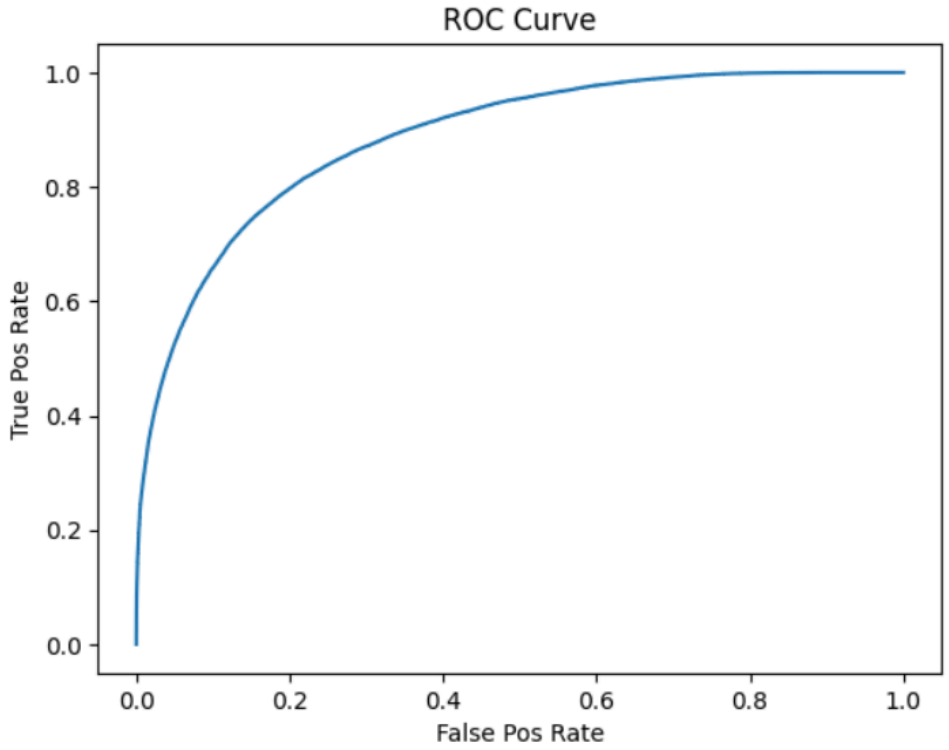
The DMatrix Model is successful overall; it is able to accurately classify around 84% of the data set. The high ROC AUC demonstrates that the model can accurately distinguish between positive and negative instances. However, its largest weakness is the recall metric, implying that the model struggles to identify all cases of conversion. As a result, applying this model means that not all conversion opportunities are identified and thus fewer potential customers are targeted.

Figure 1: Model Metrics for the DMatrix Model

```
  MODEL METRICS
-----------------
RMSE:      0.3942
Accuracy:  0.8446
Precision: 0.7573
Recall:    0.5566
F1 Score:  0.6416
ROC AUC:   0.8852
```



