The results indicate the LE_SS (Data Cleaning, Label Encoder, and Standard Scaler) techniques with the best performance compared to the other techniques. LE_SS is the only one that presented a significant statistical difference in the perspective of two analyzed metrics, Precision and FAR. While in the F1-Score metric, the LE_SS showed values very close to the critical distance limit margin. And in the Recall metric, the LE_SS remained within the critical distance limit margin with values close to the other techniques, with no significant statistical difference. Below, the results are presented from the perspective of each analyzed metric.

Precision (Table A.1): the LE_SS (Data Cleaning, Label Encoder, and Standard Scaler) techniques were the only ones that presented a significant statistical difference when compared to the GD_SS (Data Cleaning, Get Dummies and Standard Scaler) techniques, with the first greater distance, with 8% above the critical margin limit. All other comparisons are within the critical limit. The second largest distance was very close to the margin, with the LE_SS techniques compared to the GD (Data Cleaning and Get Dummies) techniques, with 87% of the critical distance value. At the third largest distance, the LE_SS and LE_MM (Data Cleaning, Label Encoder, and MinMax Scaler) techniques were aligned when compared to the LE (Data Cleaning and Label Encoder) and GD_SS (Data Cleaning, Get Dummies and Standard Scaler) techniques, respectively, both with 75% of the critical distance value. Except for the GD_MM techniques (Data Cleaning, Get Dummies, and MinMax Scaler) with 73% of the critical distance value, when compared to the GD_SS techniques, all other techniques, when compared, presented percentages that varied from 2% to 54% of the value of the critical distance.

Critical Distance: 2.66						
Group 1	**Ranking**	**Group 2**	**Ranking**	**Distance**	**(%)**	**Hypothesis**
LE_SS	2.00	LE_MM	2.88	0.88	33%	Equal
LE_SS	2.00	GD_MM	2.94	0.94	35%	Equal
LE_SS	2.00	LE	4.00	2.00	75%	Equal
LE_SS	2.00	GD	4.31	2.31	87%	Equal
LE_SS	2.00	GD_SS	4.88	2.88	108%	Different
LE_MM	2.88	GD_MM	2.94	0.06	2%	Equal
LE_MM	2.88	LE	4.00	1.12	42%	Equal
LE_MM	2.88	GD	4.31	1.43	54%	Equal
LE_MM	2.88	GD_SS	4.88	2.00	75%	Equal
GD_MM	2.94	LE	4.00	1.06	40%	Equal
GD_MM	2.94	GD	4.31	1.37	51%	Equal
GD_MM	2.94	GD_SS	4.88	1.94	73%	Equal
LE	4.00	GD	4.31	0.31	12%	Equal
LE	4.00	GD_SS	4.88	0.88	33%	Equal
GD	4.31	GD_SS	4.88	0.57	21%	Equal

Table A.1: Comparison of data preprocessing techniques in binary class models from the perspective of the **Precision metric** for the Nemenyi test.

Recall (Table A.2): all techniques, when compared, showed a percentage value within the critical limit margin. The LE_MM (Data Cleaning, Label Encoder, and MinMax Scaler) techniques presented the first greater distance, with 40% of the critical distance value, compared to the GD (Data Cleaning and Get Dummies) techniques. The second largest distance was also with the LE_MM techniques compared to the LE (Data Cleaning and Label Encoder) techniques, with 38% of the critical distance value. The third largest distance was for LE_SS (Data Cleaning, Label

Encoder, and Standard Scaler) techniques compared to GD (Data Cleaning and Get Dummies) techniques, with 33% of the critical distance value. When compared, all the other techniques presented percentages ranging from 0% to 31% of the critical distance value.

Critical Distance: 2.66						
Group 1	**Ranking**	**Group 2**	**Ranking**	**Distance**	**(%)**	**Hypothesis**
LE_MM	2.94	LE_SS	3.12	0.18	7%	Equal
LE_MM	2.94	GD_SS	3.50	0.56	21%	Equal
LE_MM	2.94	GD_MM	3.50	0.56	21%	Equal
LE_MM	2.94	LE	3.94	1.00	38%	Equal
LE_MM	2.94	GD	4.00	1.06	40%	Equal
LE_SS	3.12	GD_SS	3.50	0.38	14%	Equal
LE_SS	3.12	GD_MM	3.50	0.38	14%	Equal
LE_SS	3.12	LE	3.94	0.82	31%	Equal
LE_SS	3.12	GD	4.00	0.88	33%	Equal
GD_SS	3.50	GD_MM	3.50	0.00	0%	Equal
GD_SS	3.50	LE	3.94	0.44	17%	Equal
GD_SS	3.50	GD	4.00	0.50	19%	Equal
GD_MM	3.50	LE	3.94	0.44	17%	Equal
GD_MM	3.50	GD	4.00	0.50	19%	Equal
LE	3.94	GD	4.00	0.06	2%	Equal

Table A.2: Comparison of data preprocessing techniques in binary class models from the perspective of the **Recall metric** for the Nemenyi test.

