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Kelas : A

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Tugas 1 !!!

Membuat Program Algoritma Genetika menggunakan MATLAB

Penyelesaian :

Program Algoritma Genetika dalam MATLAB

1. Calculate\_fitness.m

function fitness = Calculate\_fitness(gen,target)

fitness = (sum(target == gen)/length(target))\*100;

end

1. Create\_gen.m

function gen = Create\_gen(panjang\_gen)

random\_number = randi([32,126],1,panjang\_gen);

gen = char(random\_number);

end

1. Create\_population.m

function populasi = Create\_population(target,besar\_populasi)

populasi = struct();

for i=1:besar\_populasi

gen = Create\_gen(length(target));

populasi(i).gen = gen;

populasi(i).fitness = Calculate\_fitness(gen,target);

end

end

1. Selection.m

function [best1, best2] = Selection(populasi)

fitness\_data = zeros(1,length(populasi));

for i=1:length(populasi)

fitness\_data(i) = populasi(i).fitness;

end

[~,index] = max(fitness\_data);

parent1 = populasi(index);

populasi(index) = [];

fitness\_data(index) = [];

[~,index] = max(fitness\_data);

parent2 = populasi(index);

best1 = parent1;

best2 = parent2;

end

1. Crossover.m

function [child1,child2] = Crossover(parent1,parent2)

child1 = parent1;

child2 = parent2;

% crossover point

CP = round(length(parent1.gen)/2);

child1.gen(1:CP) = parent2.gen(1:CP);

child2.gen(1:CP) = parent1.gen(1:CP);

end

1. Mutation.m

function mutant = Mutation(child,laju\_mutasi)

mutant = child;

for i=1:length(mutant.gen)

if rand <= laju\_mutasi

mutant.gen(i) = char(randi([32,126]));

end

end

end

1. Regeneration.m

function new\_populasi = Regeneration(children,populasi)

fitness = zeros(1,length(populasi));

for i=1:length(fitness)

fitness(i) = populasi(i).fitness;

end

% kita remove berdasarkan fitness paling minimum

for i=1:length(children)

[~,index] = min(fitness);

populasi(index) = [];

fitness(index) = [];

end

% add member

for i=1:length(children)

n = length(populasi) + 1;

populasi(n) = children(i);

end

new\_populasi = populasi;

end

1. Termination.m

function [isLooping,solusi] = Termination(populasi)

[the\_best\_solution,~] = Selection(populasi);

if the\_best\_solution.fitness == 100

isLooping = false;

disp('ketemu jawabannya');

else

isLooping = true;

end

solusi = the\_best\_solution;

end

1. Loging.m

function Logging(populasi,target,solusi,generasi)

clc

fprintf('target : %s \n', target);

fprintf('solusi : %s \n', solusi.gen);

fprintf('generasi : %d \n', generasi);

for i=1:length(populasi)

fprintf('gen : %s |', populasi(i).gen);

fprintf('fitness : %f', populasi(i).fitness);

fprintf('\n');

end

end

1. SimpleGA.m

function [solusi,generasi] = SimpleGA(target,besar\_populasi,laju\_mutasi)

populasi = Create\_population(target,besar\_populasi);

isLooping = true;

generasi = 0;

while isLooping

% individu terbaik

[parent1,parent2] = Selection(populasi);

% crossover

[child1,child2] = Crossover(parent1,parent2);

% mutai

mutant1 = Mutation(child1,laju\_mutasi);

mutant2 = Mutation(child2,laju\_mutasi);

% hitung fitness mutant

mutant1.fitness = Calculate\_fitness(mutant1.gen,target);

mutant2.fitness = Calculate\_fitness(mutant2.gen,target);

% calon anggota

children = [mutant1, mutant2];

populasi = Regeneration(children, populasi);

generasi = generasi + 1;

%terminasi

[isLooping,solusi] = Termination(populasi);

Logging(populasi,target,solusi,generasi);

%isLooping = false

end

end

1. Main.m

clear

clc

target = 'wirosableng';

besar\_populasi = 10;

laju\_mutasi = 0.1;

[solusi,generasi] = SimpleGA(target,besar\_populasi,laju\_mutasi);

Hasil Running Program Algoritma Genetika dalam MATLAB

target : wirosableng

solusi : wirosableng

generasi : 1272

gen : wirosaVleng |fitness : 90.909091

gen : wirosAbleng |fitness : 90.909091

gen : wirosAbleng |fitness : 90.909091

gen : wirosAbleng |fitness : 90.909091

gen : wirosubleng |fitness : 90.909091

gen : wirosHbleng |fitness : 90.909091

gen : wiros7bleng |fitness : 90.909091

gen : wirosable5g |fitness : 90.909091

gen : wirosableng |fitness : 100.000000

gen : wirosJVleag |fitness : 72.727273

>> solusi,generasi

solusi =

gen: 'wirosableng'

fitness: 100

generasi =

1272

