

Figure 1 displays the results of running each algorithm on a set of different datasets. The figure shows clear dominance of the evolutionary model all the models across all datasets.

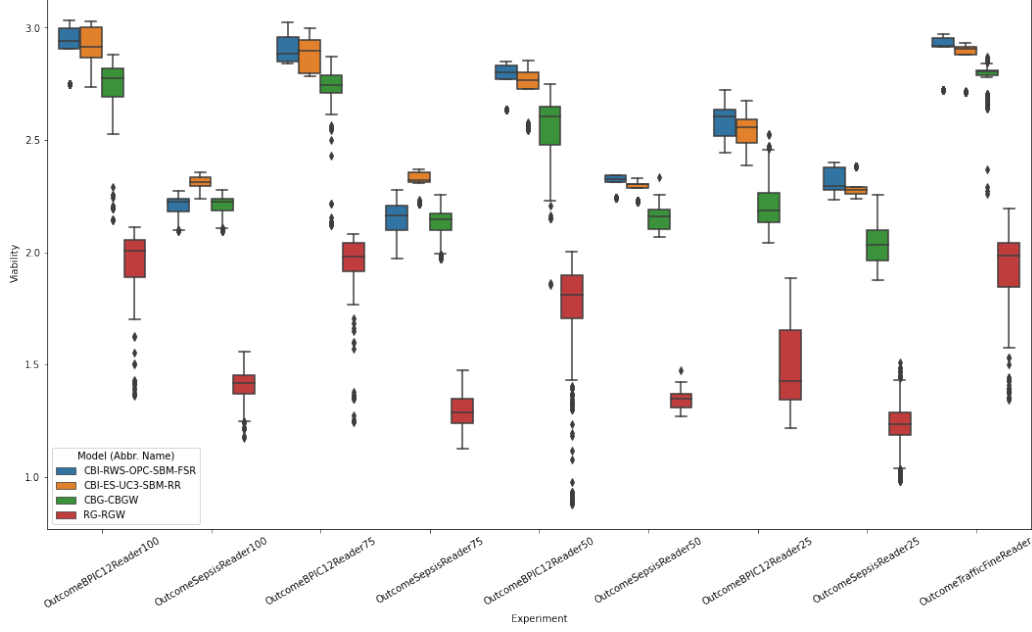


Figure 1: Boxplots of the viability of each models' generated counterfactuals across a herterogeneous collection of datasets.

Here, *CBI-ES-UC3-SBM-RR* and *CBI-RWS-OPC-SBM-FSR* display a higher median of viability across all datasets. This is unsurprising as the evolutionary algorithm use initiators that are based on the baselines. However, it is surprising that the evolutionary models consistently outperform the Casebased-Search Generator (green) across all datasets. In 6 out of 9 datasets we see an improvement of at least 0.15. From ?? we see that the gap often occurs because of much higher similarity and sparsity scores. The highest median is reached for *CBI-RWS-OPC-SBM-FSR* at 2.94. The Random-Search Generator never manages to come even close to the case based model. Except for the BPIC12-100 dataset, the Random-Search Generator has a median below 2.

In tables 1, 2, 3 and 4 we show generations of all models and compare them to Dice4EL. We see that all models return reasonable counterfactuals, except the Random-Search Generator . This model does not seem to follow any pattern.