F1-Score (Table A.3): all techniques, when compared, also showed a percentage values within the critical limit margin. The LE_SS (Data Cleaning, Label Encoder, and Standard Scaler) techniques presented the three most considerable distances when compared to the GD_SS (Data Cleaning, Get Dummies and Standard Scaler), LE (Data Cleaning and Label Encoder) and GD (Data Cleaning and Get Dummies) techniques), with 87%, 85% and 73% of the critical distance value, respectively. The first and second largest distances are close to the critical limit margin. Except for the LE_MM (Data Cleaning, Label Encoder, and MinMax Scaler) techniques when compared to the GD_SS (Data Cleaning, Get Dummies and Standard Scaler) and LE (Data Cleaning and Label Encoder) techniques, with 63% and 61% of the value critical distance, respectively, all the other techniques when compared, presented percentages that varied from 2% to 49% of the value of the critical distance.

Critical Distance: 2.66						
Group 1	**Ranking**	**Group 2**	**Ranking**	**Distance**	**(%)**	**Hypothesis**
LE_SS	2.12	LE_MM	2.75	0.63	24%	Equal
LE_SS	2.12	GD_MM	3.25	1.13	42%	Equal
LE_SS	2.12	GD	4.06	1.94	73%	Equal
LE_SS	2.12	LE	4.38	2.26	85%	Equal
LE_SS	2.12	GD_SS	4.44	2.32	87%	Equal
LE_MM	2.75	GD_MM	3.25	0.50	19%	Equal
LE_MM	2.75	GD	4.06	1.31	49%	Equal
LE_MM	2.75	LE	4.38	1.63	61%	Equal
LE_MM	2.75	GD_SS	4.44	1.69	63%	Equal
GD_MM	3.25	GD	4.06	0.81	30%	Equal
GD_MM	3.25	LE	4.38	1.13	42%	Equal
GD_MM	3.25	GD_SS	4.44	1.19	45%	Equal
GD	4.06	LE	4.38	0.32	12%	Equal

GD	4.06	GD_SS	4.44	0.38	14%	Equal
LE	4.38	GD_SS	4.44	0.06	2%	Equal

Table A.3: Comparison of data preprocessing techniques in binary class models from the perspective of the **F1-Score metric** for the Nemenyi test.

FAR (Table A.4): the LE_SS (Data Cleaning, Label Encoder, and Standard Scaler) techniques were the only ones that showed a significant statistical difference when compared to the GD_SS (Data Cleaning, Get Dummies, and Standard Scaler) techniques, with the first greater distance, 8% above the critical distance value. All the other techniques, when compared, presented distances within the range of the critical limit. The second largest distance was also with the LE_SS techniques compared to the GD (Data Cleaning and Get Dummies) techniques, with 78% of the value of the critical distance. The third largest distance was for the LE_MM (Data Cleaning, Label Encoder, and MinMax Scaler) techniques compared to the GD_SS (Data Cleaning, Get Dummies, and Standard Scaler) techniques, with 75% of the critical distance value. Except for the GD_MM (Data Cleaning, Get Dummies, and MinMax Scaler) techniques with 73% of the critical distance value, when comparing the GD_SS (Data Cleaning, Get Dummies, and Standard Scaler) techniques, all the other techniques, when compared, presented percentages that ranged from 2% to 56% of the critical distance value.

Critical Distance: 2.66					
Group 1	**Ranking**	**Group 2**	**Ranking**	**Distance**	**(%)**	**Hypothesis**
LE_SS	2.12	LE_MM	3.00	0.88	33%	Equal
LE_SS	2.12	GD_MM	3.06	0.94	35%	Equal
LE_SS	2.12	LE	3.62	1.50	56%	Equal
LE_SS	2.12	GD	4.19	2.07	78%	Equal
LE_SS	2.12	GD_SS	5.00	2.88	108%	Different
LE_MM	3.00	GD_MM	3.06	0.06	2%	Equal
LE_MM	3.00	LE	3.62	0.62	23%	Equal
LE_MM	3.00	GD	4.19	1.19	45%	Equal
LE_MM	3.00	GD_SS	5.00	2.00	75%	Equal
GD_MM	3.06	LE	3.62	0.56	21%	Equal
GD_MM	3.06	GD	4.19	1.13	42%	Equal
GD_MM	3.06	GD_SS	5.00	1.94	73%	Equal
LE	3.62	GD	4.19	0.57	21%	Equal
LE	3.62	GD_SS	5.00	1.38	52%	Equal
GD	4.19	GD_SS	5.00	0.81	30%	Equal

Table A.4: Comparison of data preprocessing techniques in binary class models from the perspective of the **FAR metric** for the Nemenyi test.