Evolutionary harmonization

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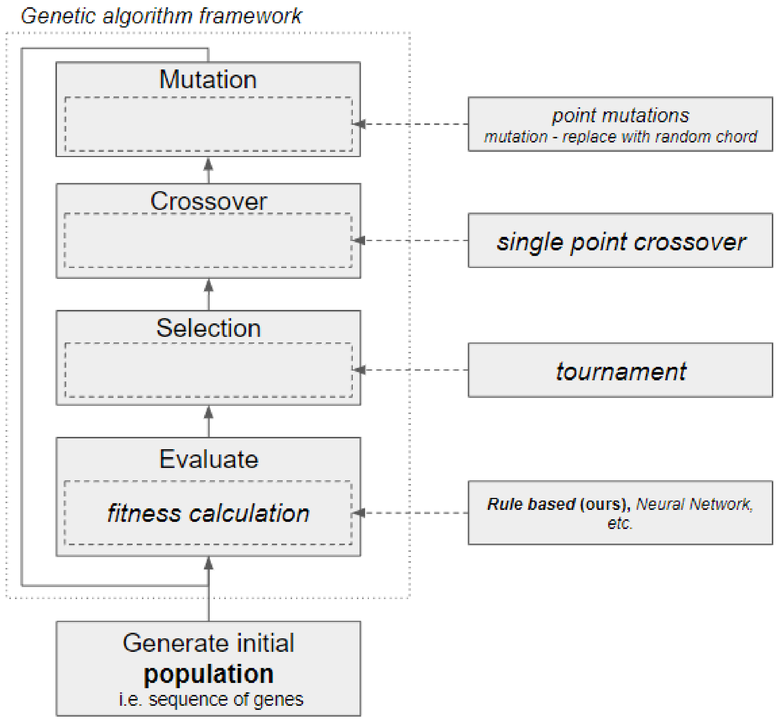
Introduction

Genetic algorithms (GA) can be applied to a lot of different tasks. Mostly we have seen them take on picture generation, solving the traveling salesman problem and so on. As GA concept is easy to understand, we can implement the basics with a small effort. GA itself follows the **processes happening in the nature** and within ourselves. The main process that is definitive is the **survival of the fittest**. Similarly to individuals in the nature, we pit the instances that we have in the population against each other, measure their fitness and decide **which instances** will **produce a better solution** going forward.

Our idea was to apply the GA mindset to the **world of music**. Even in that ambiguous world, there are a lot of rules. Those rules were made by deciding which sound frequencies together make sense and are enjoyable to the human brain. In addition, we have rules that indicate which sequences of these sound frequencies are well-formed and not chaotic, so that the brain can sense some kind of familiar pattern.

The specific task we wanted to solve was to generate a **logical chord progression to a given melody**. A gene in our case is a sequence of chords.

Algorithm



Results

For testing, we chose a short example of the public domain song **"Happy birthday"**. We took the first 5 bars of the song and gave the melody as an input to the algorithm. We ran the algorithm for **500 epochs** and generated an **almost exactly the same chord progression** as the original chord progression, a logical procession, ending in dominant and tonic. The example can be seen on the right.