Factual Seq. Amount	Activity	Outcome	Resource	Our CF Seq. Amount	Activity	Outcome	Resource	DiCE4EL CF Seq. Activity	Resource	Amount
150	A-SUBMITTED	0	112							
150	A-PARTLYSUBMITTED	0	112							
150	A-PREACCEPTED	0	112							
150	W-Completeren aanvraag	0	112							
150	W-Completeren aanvraag	0	111							
150	W-Completeren aanvraag	0	889							
150	W-Completeren aanvraag	0	889							
150	W-Completeren aanvraag	0	9							
150	A-ACCEPTED	0	9							
150	A-FINALIZED	0	9	150	A-SUBMITTED	1	112			
150	O-SELECTED	0	9	150	A-PARTLYSUBMITTED	1	112			
150	O-CREATED	0	9	150	A-PREACCEPTED	1	112	A-SUBMITTED	112	150
150	O-SENT	0	9	150	W-Completeren aanvraag	1	111	A-PARTLYSUBMITTED	112	150
150	W-Completeren aanvraag	0	9	150	W-Completeren aanvraag	1	111	A-PREACCEPTED	112	150
150	W-Nabellen offertes	0	9	150	A-ACCEPTED	1	861	A-ACCEPTED	1	150
150	W-Nabellen offertes	0	9	150	A-FINALIZED	1	111	O-SELECTED	1	150
150	O-SENT-BACK	0	129	150	O-SELECTED	1	111	A-FINALIZED	1	150
150	W-Nabellen offertes	0	129	150	O-CREATED	1	111	O-CREATED	1	150
150	W-Valideren aanvraag	0	138	150	O-SENT	1	111	O-SENT	1	150
150	O-DECLINED	0	138	150	W-Completeren aanvraag	1	111	W-Completeren aanvraag	1	150
150	A-DECLINED	0	138	150	O-SENT-BACK	1	149	O-SENT-BACK	11259	150
150	W-Valideren aanvraag	0	138	150	W-Nabellen offertes	1	149	W-Nabellen offertes	11259	150
				150	O-ACCEPTED	1	629	O-ACCEPTED	9	150

Table 1: A comparison between the Casebased-Search Generator and D4EL

Factual Seq. Amount	Activity	Outcome	Resource	Our CF Seq. Amount	Activity	Outcome	Resource	DiCE4EL CF Seq. Activity	Resource	Amount
150	A-SUBMITTED	0	112							
150	A-PARTLYSUBMITTED	0	112							
150	A-PREACCEPTED	0	112							
150	W-Completeren aanvraag	0	112							
150	W-Completeren aanvraag	0	111							
150	W-Completeren aanvraag	0	889							
150	W-Completeren aanvraag	0	889							
150	W-Completeren aanvraag	0	9							
150	A-ACCEPTED	0	9	1	A-SUBMITTED	1	112			
150	A-FINALIZED	0	9	1	A-PARTLYSUBMITTED	1	112			
150	O-SELECTED	0	9	1	A-PREACCEPTED	1	112			
150	O-CREATED	0	9	1	A-ACCEPTED	1	861	A-SUBMITTED	112	150
150	O-SENT	0	9	1	A-FINALIZED	1	861	A-PARTLYSUBMITTED	112	150
150	W-Completeren aanvraag	0	9	1	O-SELECTED	1	861	A-PREACCEPTED	112	150
150	W-Nabellen offertes	0	9	1	O-CREATED	1	861	A-ACCEPTED	1	150
150	W-Nabellen offertes	0	9	1	O-SENT	1	861	O-SELECTED	1	150
150	O-SENT-BACK	0	129	1	W-Completeren aanvraag	1	861	A-FINALIZED	1	150
150	W-Nabellen offertes	0	129		W-Nabellen offertes	1	11189	O-CREATED	1	150
150	W-Valideren aanvraag	0	138	159	W-Nabellen offertes	1	861	O-SENT	1	150
150	O-DECLINED	0	138	1	O-SENT-BACK	1	129	W-Completeren aanvraag	1	150
150	A-DECLINED	0	138	15363	W-Nabellen offertes	1	912	O-SENT-BACK	11259	150
150	W-Valideren aanvraag	0	138	14536	W-Valideren aanvraag	1	129	W-Nabellen offertes	11259	150
				1	O-ACCEPTED	1	138	O-ACCEPTED	9	150

