Genetic Algorithm in Optimization of Events

Choosing the right parameter values for machine learning tasks is a challenge. Some results can be bad not because the data is noisy or the learning algorithm is weak, but because of incorrect selection of border values. This article provides a brief introduction to evolutionary algorithms (EAs) and describes a genetic algorithm (GA) that is one of the simplest random EAs.

Example:

Suppose a data scientist has an image database divided into multiple classes and an image separator will be created. After a data scientist researched the database, the k nearest neighbor to K (KNN) seems to be the best option. To use the KNN algorithm, there is a key K parameter you can use that is K. Suppose the first number 3 is selected. The scientist begins the learning process of the KNN algorithm with K = 3 selected. The professional model produced has reached the division of 85%. Are those percentages acceptable? Alternatively, can we get a better class accuracy than we have achieved now? We cannot say that 85% is the best accuracy to reach until different tests are done. But to do some testing, we must definitely change something in the test such as changing the K value used in the KNN algorithm. We cannot say that 3 is the best value you can use in this study unless you are trying to use different K values and note how class accuracy differs. The question is "how can you find the best K value that increases performance by categories?" This is what is called optimization.

For optimal use, we start with some sort of initial number of variables used in the test. Because these numbers may not be the best you can use, we should change them until we find the best ones. In some cases, these values are generated by complex tasks that we cannot easily solve. But it is very important to do the right thing because the classification may reflect the inaccuracy of the class not because, for example, the data has no sound or the learning algorithm is weak but because of the incorrect selection of the initial learning parameters.

Effective strategies are divided into four main categories:

- Constrained Optimization
- Multimodal Optimization
- Multiobjective Optimization
- Combinatorial Optimization