Evolutionary Learning → as a powerful approach

→ It is a subset of ML.

→ It is based on the concept of Biological evolution.

→ It uses evolutionary algorithm.

→ It is especially used when:

- Data is incomplete.
- Solution is complex

→ It is an optimization technique.

→ Finds best solutions.

→ Works like natural evolution (Darwin's theory)

Algorithms used in EL:

- Genetic Algorithm
- Genetic Programming
- Evolution Strategies ⇒ works well with complex.

⇒ It is expensive

Real-world applications

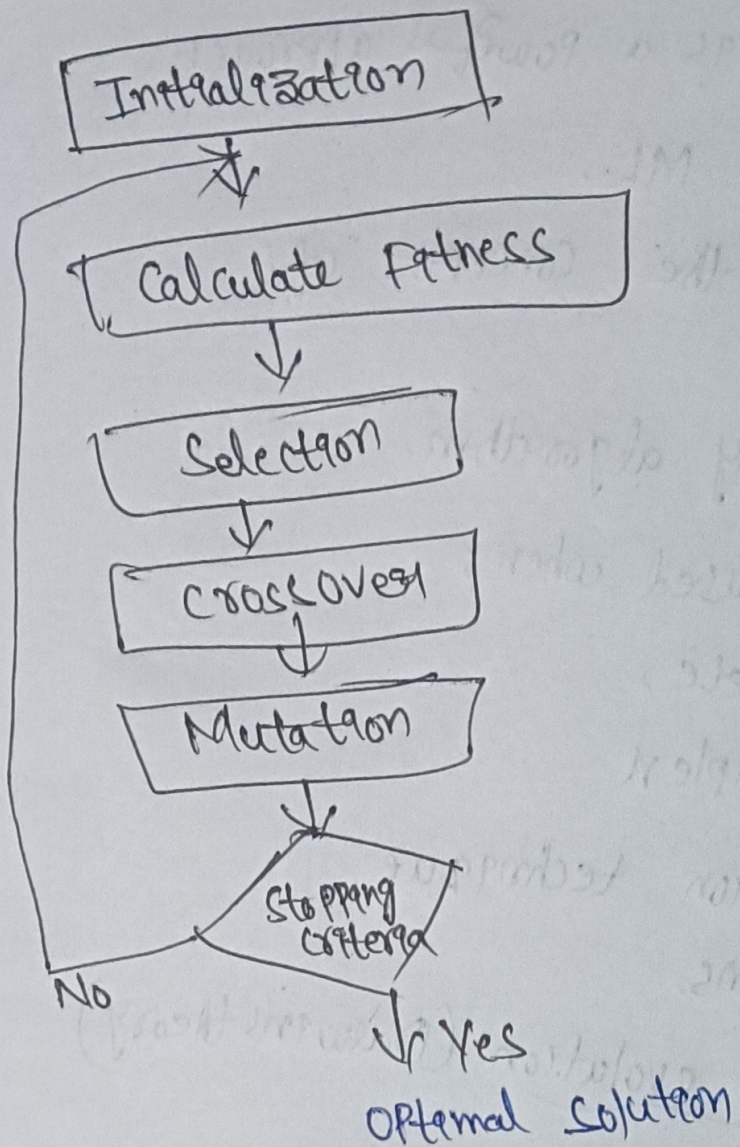
- Robotics
- Game Playing AI

Genetic Algorithm

→ It is an optimization technique.
→ used to find optimal solutions to complex problems.
→ It is inspired by natural evolution.
⇒ they belong to evolutionary Algorithms
⇒ It is adaptive, heuristic
⇒ It is based on genetics & natural selection,
⇒ used to generate high quality solution for an optimization problem.

Operations of Genetic Algorithm

1. Selection
2. Crossover
3. Mutation
4. Encoding


Initialization
Calculate Fitness
Selection
Crossover
Mutation
Stopping criteria
No
Yes
Optimal solution

* Isomap

→ Isomap stands for Isometric mapping.

→ It is a non-linear dimensionality reduction technique.

→ Same as MDS.

→ It is widely used method.

→ It is a dimensionality reduction method.

→ It is an extension of MDS (Multidimensional Scaling)

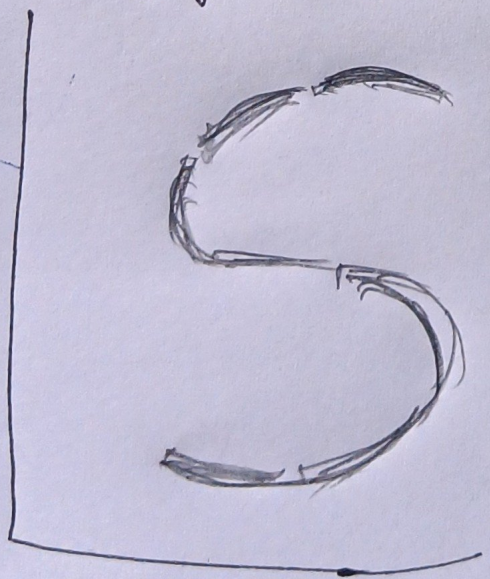
→ It helps in reducing high-dimensional data into low-dimensions (HD - low dimension)
(like 2D or 3D)

Why use?

→ To visualize complex data in 2D or 3D.

→ To handle non-linear DS.

Original 3D Data



Reduced 2D Data