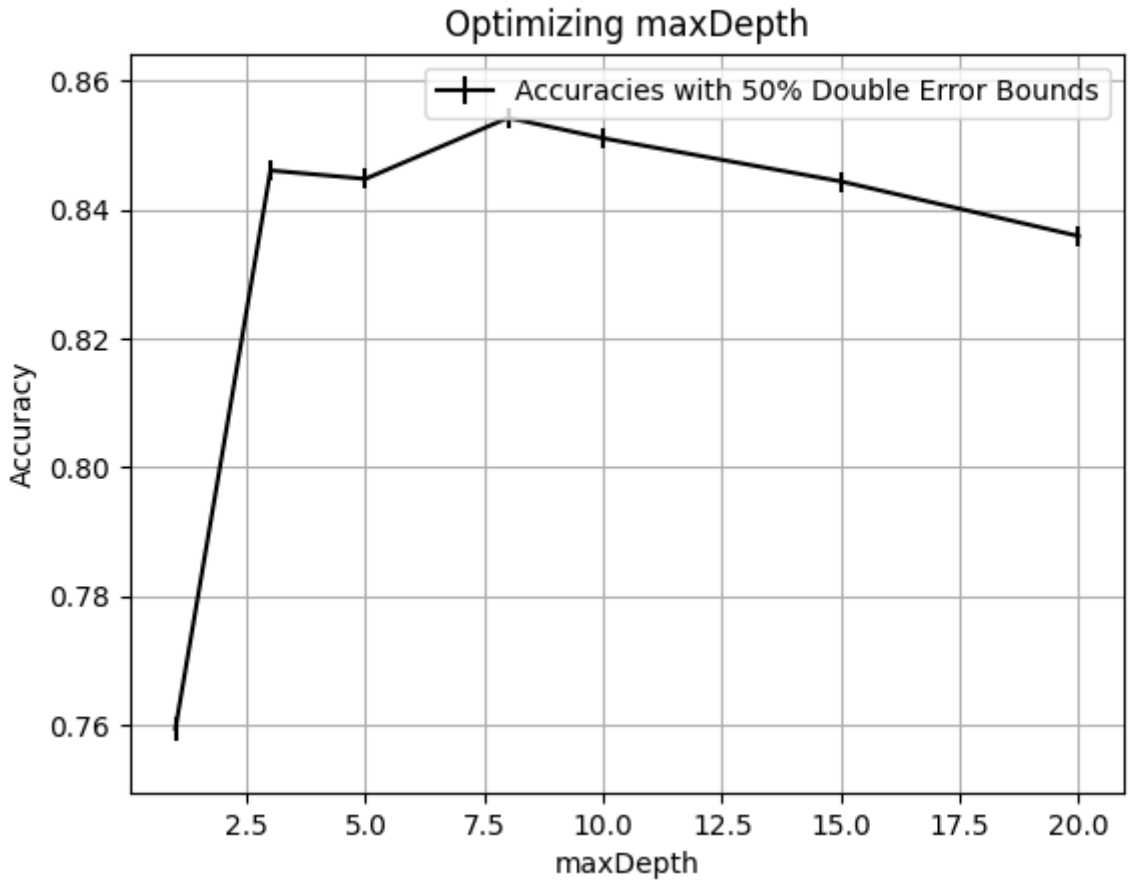
Assignment 2

Parameter Sweeps

Numeric and Categorical Features

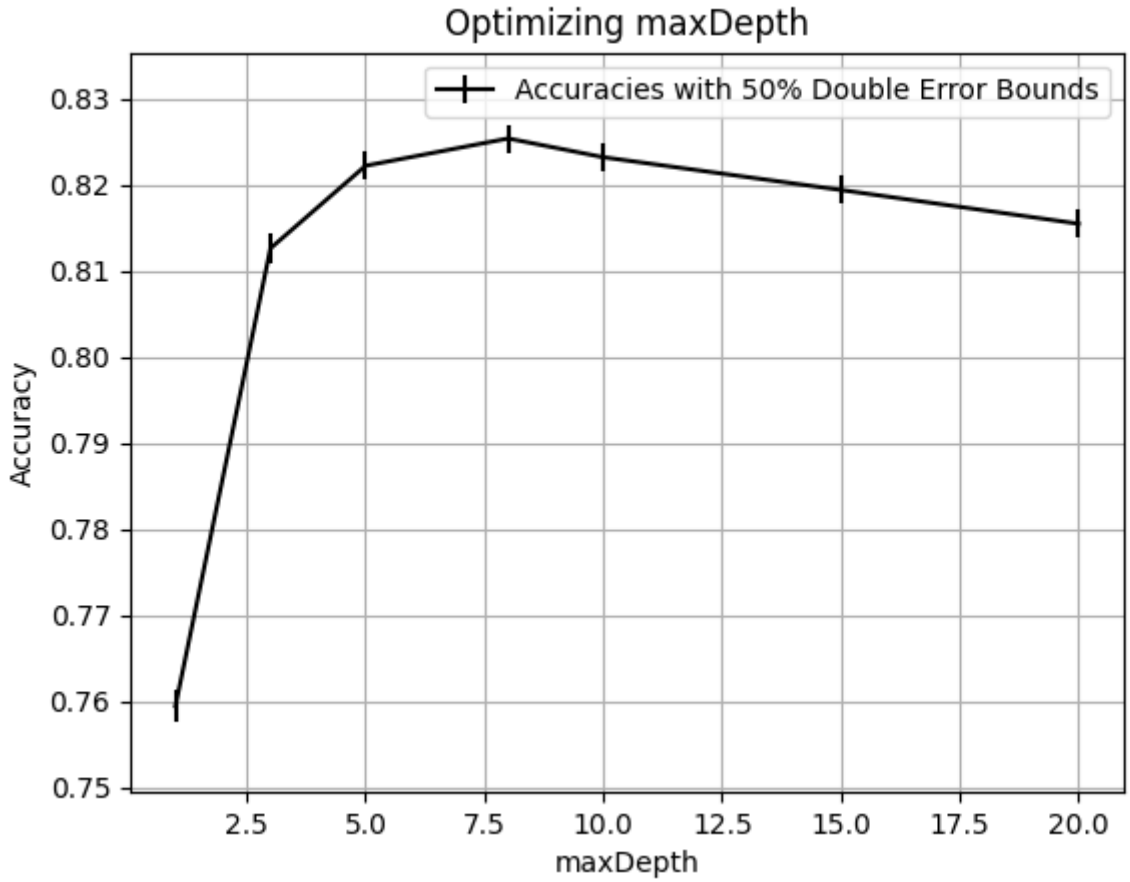
maxDepth	accuracy	lower bound	upper bound	runtime
1	0.759476	0.757673	0.761278	186.107
3	0.846053	0.844532	0.847575	318.294
5	0.844746	0.843219	0.846273	395.475
8	0.854212	0.852724	0.8557	434.332
10	0.851044	0.849542	0.852545	445.942
15	0.84435	0.842822	0.845879	459.84
20	0.835875	0.834313	0.837436	465.214



