

IEEE-CIS Fraud Detection — LightGBM Split Points

Adversarial Validation Version

This notebook shows some techniques to snoop on the gradient boosting process used by LightGBM - using its own APIs. This is the adversarial validation version, training LightGBM to predict whether rows are from the train or test set. The [original version of this kernel is here](https://www.kaggle.com/jtrotman/ieee-fraud-lgb-split-points) (<https://www.kaggle.com/jtrotman/ieee-fraud-lgb-split-points>).

By counting the split points used in the decision trees, we can see the ways the algorithm divides the input space up. Given that the train and test sets are different time eras, this may lead to new insights about what areas in *feature space* are specific to past or "future" data.

For more info on LightGBM see [pdf by Microsoft](https://www.microsoft.com/en-us/research/wp-content/uploads/2017/11/lightgbm.pdf) (<https://www.microsoft.com/en-us/research/wp-content/uploads/2017/11/lightgbm.pdf>) or the [LightGBM github](https://github.com/Microsoft/LightGBM) (<https://github.com/Microsoft/LightGBM>).

For another example of gradient boosting model analysis with XGBoost see the great [xgbfi](https://github.com/Far0n/xgbfi) (<https://github.com/Far0n/xgbfi>) tool by Faron (<https://www.kaggle.com/mmueller>).

We start by building a model...

Code

Code

Code

```
train (590540, 433)  
test (506691, 432)
```

Out[3]:
(1097231, 433)

No count features in this version, the kernel runs out of memory. Add some simple extra features:

In [4]:

```
uni['TimeInDay'] = uni.TransactionDT % 86400  
uni['Cents'] = uni.TransactionAmt % 1
```

In [5]:

```
params = {  
    'num_leaves': 64,  
    'objective': 'binary',  
    'min_data_in_leaf': 10,  
    'learning_rate': 0.1,  
    'feature_fraction': 0.5,  
    'bagging_fraction': 0.9,  
    'bagging_freq': 1,  
    'max_cat_to_onehot': 128,
```

```

        'metric': 'auc',
        'num_threads': 8,
        'seed': 42,
        'subsample_for_bin': uni.shape[0]
    }

```

FAST Cross Validation with *Cached OOF*

Let's use (nearly) all input columns as features, and run a KFold CV. By passing a callback to `lgb.cv` we can store references to the trained models and save them, then query them for split point and feature importance information.

In [6]:

```

class LightGbmSnoop:
    def __init__(self):
        self.train_logs = []
        self.valid_logs = []
    def _callback(self, env):
        self.model = env.model
        self.train_logs.append( [b.eval_train()[0][2]
for b in self.model.boosters] )
        self.valid_logs.append( [b.eval_valid()[0][2]
for b in self.model.boosters] )
    def train_log(self):
        return pd.DataFrame(self.train_logs).add_prefix('train_')
    def valid_log(self):
        return pd.DataFrame(self.valid_logs).add_prefix('valid_')
    def logs(self):
        return pd.concat((self.train_log(), self.valid_log()), 1)
    def get_oof(self, n):
        oof = np.zeros(n, dtype=float)
        for i, b in enumerate(self.model.boosters):
            vs = b.valid_sets[0] # validation data
            idx = vs.used_indices
            # Note: this uses all trees, not the early
            # stopping peak count.
            # You can use b.rollback_one_iter() to drop
            # trees :)
            p = b._Booster__inner_predict(1) # 0 = train; 1 = valid
            oof[idx] = p
        return oof

TGT = 'isTest'
FEATS = uni.columns.tolist()
FEATS.remove(TGT)
FEATS.remove('TransactionDT') # makes train/test trivially
# separable, remove it
print(len(FEATS), 'features')

```

```

folds = list(KFold(n_splits=4, shuffle=True, random_state=42).split(uni[FEATS]))
ds = lgb.Dataset(uni[FEATS], uni[TGT], params=params)
s = LightGbmSnoop()
res = lgb.cv(params,
              ds,
              folds=folds,
              num_boost_round=3000,
              early_stopping_rounds=100,
              verbose_eval=100,
              callbacks=[s._callback])

