Results

August 27, 2023

1 Tables of Friedman, Bonferroni-Dunn, Holm, Hochberg and Hommel Tests

Table 1: Average Rankings of the algorithms

Algorithm	Ranking
SMOTE	2.8518518518518525
ROS	2.5185185185185173
VAE	2.4259259259259265
GAN	2.2037037037037033

Friedman statistic considering reduction performance (distributed according to chi-square with 3 degrees of freedom: 3.5222222222221795.
P-value computed by Friedman Test: 0.3178913896143547.

Iman and Davenport statistic considering reduction performance (distributed according to F-distribution with 3 and 78 degrees of freedom: 1.1819876667144553.
P-value computed by Iman and Daveport Test: 0.32209362196935565.

Table 2: Holm / Hochberg Table for $\alpha = 0.05$

i	algorithm	$z = (R_0 - R_i)/SE$	p	Holm/Hochberg/Hommel
3	SMOTE	1.8446619684315577	0.06508672649276634	0.016666666666666666
2	ROS	0.8959786703810385	0.3702641551795073	0.025
1	VAE	0.6324555320336787	0.5270892568655363	0.05

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.
Holm's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.
Hommel's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.

Table 3: Holm / Hochberg Table for $\alpha = 0.10$

i	algorithm	$z = (R_0 - R_i)/SE$	p	Holm/Hochberg/Hommel
3	SMOTE	1.8446619684315577	0.06508672649276634	0.03333333333333333
2	ROS	0.8959786703810385	0.3702641551795073	0.05
1	VAE	0.6324555320336787	0.5270892568655363	0.1

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value ≤ 0.03333333333333333.
Holm's procedure rejects those hypotheses that have a p-value ≤ 0.03333333333333333.
Hommel's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.

Table 4: Adjusted p-values

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Homm}
1	SMOTE	0.06508672649276634	0.19526017947829902	0.19526017947829902	0.19526017947829902	0.19526017947829902
2	ROS	0.3702641551795073	1.110792465538522	0.7405283103590146	0.5270892568655363	0.5270892568655363
3	VAE	0.5270892568655363	1.581267770596609	0.7405283103590146	0.5270892568655363	0.5270892568655363

Nemenyi's procedure rejects those hypotheses that have a p-value $\leq 0.008333333333333333$.
Holm's procedure rejects those hypotheses that have a p-value $\leq 0.008333333333333333$.
Bergmann's procedure rejects these hypotheses:
Nemenyi's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.
Holm's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.
Bergmann's procedure rejects these hypotheses:

Table 5: Holm / Shaffer Table for $\alpha = 0.05$

i	algorithms	$z = (R_0 - R_i)/SE$	p	Holm	Shaffer
6	SMOTE vs. GAN	1.8446619684315577	0.0650867264927663 4	0.008333333333333333	0.008333333333333333
5	SMOTE vs. VAE	1.212206436397879	0.2254333683050753	0.01	0.01
4	SMOTE vs. ROS	0.9486832980505193	0.3427817111479086	0.0125	0.0125
3	ROS vs. GAN	0.8959786703810385	0.3702641551795073	0.016666666666666666	0.016666666666666666
2	VAE vs. GAN	0.6324555320336787	0.5270892568655363	0.025	0.025
1	ROS vs. VAE	0.2635231383473598	0.7921473917959013	0.05	0.05

Table 6: Holm / Shaffer Table for $\alpha = 0.10$

i	algorithms	$z = (R_0 - R_i)/SE$	p	Holm	Shaffer
6	SMOTE vs. GAN	1.8446619684315577	0.0650867264927663 4	0.016666666666666666	0.016666666666666666
5	SMOTE vs. VAE	1.212206436397879	0.2254333683050753	0.02	0.02
4	SMOTE vs. ROS	0.9486832980505193	0.3427817111479086	0.025	0.025
3	ROS vs. GAN	0.8959786703810385	0.3702641551795073	0.03333333333333333	0.03333333333333333
2	VAE vs. GAN	0.6324555320336787	0.5270892568655363	0.05	0.05
1	ROS vs. VAE	0.2635231383473598	0.7921473917959013	0.1	0.1

Table 7: Adjusted p-values

i	hypothesis	unadjusted p	p_{Neme}	p_{Holm}	p_{Shaf}	p_{Berg}
1	SMOTE vs .GAN	0.06508672649276634	0.39052035895659803	0.39052035895659803	0.39052035895659803	0.39052035895659803
2	SMOTE vs .VAE	0.2254333683050753	1.3526002098304517	1.1271668415253764	0.6763001049152259	0.6763001049152259
3	SMOTE vs .ROS	0.3427817111479086	2.056690266887452	1.3711268445916345	1.028345133443726	0.6855634222958172
4	ROS vs .GAN	0.3702641551795073	2.221584931077044	1.3711268445916345	1.110792465538522	1.110792465538522
5	VAE vs .GAN	0.5270892568655363	3.162535541193218	1.3711268445916345	1.110792465538522	1.110792465538522
6	ROS vs .VAE	0.7921473917959013	4.752884350775408	1.3711268445916345	1.110792465538522	1.110792465538522