (\cos(x[4]) * 1)))$

$g1 = (f1 - 1000) * \text{Forward collision warning}$

out1 = [f1,f2]

out2 = [g1]

END FUNCTION

END Class

Comment "NSGA2 and get_termination are used from optimization library"

algorithm = NSGA2(

pop_size=1000,

n_offsprings=800,

sampling=RandomSelection,

crossover=SBX,

mutation=PolynomialMutation,

eliminate_duplicates=True

)

termination = get_termination("n_gen", 40)

FUNCTION run_optimisation (parametersList1)

Result = Optimize (problem(parametersList1) , algorithm, termination, seed = 1)

END FUNCTION

Combination = listOfAllCombination (forward collision warning, Low visibility, Low audibility,
Driver impairment, IDriver eyes of the road, State of the queue, D, OP1, OP2, OP3)

FOR i = Combination[0] till Combination[end]

ResultLog = run_optimisation(i)

ENDFOR