```

433 features

```

[100] cv_agg's auc: 0.917418 + 0.000519999
[200] cv_agg's auc: 0.925358 + 0.000520904
[300] cv_agg's auc: 0.929449 + 0.000672983
[400] cv_agg's auc: 0.932582 + 0.000721708
[500] cv_agg's auc: 0.934982 + 0.000803744
[600] cv_agg's auc: 0.937083 + 0.000706714
[700] cv_agg's auc: 0.938906 + 0.000583477
[800] cv_agg's auc: 0.940321 + 0.000531348
[900] cv_agg's auc: 0.941642 + 0.000479121
[1000] cv_agg's auc: 0.942843 + 0.000465294
[1100] cv_agg's auc: 0.943922 + 0.000444832
[1200] cv_agg's auc: 0.944846 + 0.000427049
[1300] cv_agg's auc: 0.945773 + 0.000362511
[1400] cv_agg's auc: 0.946638 + 0.000327034
[1500] cv_agg's auc: 0.947491 + 0.000307769
[1600] cv_agg's auc: 0.948264 + 0.000296751
[1700] cv_agg's auc: 0.948851 + 0.000307833
[1800] cv_agg's auc: 0.949436 + 0.000349221
[1900] cv_agg's auc: 0.94999 + 0.000380292
[2000] cv_agg's auc: 0.950554 + 0.000365481
[2100] cv_agg's auc: 0.951094 + 0.000392246
[2200] cv_agg's auc: 0.95159 + 0.000428611
[2300] cv_agg's auc: 0.952025 + 0.000441231
[2400] cv_agg's auc: 0.952468 + 0.000434424
[2500] cv_agg's auc: 0.952878 + 0.00040348
[2600] cv_agg's auc: 0.953266 + 0.000406937
[2700] cv_agg's auc: 0.95363 + 0.000415056
[2800] cv_agg's auc: 0.953959 + 0.000382181
[2900] cv_agg's auc: 0.954295 + 0.000375364
[3000] cv_agg's auc: 0.9546 + 0.000375695

```

Demo of how to save validation predictions, and get AUC of full validation:

In [7]:

```

OOF = s.get_oof(uni.shape[0])
np.save('ieee_fraud_adversarial_lgb_oof', OOF)
roc_auc_score(uni[TGT], OOF)

```

Out[7]:

```

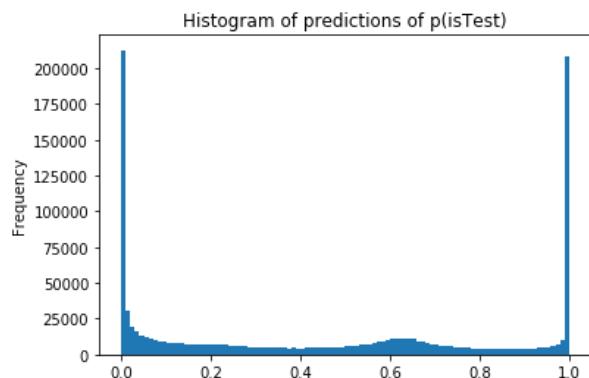
0.9546000216430311

```

The models are normally quite confident:

```
In [8]: pd.Series(OOF).plot.hist(bins=100, title='Histogram o  
f predictions of p(isTest)')
```

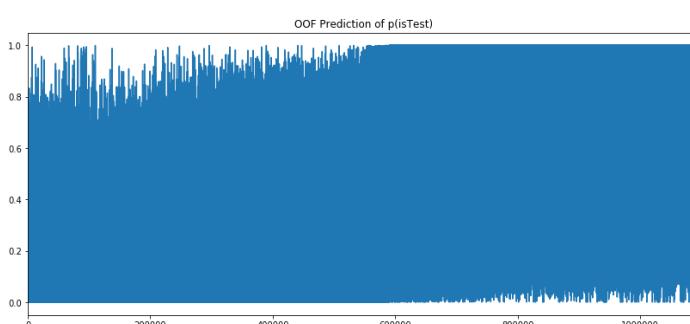
```
Out[8]: <matplotlib.axes._subplots.AxesSubplot at 0x7fe7dd08b  
c50>
```



And the predictions are generally lower for the training set (first half) and higher for the test set (2nd half).

```
In [9]: pd.Series(OOF).plot(figsize=(14,6), title='OOF Prediction of p(isTest)')
```

