[[1]](#footnote-1)

ADDITIONAL RESULTS

**Five-fold cross validation results on matched outage and weather training data (hourly outages)**. Given a -value threshold, we selected the model with the highest value using hourly customer outages (negative binomial: NB and Poisson mixture model: PMM).

A picture containing text

Description automatically generated

**Five-fold cross validation results on matched outage and weather training data (total outages)**. Given a -value threshold, we selected the model with the highest value using the total number of customer outages (negative binomial: NB and Poisson mixture model: PMM).

A picture containing shape

Description automatically generated

**Grid search CV results showing best hyperparameter configurations across storm regression models and counties for outages to weather matching scenarios.** The values in the table show hourly customer outages predictions in terms of r-squared and rmse error metrics evaluated on the validation data.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **OUTAGES TO WEATHER: Hyperparameter Grid Search Selection** | | | | | | | | | | | | | | | |
|  | **Random Forest** | | | | | **K-Nearest Neighbors** | | | | | **Poisson** | | | | |
| **County** | **Gap** | **Conta** | **Lag** | **Metric** | | **Gap** | **Conta** | **Lag** | **Metric** | | **Gap** | **Conta** | **Lag** | **Metric** | |
|  |  |  |  | **R^2** | **rmse** |  |  |  | **R^2** | **rmse** |  |  |  | **R^2** | **rmse** |
| Nassau | 20 | 0.4 | 10 | 0.183 | 1470.756 | 8 | 0.1 | 1 | 0.114 | 882.056 | 20 | 0.4 | 20 | 0.328 | 868.245 |
| Queens | 5 | 0.5 | 1 | 0.178 | 740.78 | 1 | 0.3 | 0 | 0.335 | 674.549 | 1 | 0.1 | 1 | 0.134 | 763.384 |
| Putnam | 8 | 0.4 | 0 | 0.206 | 979.862 | 1 | 0.4 | 0 | 0.142 | 1359.41 | 20 | 0.1 | 0 | 0.282 | 863.417 |
| Rockland | 20 | 0.5 | 10 | 0.159 | 543.058 | 20 | 0.4 | 5 | 0.13 | 438.92 | 40 | 0.5 | 6 | 0.315 | 229.552 |
| Washington | 20 | 0.5 | 9 | 0.176 | 3106.045 | 5 | 0.3 | 4 | 0.122 | 3170.485 | 5 | 0.5 | 6 | 0.05 | 3203.083 |
| Suffolk | 8 | 0.2 | 7 | 0.088 | 1057.634 | 20 | 0.1 | 5 | 0.063 | 963.234 | 40 | 0.5 | 10 | 0.213 | 807.969 |
| Westchester | 1 | 0.5 | 10 | 0.35 | 561.528 | 20 | 0.2 | 10 | 0.316 | 477.796 | 1 | 0.1 | 8 | 0.491 | 371.083 |
| Kings | 5 | 0.5 | 9 | 0.232 | 256.559 | 8 | 0.2 | 10 | 0.157 | 218.585 | 8 | 0.1 | 4 | 0.401 | 138.334 |
| New York | 5 | 0.2 | 10 | 0.393 | 95.72 | 20 | 0.2 | 0 | 0.185 | 133.913 | 40 | 0.1 | 10 | 0.516 | 91.693 |
| Bronx | 1 | 0.4 | 3 | 0.15 | 328.069 | 8 | 0.2 | 0 | 0.096 | 307.038 | 5 | 0.1 | 0 | 0.188 | 280.23 |

**Grid search CV results showing best hyperparameter configurations across storm regression models and counties for weather to outages matching scenarios.** The values in the table show hourly customer outages predictions in terms of r-squared and rmse error metrics evaluated on the validation data.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **WEATHER TO OUTAGES: Hyperparameter Grid Search Selection** | | | | | | | | | | | | | | | |
|  | **Random Forest** | | | | | **K-Nearest Neighbors** | | | | | **Poisson** | | | | |
| **County** | **Gap** | **Conta** | **Lag** | **Metric** | | **Gap** | **Conta** | **Lag** | **Metric** | | **Gap** | **Conta** | **Lag** | **Metric** | |
|  |  |  |  | **R^2** | **rmse** |  |  |  | **R^2** | **rmse** |  |  |  | **R^2** | **rmse** |
| Nassau | 1 | 0.4 | 3 | 0.274 | 696.889 | 5 | 0.1 | 5 | 0.185 | 918.717 | 1 | 0.3 | 10 | 0.125 | 829.278 |
| Queens | 8 | 0.3 | 4 | 0.073 | 588.171 | 20 | 0.2 | 0 | 0.089 | 581.084 | 1 | 0.3 | 9 | 0.048 | 598.486 |
| Putnam | 40 | 0.5 | 1 | 0.159 | 780.442 | 20 | 0.1 | 1 | 0.177 | 859.562 | 5 | 0.1 | 7 | 0.092 | 851.337 |
| Rockland | 8 | 0.1 | 3 | 0.184 | 211.652 | 8 | 0.1 | 7 | 0.182 | 262.935 | 1 | 0.1 | 8 | 0.133 | 358.521 |
| Washington | 5 | 0.1 | 0 | 0.132 | 2128.323 | 8 | 0.5 | 3 | 0.148 | 2211.137 | 1 | 0.1 | 10 | 0.029 | 2246.361 |
| Suffolk | 8 | 0.4 | 10 | 0.146 | 957.286 | 5 | 0.2 | 10 | 0.127 | 969.572 | 8 | 0.5 | 10 | 0.113 | 985.807 |
| Westchester | 40 | 0.4 | 1 | 0.229 | 464.552 | 20 | 0.2 | 5 | 0.318 | 433.762 | 5 | 0.3 | 8 | 0.100 | 540.294 |
| Kings | 40 | 0.3 | 9 | 0.156 | 132.463 | 5 | 0.1 | 0 | 0.120 | 160.536 | 40 | 0.1 | 10 | 0.169 | 125.096 |
| New York | 8 | 0.4 | 5 | 0.096 | 76.214 | 5 | 0.1 | 10 | 0.140 | 185.680 | 20 | 0.4 | 10 | 0.075 | 56.063 |
| Bronx | 40 | 0.5 | 10 | 0.170 | 192.292 | 20 | 0.5 | 10 | 0.055 | 196.413 | 5 | 0.4 | 10 | 0.108 | 190.789 |

1. [↑](#footnote-ref-1)