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Opgave om Genetiske Algoritmer.

Sila.

Exercise – Healthcare & Genetiske Algoritmer.

In groups of 2- 3.

Case:

by Michael Allen.

A real-life example in healthcare is that the array of 0s and 1s may represents the choices of closed or open hospital units providing a given service. We then evaluate each solution against predetermined criteria.

Here we will define a known solution based on a string of 70 0s or 1s. The number of possible combinations for this is 2^70, or 1.2 x 10^21 – that is 1 followed by twenty one zeros. Or, to put it another way (as these large numbers are difficult to imagine) ..... the universe is about 15 billion (15 x 10^9) years old, or 5 x 10^17 seconds old. If we could evaluate 1,000 solutions per second, then a computer would need to run for twice the current age of the universe in order to evaluate all possible combinations. Let's see how close to the perfect solution we can get in reasonable time!

In GA we will call each potential solution to be evaluated a 'chromsome'. Each element (a 0 or 1) in that chromsome is a 'gene'.

Se filen HealthcareModellingGA (Canvas) for en nærmere beskrivelse af problematikken.

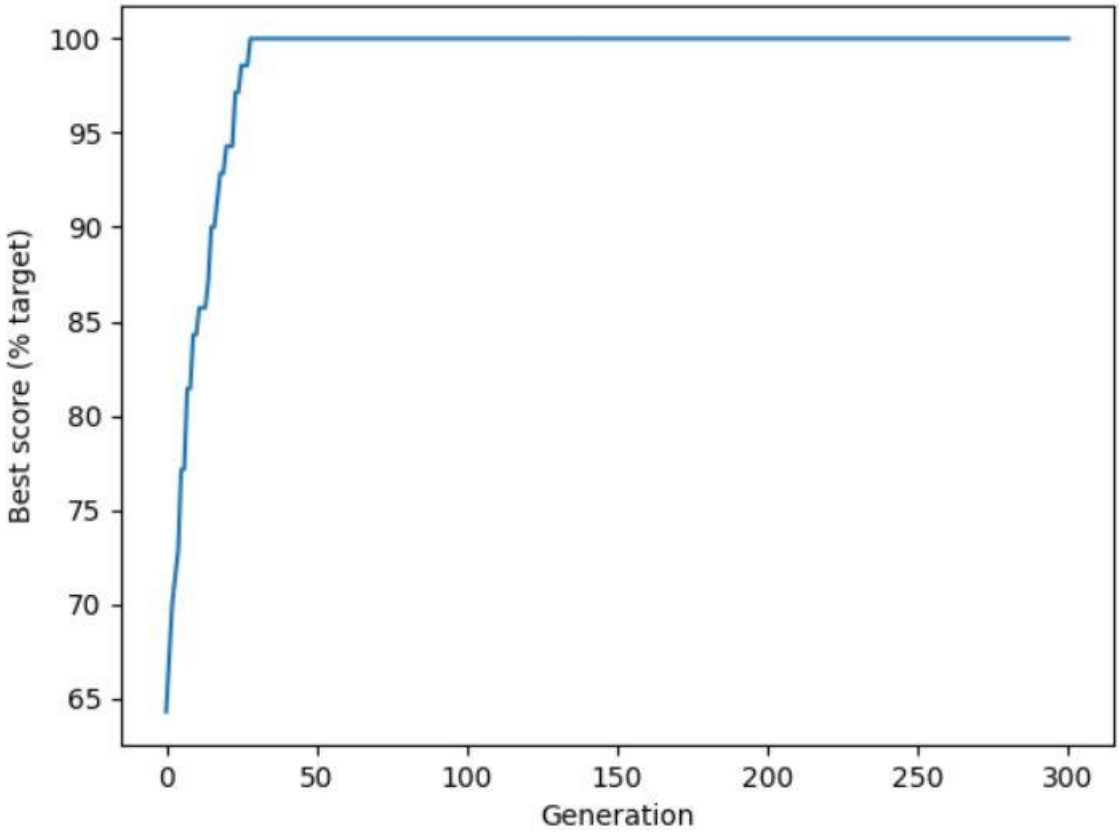
Opgave

På baggrund eksempel kode i filen HealthcareGA.py – skal vi se på en case med 2000 hospital units.