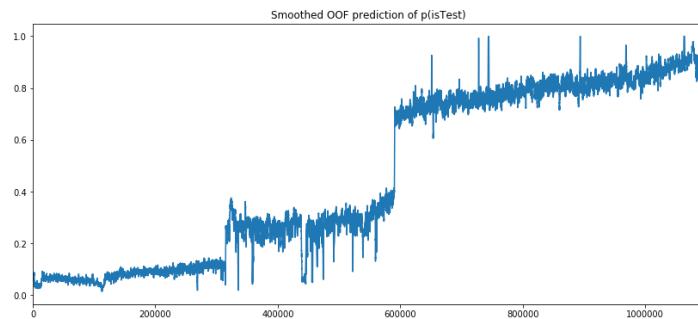
```
Out[9]: <matplotlib.axes._subplots.AxesSubplot at 0x7fe7dc329  
f98>
```



But that is hard to see, so using smoothing helps, and reveals a **shelf** at about 300k rows where train suddenly becomes a bit more like test, the abrupt change to the test set is visible at about 590k rows, and after that the test set rows get a higher prediction as time goes on :)

```
In [10]: pd.Series(OOF).rolling(500).mean().plot(figsize=(14,6  
, title='Smoothed OOF prediction of p(isTest)')
```

```
Out[10]:  
<matplotlib.axes._subplots.AxesSubplot at 0x7fe7dce0c  
cf8>
```



Save the models - LightGBM saves in an easy to parse text format. (The files won't be used here but it is useful in general to save.)

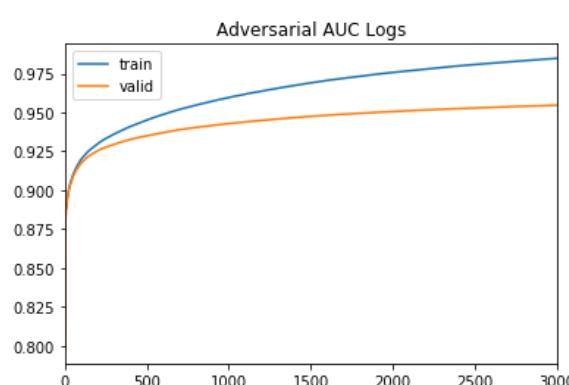
```
In [11]:  
for i, b in enumerate(s.model.boosters):  
    b.save_model(f'ieee_fraud_adversarial_lgb_model_  
{i}.txt')
```

Likewise for AUC training/validation logs.

```
In [12]:  
s.logs().to_csv(f'ieee_fraud_adversarial_lgb_auc_log  
.csv', index_label='Round')
```

```
In [13]:  
logs = pd.DataFrame({'train':s.train_log().mean(1),  
'valid':s.valid_log().mean(1)})  
logs.train.plot(legend=True, title='Adversarial AUC L  
ogs')  
logs.valid.plot(legend=True)
```

```
Out[13]:  
<matplotlib.axes._subplots.AxesSubplot at 0x7fe7c77f4  
128>
```



Standard Feature Importances

Sum the usual feature importances from all models in our CV collection.

```
In [14]:  
def make_importances(clf, importance_type):  
    return pd.Series(data=clf.feature_importance(importance_type), index=clf.feature_name())  
  
IMPORTANCES = pd.concat((make_importances(b, 'gain')  
                         for b in s.model.boosters),  
                        1).sum(1).to_frame('Gain')  
IMPORTANCES['Count'] = pd.concat((make_importances(b,  
'split') for b in s.model.boosters), 1).sum(1)  
IMPORTANCES.sort_values('Gain', ascending=False).head()  
()
```

Out[14]:

	Gain	Count
id_31	2.246253e+06	4867
D15	1.307593e+06	24224
id_13	9.172363e+05	2425
D10	7.777234e+05	21659
D11	6.946566e+05	22728

```
In [15]:  
IMPORTANCES.to_csv('ieee_fraud_adversarial_lgb_importances.csv')
```

