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FACULTY OF EGINEERING AND TECHNOLOGY

Soft Computing

LECTURE -21

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OUTLINE

- Evolutionary Computation
- Implementation of SA
- Advantages of Simulated Annealing
- Algorithm Overview
- References

Evolutionary Computation

❑Evolutionary computation is another field, that is strongly inspired by nature (see Artificial Intelligence: Genetic Programming). This field was pioneered independently in the 1960s by Fogel et al. 1966, Holland 1975, Rechenberg 1973.

❑Rechenberg used evolutionary strategies to develop highly optimized devices, such as irregularly shaped reduction pieces for pipes, e.g., for an air conditioning system, which proved to have a lower air flow resistance than ordinary reduction pieces.

❑In evolutionary computation, the process of natural evolution is used as a role model for a strategy for finding optimal or near optimal solutions for a given problem.

Evolutionary Computation Operation

- Encoding/Decoding

$$x_i = x_i^- + (x_i^+ - x_i^-)\ \frac{1}{2^{l_i} - 1}\ \left(\sum_{j=0}^{l_i - 1} s_j 2^j \right).$$

- Selection/Reproduction

✓ Sampling Mechanism

$$P_i = \frac{f(\mathbf{x}_i)}{\sum_{i=1}^{N_p} f(\mathbf{x}_i)}, \qquad i = 1, 2, \ldots, N_p.$$

✓ Replacement Strategy

- Crossover
- Mutation

MULTIPLE CHOICE QUESTION

1. What is the dominant modality for communication between humans?

a) Hear

b) Speech

c) Smell

d) None of the mentioned

2. What kind of signal is used in speech recognition?

a) Electromagnetic signal

b) Electric signal

c) Acoustic signal

d) Radar

3. What is viewed as problem of probabilistic inference?

a) Speech recognition

b) Speaking

c) Hearing

d) Utterance

View Answer

4. Which specifies the prior probability of each utterance?

a) Sound model

b) Model

c) Language model

d) All of the mentioned

5. Which model gives the probability of each word following each other word?

a) Bigram model

b) Diagram model

c) Gram model

d) Speech model

REFERENCES

- https://www.hindawi.com/journals/acisc/2011/938240/