Only Categorical Features

maxDepth	accuracy	lower bound	upper bound	runtime

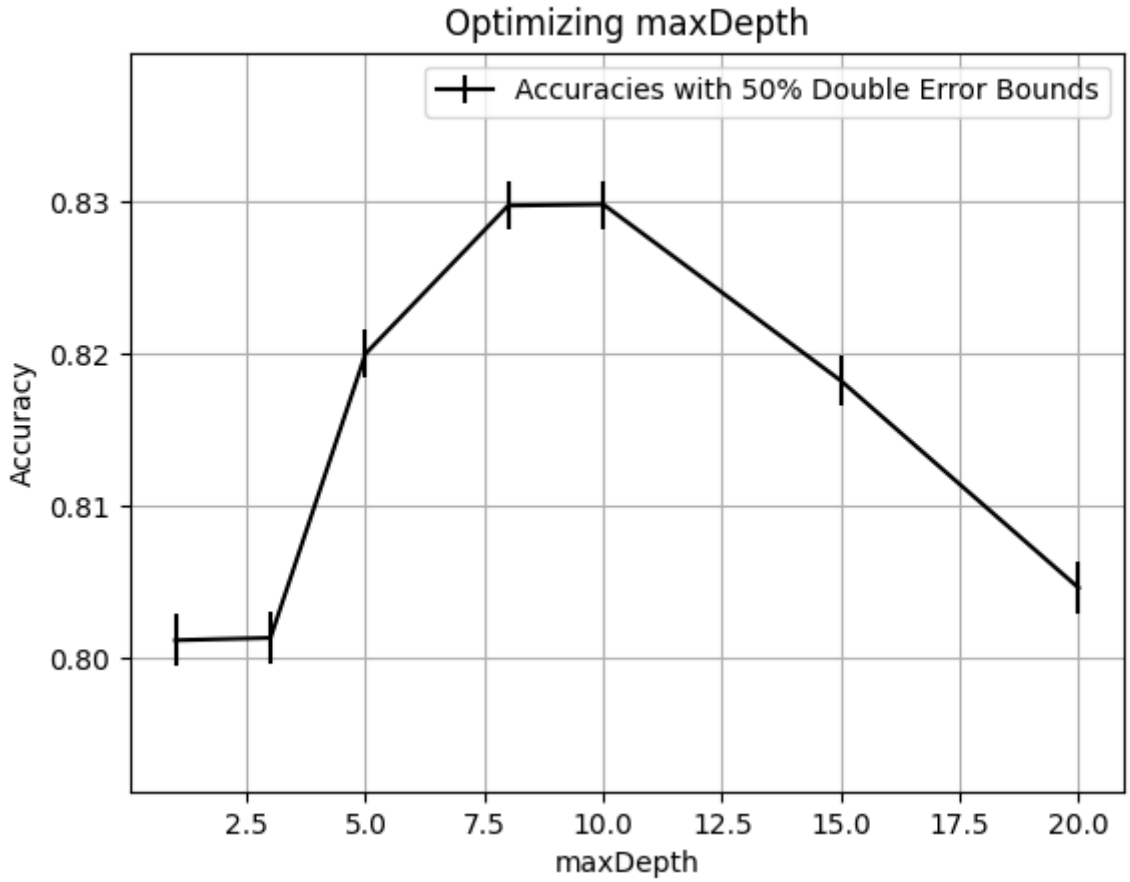
maxDepth	accuracy	lower bound	upper bound	runtime
1	0.759476	0.757673	0.761278	130.454
3	0.812626	0.810981	0.814272	211.264
5	0.822211	0.820599	0.823823	254.303
8	0.825379	0.823778	0.82698	289.562
10	0.823201	0.821592	0.82481	303.104
15	0.819399	0.817777	0.821021	324.165
20	0.815478	0.813842	0.817113	337.694