- Lav en ændring i koden for at understøtte det.
- Eksperimenter med mutation rates, størrelse af population, og antal generationer for at finde en god løsning.

Run:

Run for 70 units – 300 generationer.



Run for 2000 units – 30000 generationer.

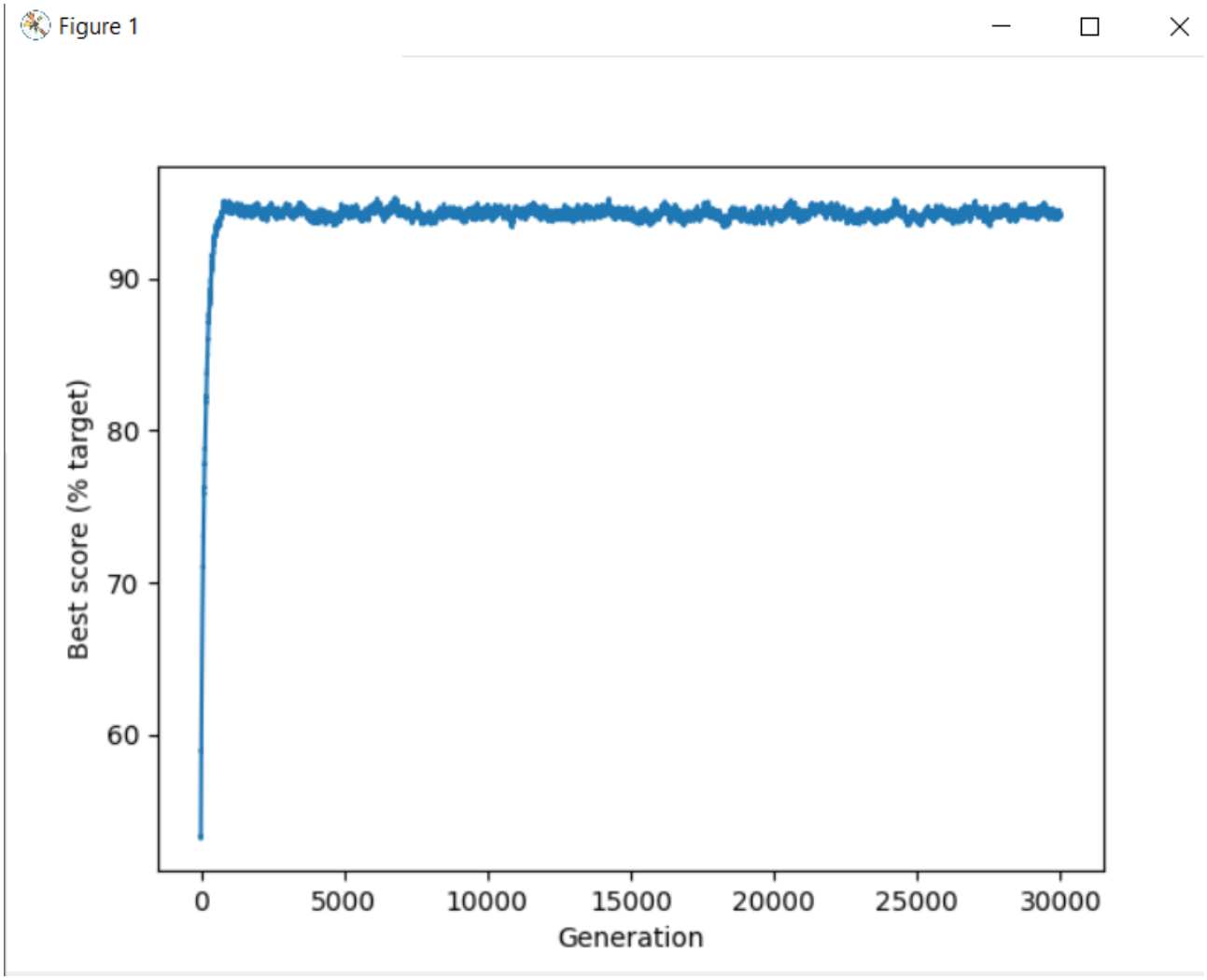


Figure 1
Best score (% target)
90
80
70
60
0
5000
10000
15000
20000
25000
30000
Generation