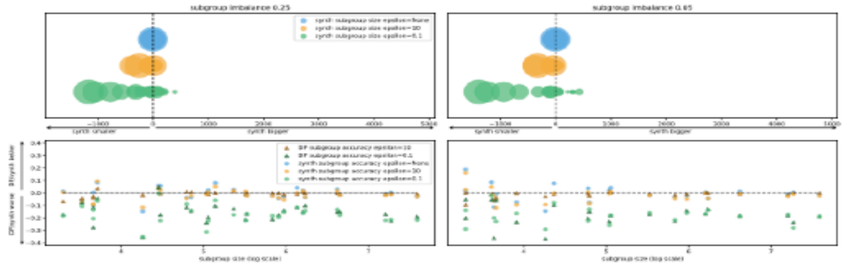
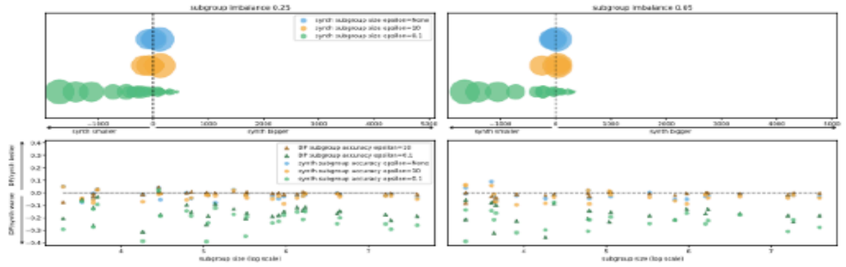
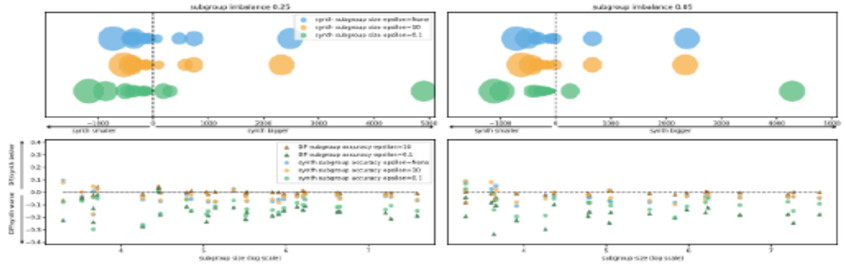
S4: Multi-Attribute Subgroup Size and Accuracy



(a) PrivBayes

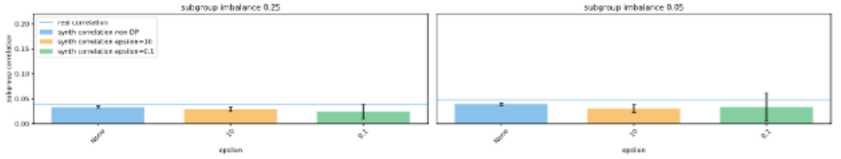


(b) DP-WGAN

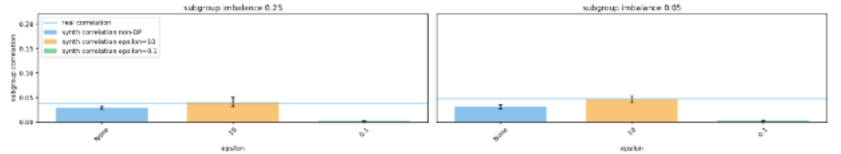


(c) PATE-GAN

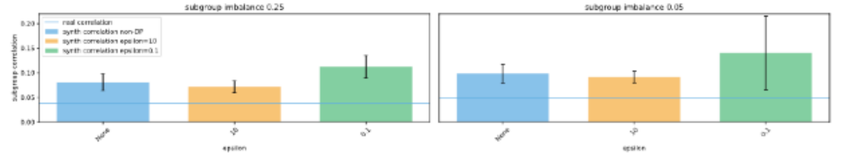
Figure 13: Size of synthetic data multi-attribute subgroup (intersection of age, sex, and race) relative to real (top) and accuracy of DP and synthetic classifiers relative to real classifier accuracy (bottom) for different single-attribute (sex) subgroup imbalance and ϵ levels, ***Texas***.



(b) PrivBayes, Texas



(d) DP-WGAN, Texas



(f) PATE-GAN, Texas

Figure 14: Mutual information between the multi-attribute subgroup and the target (income/length of stay) columns for different single-attribute subgroup imbalance (sex) and ϵ levels, ***Adult*** (left) and ***Texas*** (right).

Take-Aways

1) Do DP generative models generate data in similar classes and subgroups proportions to the real data?

No, not really. DP distorts the proportions, yielding “Robin Hood” vs “Matthew” effects depending on the DP generative model