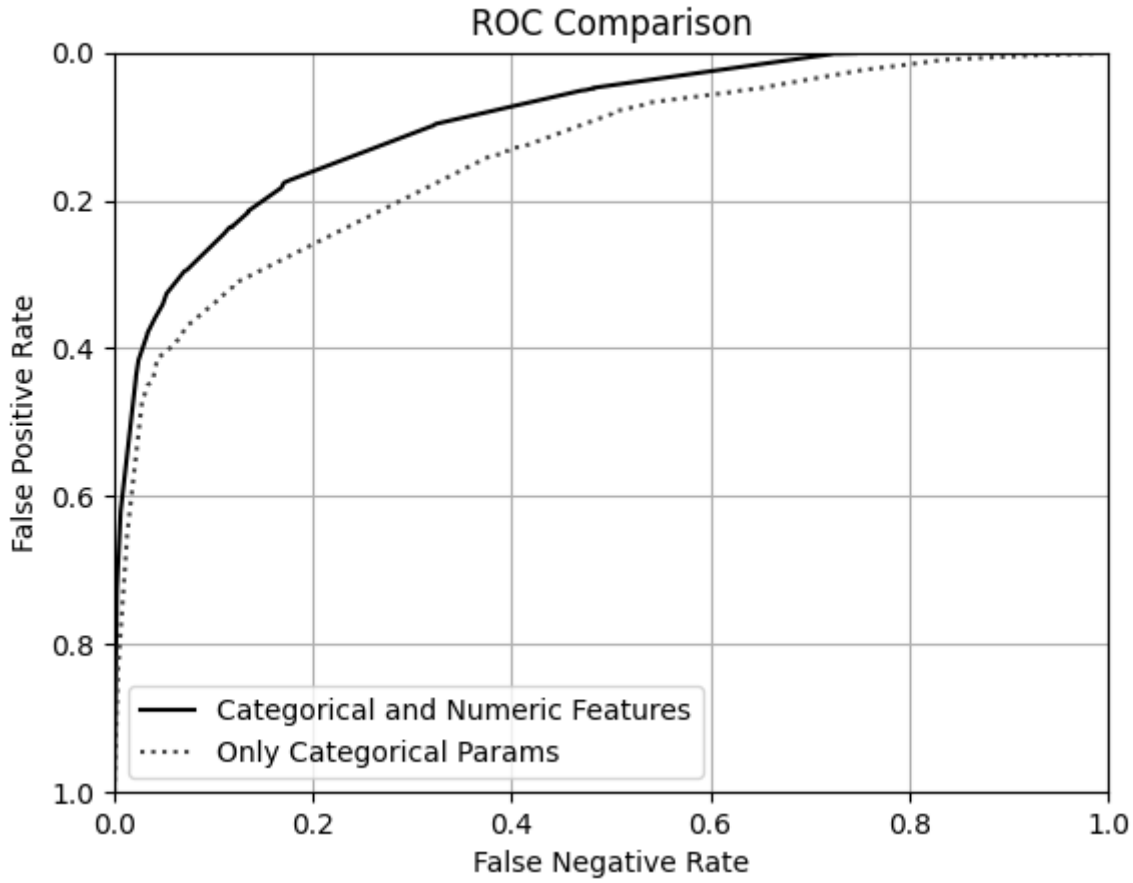
Only Numeric Features

maxDepth	accuracy	lower bound	upper bound	runtime
1	0.80118	0.799497	0.802863	60.946
3	0.801339	0.799656	0.803021	133.152
5	0.820032	0.818413	0.821652	159.428
8	0.829775	0.828191	0.83136	173.152
10	0.829855	0.82827	0.831439	176.701

maxDepth	accuracy	lower bound	upper bound	runtime
15	0.81825	0.816624	0.819876	178.97
20	0.804626	0.802954	0.806298	179.494



ROC



Analysis

At 75% one-sided accuracy, we can make several conclusions from the data above. First, featurizing using both numeric and categorical features is more accurate than only categorical, or only numeric, as the lower bound of the best accuracy in the param sweep with both feature types (0.853) is larger than the upper bound of the best using only one type (0.827). Next, we can conclude that a maxDepth of 8 is the optimal hyperparameter for this model. (again by looking at the lower/upper accuracy bounds). Finally, the model that uses both param types dominates the model that only uses categorical in the above ROC curve, further indicating the necessity of numerical features.