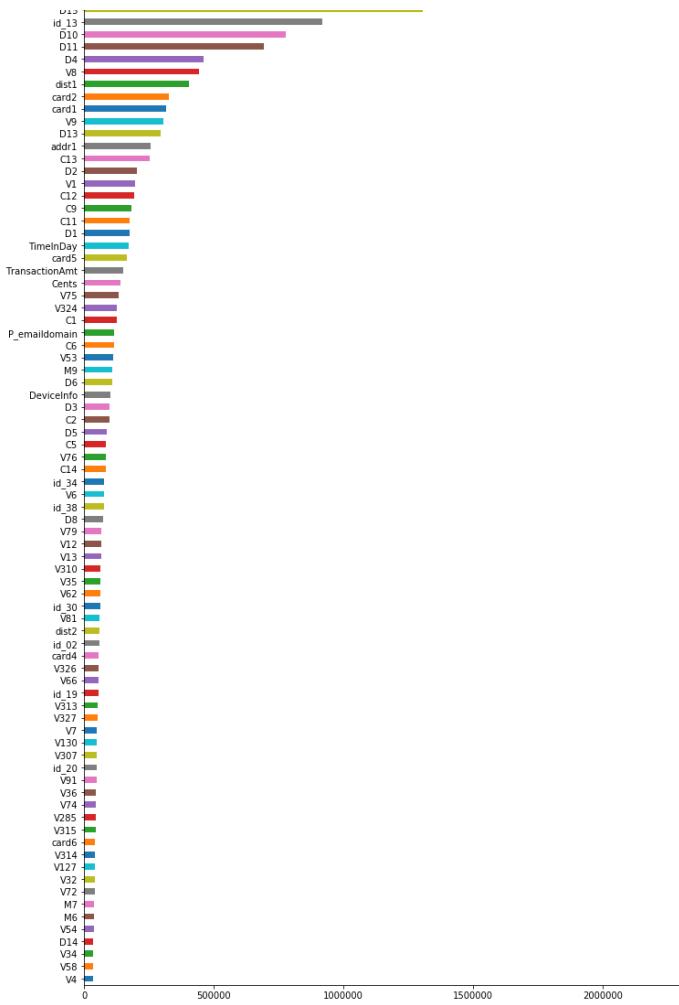
Standard Plot

```
In [16]:  
COLORS = [  
    'tab:blue', 'tab:orange', 'tab:green', 'tab:red',  
    'tab:purple',  
    'tab:brown', 'tab:pink', 'tab:gray', 'tab:olive',  
    'tab:cyan'  
]  
toplot = IMPORTANCES.sort_values('Gain').tail(80)  
toplot['Gain'].plot.barh(figsize=(12,20), color=COLORS, title='Adversarial Feature Gain')
```

Out[16]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fe7c76c7828>
```





Booster.dump_model()

The returned LightGBM model format is hierarchical, trees are nested `dict` objects containing `left_child` and `right_child` subtrees. Walking over the trees and summarizing the splits can be done with a short recursive function...

```
tree_info - list of dicts
(each contains):
    tree_structure
        left_child
        right_child
```

The `dump_model()` information records 'gain' at each split, and we simply re-use that.

In [17]:

```
# uncomment to see model structure
# clf.dump_model(num_iteration=2)['tree_info']
```

In [18]:

```
# NOTE: lightgbm.Booster has a new get_split_value_histogram API which counts split points used.  
# This code pre-dates that, and sums gain instead of counting appearances.  
# Here it is adapted from the original to use a collection of models, and sum the overall data.  
  
def get_split_point_stats_multi(clfs):  
    split_points = defaultdict(Counter)  
  
    def visit_node(d):  
        if 'tree_info' in d:  
            for tree in d['tree_info']: # a list of trees  
                visit_node(tree)  
            for k in ['tree_structure', 'left_child', 'right_child']:  
                if k in d:  
                    visit_node(d[k])  
                if 'split_feature' in d:  
                    split_points[names[d['split_feature']]][d['threshold']] += d['split_gain']  
  
        for clf in clfs:  
            names = clf.feature_name()  
            visit_node(clf.dump_model())  
    return split_points
```

In [19]:

```
split_points = get_split_point_stats_multi(s.model.boosters)
```

Each feature indexes a Counter object in the `split_points` dict. In each Counter, the keys are feature values, and the values are sum of gain, for example, here are the most used values in feature `card1`, with the gain for each:

In [20]:

```
split_points['card1'].most_common(5)
```

Out[20]:

```
[(18366.50000000004, 9251.407817780972),  
(16560.50000000004, 7868.754109740257),  
(6933.50000000001, 7852.93145608902),  
(9408.50000000002, 4097.73870074749),  
(7861.50000000001, 3051.095986843109)]
```

Dump all the split point data to an xlsx file (can be opened with open-source *Open Office* or *Libre Office* (<https://www.libreoffice.org/download/download/>))

In [21]:

