

Introduction

* Explain Concept of Computational Approach.

⇒ Computational approach is provides different techniques and methodologies to solve the any type of the problem.

Computation is a process of calculating a problem using the some steps or algorithm.

$$x \Rightarrow Y = f(x) \Rightarrow Y$$

Here, x is a some Input or Problem that can be solve using the $f(x)$ function or algorithm that can give the output Y .

There are Two types of Computation Approach.

- ci) Soft Computing
- cii) Hard Computing

Computational Approach

Hard

Computing

Precise Model

Soft

Computing

Imprecise Model

(i) Hard Computing:

Hard Computing provides the precise model or precise solution of every problem.

Every Hard Computing Problem needs exactly Mathematical or Analytical Model for the solve the Problem.

This Computing is always provides accurate solution and always work with exacte data.

Every Hard Computing Problem required coded program and more computation time.

Ex. Hard Computing use in every searching, Sorting and Integration Problem.

cii) Soft Computing:

Soft Computing provides the imprecise model or solution for every problem.

Every Soft Computing problem is solve using the formal logic and Probabilistic Model.

This computing is always provides ~~un~~ accurate solution and always work with noisy data or Ambiguous data.

Soft Computing problem always provides approximate solution.

Every Soft Computing Problem is emerge its own program to solve the problem.

Ex. Soft Computing is always use in Kitchen Appliances and Robotic work.

* Explain Difference Between Soft Computing and Hard Computing.

⇒	Soft Computing	Hard Computing
1	Soft Computing Provides imprecise Model	Hard Computing provides precise Model.
2	Soft Computing Problem is solve using the Formal Logic and Probabilistic Model.	Hard Computing problem is solve using the Mathematical or Analytical Model.
3	Always works on Ambigues or Noisy data.	Always works on exact data.
4	Used to perform Parallel Computations	Used to perform Sequential Computations.
5	Always gives approximate results.	Always gives Accurate results
6	Write its own Program.	Required coded Program.
Ex.	Use in kitchen Appliances	Use in Searching, Sorting.

* Explain Requirements of Soft Computing.

⇒ This is the main Requirements of Soft Computing.

a) Dealing with Uncertainty:

Soft Computing does not use conventional and Mathematical Model. So, It is well-suited for Real-world Problem.

b Approximate Reasoning:

Soft Computing is use Neural Network and Fuzzy logic. So, It can work on uncertain information.

c Handling Complex Systems:

Soft Computing can dealing with Complex system that can not have mathematical model.

d Parallel and Distributed Processing:

Soft Computing method can use Parallel computing which is suitable for solving large-scale

problems.

e Robustness and Fault Tolerance:

Soft Computing method can be use input data that may be noisy or prone to errors.

f Learning:

Soft Computing methods Neural Networks and Evolutionary algorithm have ability to learn from the data.

g Mapping:

Soft Computing can provides the human mapping features which is not possible using the Hard Computing.

h Adaptability:

Soft Computing methods algorithm can adapt the new things using the data.

* Write Application of Soft Computing.

=> This are the Basic Application of Soft Computing.

1 Pattern Recognition and Image Processing:

Soft Computing method such as Neural Network help in Pattern Recognition or Facial recognition and Image classification.

2 Data Mining:

Soft Computing tools like Neural Networks and genetic algorithm are employed in data mining to discover patterns.

3 Optimization Problems:

Soft Computing techniques like all the algorithm are effective in solving optimization problem.

4 Robotics:

Soft Computing is applied in robotics for tasks such as path planning and object recognition.

5 Natural Language Processing:

Soft Computing Method are Used in NLP For Language Translation and speech recognition.

6 Financial Forecasting and Trading:

Soft Computing method is use to analyzing market Trends, predicating stocks etc.

7 Biomedical Applications:

Soft Computing is applied in healthcare for processing and Interpreting medical data.

8 Adaptive Systems:

Soft Computing method are used to create Adaptive System that can learn over the time using the past data.

9 Kitchen Appliances:

Soft Computing is also used to create the kitchen appliances like Microwaves, Fridge etc.

10 Gaming:

Soft Computing method and algorithm is used to create a Gaming product like Poker and checker.