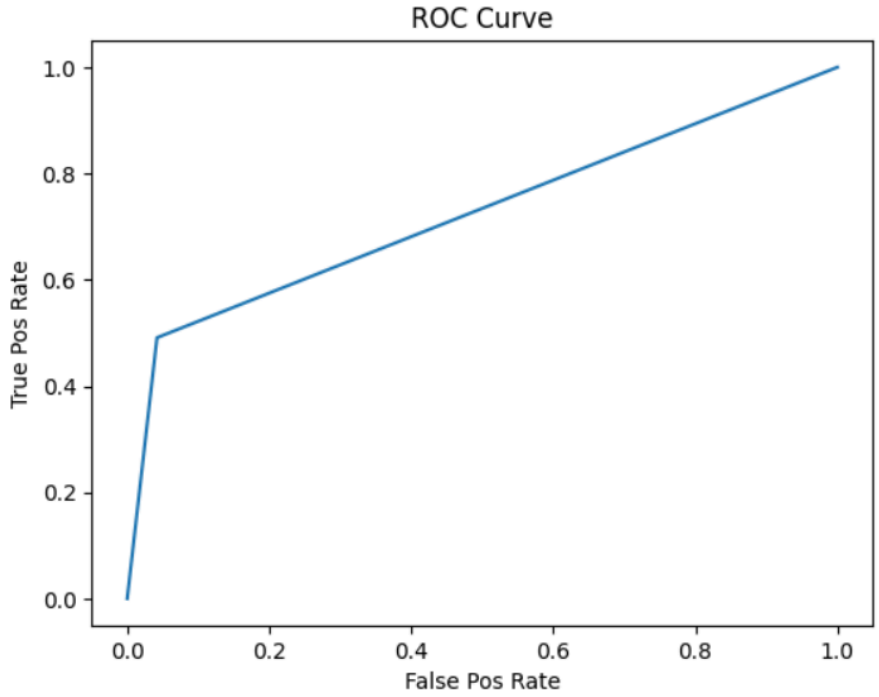
The GridSearchCV Model performed similarly to the DMatrix Model, but the recall was slightly worse. This model could be more effective if the grid search consisted of more parameter values.[1] With this model, I was able to look at feature importances, which yielded that the browser had significantly more impact on the model's output. Different browsers offer varying

[1] In particular, the default parameter values for Method 1 may be better than the parameter values I was able to test. This would result in metrics that are not as good.

user experiences -- for example, browser features such as speed, security, and ad-blocking vary and could impact the conversion.

Figure 2: Model Metrics for the GridSearchCV Model[2]

```
  MODEL METRICS
-----------------
RMSE:      0.3983
Accuracy:  0.8414
Precision: 0.7960
Recall:    0.4910
F1 Score:  0.6074
ROC AUC:   0.7246
```

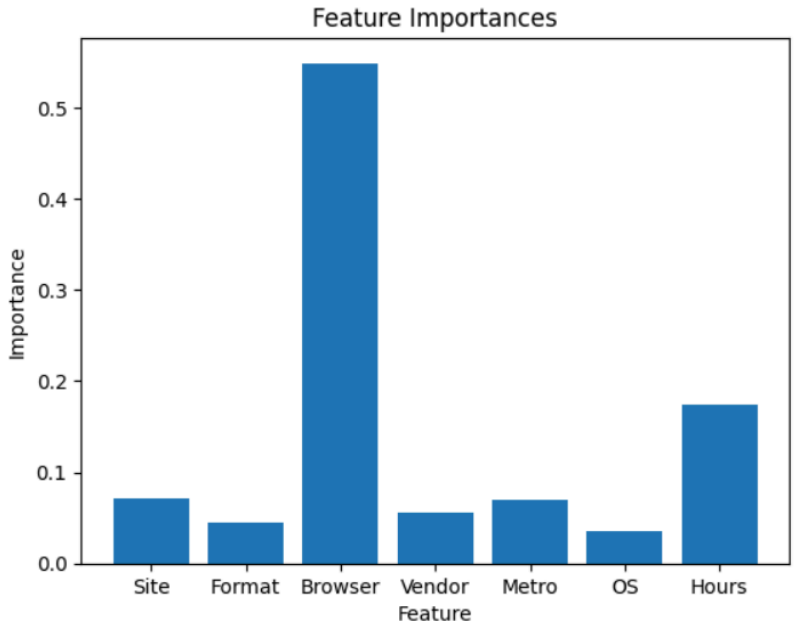


Cont. on the next page.

[2] I realize that the ROC curve looks incorrect. I believe that this is because the prediction given by the best estimator for the grid search ended up being outputted in binary (rather than as probabilities). However, I left my code as is since it demonstrated an alternate way of creating a model.

Figure 3: Feature Importances for the GridSearchCV Model

```
  FEATURE IMPORTANCES
-----------------------
```



Data suitability could be improved by adding more information on user demographics and product types. For example, the websites provided could be sorted based on category (e.g. online clothing shopping, online games) in order to better assess what websites the target demographic would be on. It would also be extremely useful to include data on the users themselves and whether they had prior exposure to the company's products.