Table 2: A comparison between the CBI-ES-UC3-SBM-RR and D4EL

Factual Seq. Amount	Activity	Outcome	Resource	Our CF Seq. Amount	Activity	Outcome	Resource	DiCE4EL CF Seq. Activity	Resource	Amount
150	A-SUBMITTED	0	112							
150	A-PARTLYSUBMITTED	0	112							
150	A-PREACCEPTED	0	112							
150	W-Completeren aanvraag	0	112		A-SUBMITTED	1	112			
150	W-Completeren aanvraag	0	111		A-PARTLYSUBMITTED	1	112			
150	W-Completeren aanvraag	0	889		A-PREACCEPTED	1	112			
150	W-Completeren aanvraag	0	889		W-Completeren aanvraag	1	861			
150	W-Completeren aanvraag	0	9	70	W-Completeren aanvraag	1	861			
150	A-ACCEPTED	0	9	70	W-Completeren aanvraag	1	861			
150	A-FINALIZED	0	9	70	A-ACCEPTED	1	861			
150	O-SELECTED	0	9	70	A-FINALIZED	1	861			
150	O-CREATED	0	9	70	O-SELECTED	1	861	A-SUBMITTED	112	150
150	O-SENT	0	9	70	O-CREATED	1	861	A-PARTLYSUBMITTED	112	150
150	W-Completeren aanvraag	0	9	70	O-SENT	1	861	A-PREACCEPTED	112	150
150	W-Nabellen offertes	0	9	70	W-Completeren aanvraag	1	861	A-ACCEPTED	1	150
150	W-Nabellen offertes	0	9	70	W-Nabellen offertes	1	109	O-SELECTED	1	150
150	O-SENT-BACK	0	129	70	W-Nabellen offertes	1	861	A-FINALIZED	1	150
150	W-Nabellen offertes	0	129					O-CREATED	1	150
150	W-Valideren aanvraag	0	138	70	O-SENT-BACK	1	789	O-SENT	1	150
150	O-DECLINED	0	138	70	W-Nabellen offertes	1	789	W-Completeren aanvraag	1	150
150	A-DECLINED	0	138					O-SENT-BACK	11259	150
150	W-Valideren aanvraag	0	138		W-Valideren aanvraag	1	138	W-Nabellen offertes	11259	150
				70	O-ACCEPTED	1	11289	O-ACCEPTED	9	150

Table 3: A comparison between the CBI-RWS-OPC-SBM-FSR and D4EL

Factual Seq. Amount	Activity	Outcome	Resource	Our CF Seq. Amount	Activity	Outcome	Resource	DiCE4EL CF Seq. Activity	Resource	Amount
				11246	A-PARTLYSUBMITTED	1				
				158	A-FINALIZED	1				
				13939	O-SENT	1				
150	A-SUBMITTED	0	112	5	A-APPROVED	1				
150	A-PARTLYSUBMITTED	0	112	257	A-APPROVED	1				
150	A-PREACCEPTED	0	112	29559	W-Nabellen offertes	1				
150	W-Completeren aanvraag	0	112	4664	O-CANCELLED	1				
150	W-Completeren aanvraag	0	111	19917	O-SELECTED	1				
150	W-Completeren aanvraag	0	889	16922	W-Completeren aanvraag	1				
150	W-Completeren aanvraag	0	889							
150	W-Completeren aanvraag	0	9	19969	A-SUBMITTED	1				
150	A-ACCEPTED	0	9	165	A-PREACCEPTED	1				
150	A-FINALIZED	0	9							
150	O-SELECTED	0	9	25534	A-DECLINED	1				
150	O-CREATED	0	9					A-SUBMITTED	112	150
150	O-SENT	0	9	21436	O-CREATED	1		A-PARTLYSUBMITTED	112	150
150	W-Completeren aanvraag	0	9	17468	W-Beoordelen fraude	1		A-PREACCEPTED	112	150
150	W-Nabellen offertes	0	9					A-ACCEPTED	1	150
150	W-Nabellen offertes	0	9	29395	W-Completeren aanvraag	1		O-SELECTED	1	150
150	O-SENT-BACK	0	129	52	O-SENT-BACK	1		A-FINALIZED	1	150
150	W-Nabellen offertes	0	129					O-CREATED	1	150
150	W-Valideren aanvraag	0	138	11627	A-FINALIZED	1		O-SENT	1	150
150	O-DECLINED	0	138	414	W-Valideren aanvraag	1		W-Completeren aanvraag	1	150
150	A-DECLINED	0	138	16381	O-SENT-BACK	1		O-SENT-BACK	11259	150
150	W-Valideren aanvraag	0	138	2828	A-ACCEPTED	1		W-Nabellen offertes	11259	150
				8834	O-ACCEPTED	1		O-ACCEPTED	9	150

Table 4: A comparison between the Random-Search Generator and D4EL