```
with pd.ExcelWriter('ieee_fraud_adversarial_split_points.xlsx') as writer:  
    for feat in FEATS:  
        counter = split_points[feat]
```

```

df = pd.Series(counter, name=feat).sort_index()
().to_frame('GainSum')
df.to_excel(writer, feat, index_label=feat)

for sheet in writer.sheets.values():
    sheet.set_column(0, 0, 30)

```

Plotting Code

Warning: this only shows the 50 split points with the most gain, so the x-axis will be a bit nonlinear, some values won't appear. See the xlsx file for all the values.

In [22]:
MAX_SHOW = 50

Code

Plots For IEEE Features

All the features with 2 or more unique split point values are shown.

Notes

Most of the split points have long decimal values like `379.0000000000006` - the LightGBM algorithm only sees binned data, so it sets split thresholds as values [halfway between neighbouring bin lower/upper edges](#) (<https://github.com/microsoft/LightGBM/blob/master/src/io/bin.cpp>), but bumped upwards a tiny fraction using `std::nextafter` in the [C++ standard library](#) (<https://en.cppreference.com/w/cpp/numeric/math/nextafter>), resulting in strangely precise floating point format (https://en.wikipedia.org/wiki/Double-precision_floating-point_format) values :)

Zero is checked for using a `kZeroThreshold = 1e-35` (<https://github.com/microsoft/LightGBM/blob/master/include/LightGBM/meta.h>) variable - this comes out of the model as a split point of `1.0000000180025095e-35` — a tiny number. When you see that, think zero.

Split points for categorical dtypes depends on the `max_cat_to_onehot` which I have set to 128 - so categoricals in this data set are treated with a one-vs-all split. This means `feature==value` in the node split test, instead of the usual `feature<=value`. `max_cat_to_onehot` is by default set to 4, meaning categories with more values than this use splits based on target statistics, and the resulting split points have values like `1||3||5||7||8||9` which indicate which category codes go down the *left* branch. (But this is hard to show in bar charts... hence I used *one-vs-all splits*.)

Note: in this adversarial version, `id` columns are included. Two (`DeviceInfo` and `id_30`) have more than 128 values, so their bar charts have these obscure very long

axis labels :)

LightGBM keeps a separate bin for NaN values and at all node tests, records whether that bin goes left/right separately - this is not shown here.

What to Look For

With adversarial validation, one of the the aims is to detect differences in the train/test set features, and possibly alter the representations to make test look more like train, with the hope that this results in better model accuracy.

