Genetic Algorithms

St. Joseph's University, Bengaluru

ML 2 BDA3321

Representing Hypothesis

Hypothesis are represented using bit string.

Example 1

If the attribute "Outlook" can take three values:
{Sunny, Overcast, Rainy}
$(0, 1, 0)$ represents Overcast.
$(1, 1, 0)$ represents Sunny or Overcast

Example 2

Consider a second attribute "Wind" which can the value:
{Strong, Weak}
Then in conjuction with example above $(0, 1, 1, 1, 0)$ represents
Outlook is overcast or rainy or Wind is strong.

Examples

Example 3

Rule Post condition can be represented similarly. Take the examples in slide 2. Then *If Wind = Strong, then play tennis* can be represented as:

$$(1, 1, 1, 1, 0, 1, 0)$$

Hypothesis in GAs

What does $(1, 1, 1, 0, 1, 1, 1)$ represent?

Genetic Operators

These are rules that operate on the hypothesis in order to produce new hypothesis.

Crossover operator

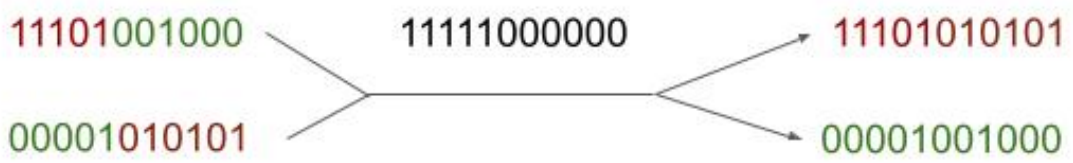
This produces two new offsprings from two parents, by copying selected bits from each parent.

Crossover mask

The choice of which parent contributes the bit for position i is decided by an additional string, called the crossover mask.

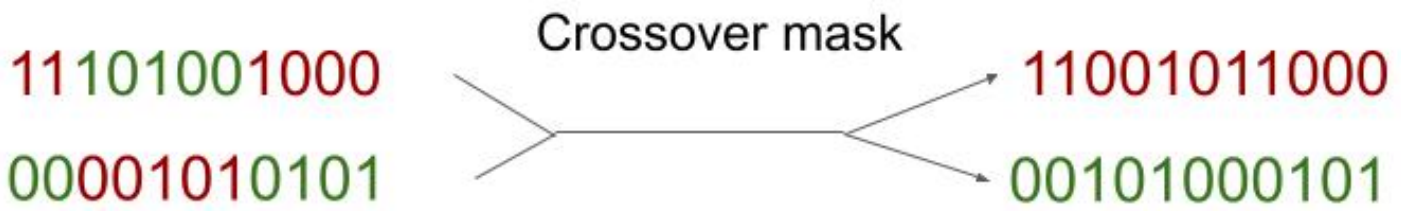
Crossover Operator

Single Point Crossover



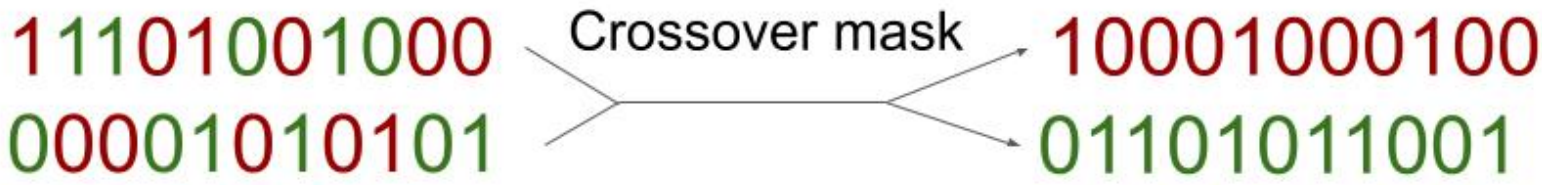
Crossover Operator

Two Point Crossover



Crossover Operator

Uniform Crossover



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