demo-03_selection

December 14, 2020

1 Analiza i projektiranje računalom - 4. laboratorijska vježba: demo selection.py

1.1 Priprema za izvođenje

[1]:
```
import os

CD_KEY = "--HW04_D03_IN_ROOT"
```

[2]:
```
if (
    CD_KEY not in os.environ
    or os.environ[CD_KEY] is None
    or len(os.environ[CD_KEY]) == 0
    or os.environ[CD_KEY] == "false"
):
    %cd ..
else:
    print(os.getcwd())

os.environ[CD_KEY] = "true"
```

```
/mnt/data/projekti/faks/AIPR/dz/dz-04
```

1.2 Učitavanje paketa

[3]:
```
import numpy as np

from src.evolution.function import Function
from src.evolution.population import Population
from src.evolution.selection import TournamentSelection
```

1.3 Inicijalizacija

1.3.1 Formatiranje

[4]:
```
np.set_printoptions(precision=2, suppress=True)
```

1.3.2 Konstante

[5]:
```
wellness_function = Function(lambda x: np.mean(np.square(x)))

capacity = 10

tournament_sizes = (3, 5)
winner_counts = (2, 3)
```

1.3.3 Populacije

[6]:
```
population = Population(
    wellness_function=wellness_function,
    capacity=capacity
)
population.invade(np.random.uniform(-1, 1, (capacity, 3)))
```

1.3.4 Selekcije

[7]:
```
selections = [
    TournamentSelection(
        tournament_size=tournament_size,
        n_winners=n_winners,
    )
    for tournament_size in tournament_sizes
    for n_winners in winner_counts
]
```

1.4 Demonstracija

[8]:
```
print(population)
```

```
Population (10 / 10)
        [0.3555822999384026] [-0.1   0.3  -0.98]
        [0.28879528109863156] [ 0.59  0.65 -0.3 ]
        [0.2730715321927454] [-0.79  0.32 -0.31]
        [0.23083907844681703] [0.25 0.65 0.45]
        [0.21880765382593237] [-0.26  0.71 -0.29]
        [0.18536949859960483] [ 0.73 -0.15  0.05]
        [0.12007485899453436] [0.6  0.03 0.06]
        [0.06480918913974147] [0.38 0.23 0.02]
        [0.056507752725287935] [-0.17  0.35  0.14]
        [0.053983651403370726] [-0.23 -0.27 -0.2 ]
```

[9]:
```
for selection in selections:
    print(selection)
```

```
    participants, winners = selection(
        population=population
    )

    print(f"\tParticipants: {participants}")
    for x in population[participants]:
        print(f"\t\t{x}")

    print(f"\tWinners: {winners}")
    for x in population[winners]:
        print(f"\t\t{x}")

    print()
```

```
TournamentSelection (3-tournament, 2 win)
        Participants: [2 3 6]
                [0.2730715321927454] [-0.79  0.32 -0.31]
                [0.23083907844681703] [0.25 0.65 0.45]
                [0.12007485899453436] [0.6  0.03 0.06]
        Winners: [2 3]
                [0.2730715321927454] [-0.79  0.32 -0.31]
                [0.23083907844681703] [0.25 0.65 0.45]

TournamentSelection (3-tournament, 3 win)
        Participants: [3 4 9]
                [0.23083907844681703] [0.25 0.65 0.45]
                [0.21880765382593237] [-0.26  0.71 -0.29]
                [0.053983651403370726] [-0.23 -0.27 -0.2 ]
        Winners: [3 4 9]
                [0.23083907844681703] [0.25 0.65 0.45]
                [0.21880765382593237] [-0.26  0.71 -0.29]
                [0.053983651403370726] [-0.23 -0.27 -0.2 ]

TournamentSelection (5-tournament, 2 win)
        Participants: [1 2 4 6 9]
                [0.28879528109863156] [ 0.59  0.65 -0.3 ]
                [0.2730715321927454] [-0.79  0.32 -0.31]
                [0.21880765382593237] [-0.26  0.71 -0.29]
                [0.12007485899453436] [0.6  0.03 0.06]
                [0.053983651403370726] [-0.23 -0.27 -0.2 ]
        Winners: [1 2]
                [0.28879528109863156] [ 0.59  0.65 -0.3 ]
                [0.2730715321927454] [-0.79  0.32 -0.31]

TournamentSelection (5-tournament, 3 win)
        Participants: [4 5 6 8 9]
```

```
        [0.21880765382593237] [-0.26  0.71 -0.29]
        [0.18536949859960483] [ 0.73 -0.15  0.05]
        [0.12007485899453436] [0.6  0.03 0.06]
        [0.056507752725287935] [-0.17  0.35  0.14]
        [0.053983651403370726] [-0.23 -0.27 -0.2 ]
Winners: [4 5 6]
        [0.21880765382593237] [-0.26  0.71 -0.29]
        [0.18536949859960483] [ 0.73 -0.15  0.05]
        [0.12007485899453436] [0.6  0.03 0.06]
```