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FACULTY OF ENGINEERING AND TECHNOLOGY

Soft Computing

LECTURE -21

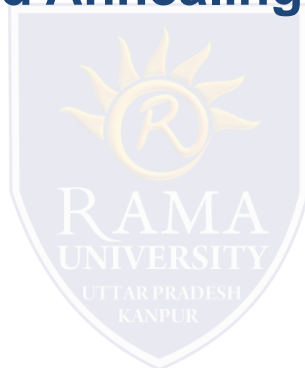
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OUTLINE

- **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



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

- ✓ 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

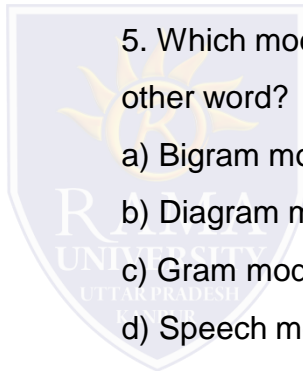
[View Answer](#)

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/>

