0.0.1 Results

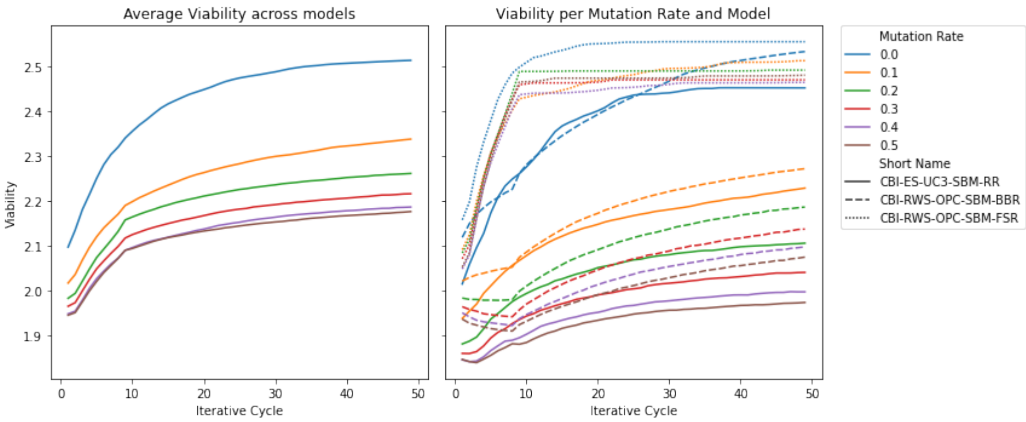

Figure 1: This figure shows the viability for each model and mutation rate per iterative cycle. The first plot shows the average across models. The second figure shows the same information per model. The x-axis shows how the viability evolves for each evolutionary cycle. The color indicates the mutation rate. The line-type marks each model tested.

As we can see in Figure 1, that a mutation rate of 0 yields better results on average. Suggesting that mutating the children might impede the model. For model-configurations that use the Fittest-Survivor-Recombination we observe a sharp apattern of convergence before the 10th iterative cycle.

Figure 2 reveals the reason for this behavior. In all plots of a shapr change right before the 10th iterative cycle. However, the feasibility measure also displays a sudden stop of improvement for all mutation rates except 0.0 and 0.4. These exceptions also change their rate of growth, but improve shortly after the 30th iterative cycle. The figure also shows that a mutation rate of 0.2 reaches the highest feasibility among the other edit rates. However, after 48 cycles the mutation rate 0.0 overtakes 0.2.

0.0.2 Discussion

While it is expected, that every rate-configuration eventually converges towards an optimal value, it remains surprising that most rate-configurations suddenly converge around the 10 iteration. There are a multitude of possible reasons for this phenomenon. As the viability measure incorporates structural information and event-related information, we assume that the algorithm focuses on finding a structural optimum first.

Hence, the algorithm first prioritizes finding the best sequence in terms of activities. After finding a activity sequence, the model mostly focuses on improving the event attributes. Another explanation could be the ratio

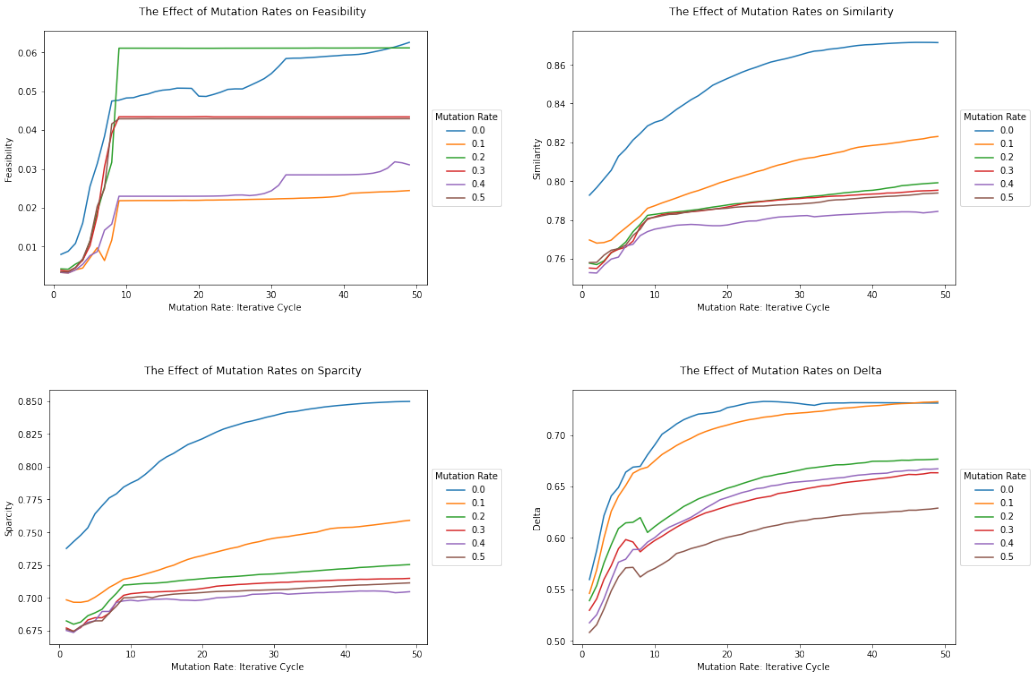

Figure 2: Shows all components of the viability measure.

between the number of generated children and the population threshold. In this experiment, we generated 200 new children while limiting the population size to 1000.

With these observations in mind, we choose to set the mutation rate to 0.01. This decision implicates that mutations occur very rarely. Therefore, the main driving force for finding the best counterfactual is now the crossing operation. With this setting, we maintain the models ability to improve beyond [50]th iterative cycle.