In some ways what we **don't** see is more interesting than what we **do**. As with normal feature importances: if we see a feature is not used at all it is clearly not useful in detecting train/test difference, so is probably a safe feature to predict isFraud.

If there is **one prominent peak** it means the train or test sets have values on one side of the split that are not present in the other set. It may make sense to cap the values in both sets.

Notes

Here are some quick observations:

- ProductCD (https://www.kaggle.com/jtrotman/ieee-fraud-adversarial-lgb-split-points#plot_ProductCD) differs most in the H, R and S values, as also seen in the heatmap plots notebook (<https://www.kaggle.com/jtrotman/ieee-fraud-time-series-heatmaps>).
- id_30 (https://www.kaggle.com/jtrotman/ieee-fraud-adversarial-lgb-split-points#plot_id_30) has very clear peaks at iOS 11.4.1 and the later values of Mac OS X 10_13_4 onwards, which are obviously time-related, software versions released in the test set era.
- Cents (https://www.kaggle.com/jtrotman/ieee-fraud-adversarial-lgb-split-points#plot_Cents) (links don't work! It is the last plot!) has an interesting spike at about 0.989 - which might be tied in to [Chris Deotte's discussion post here](https://www.kaggle.com/c/ieee-fraud-detection/discussion/108467#624331) (<https://www.kaggle.com/c/ieee-fraud-detection/discussion/108467#624331>).

A further useful extension would be to look at how the leaf node values vary underneath each split in the left/right branches, similarly to **SHAP plots** (<https://github.com/slundberg/shap>)...

In [24]:

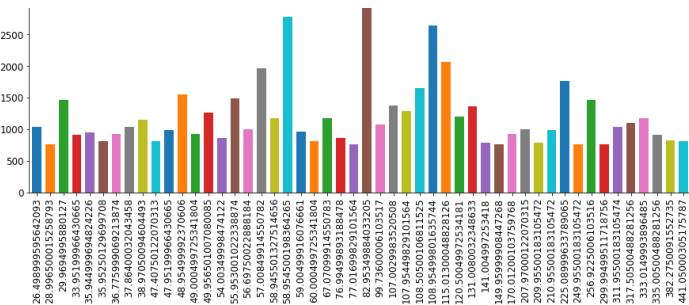
```
for col in FEATS:  
    counts = split_points[col]  
    if len(counts) >= 2:  
        plot_it(col)
```

TransactionAmt

Used 23663 times, total gain is 151563.1643782854.

253 split point values used. Most permeant is 82.95349884033205 with gain of 3247.079798221588.

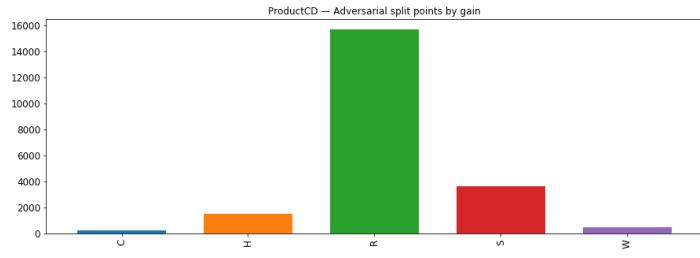




ProductCD

Used 421 times, total gain is 21543.100453674793.

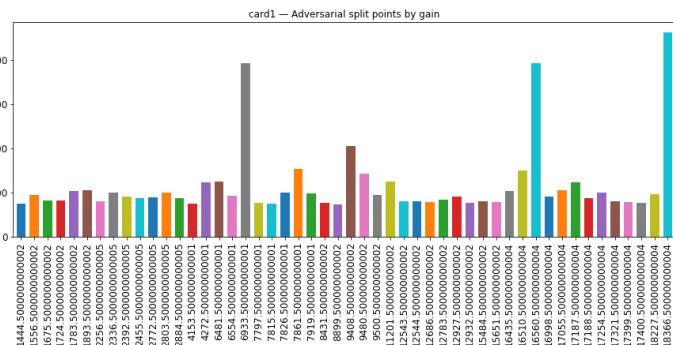
5 split point values used. Most prevalent is R with gain of 15691.42731565237.



card1

Used 38522 times, total gain is 317609.9794524312.

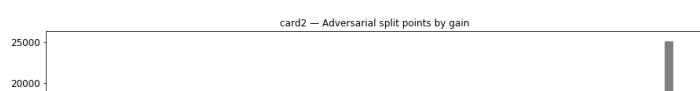
253 split point values used. Most predominant is 18366.500000000004 with gain of 9251.407817780972.

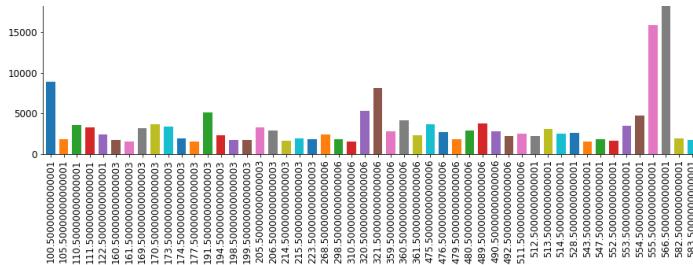


card2

Used 32901 times, total gain is 325350.36206150055.

234 split point values used. Most fashionable is 566.5000000000001 with gain of 25107.91057342291.

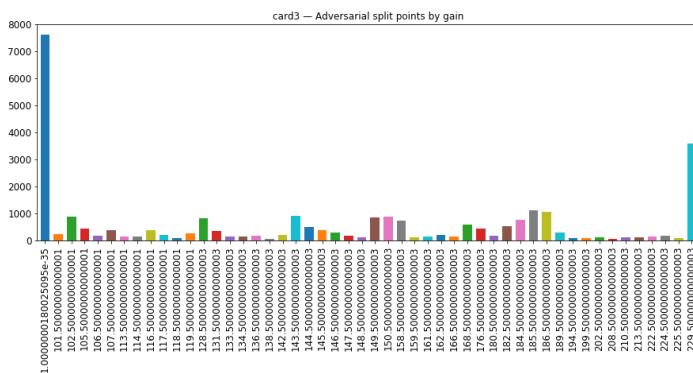




card3

Used 1887 times, total gain is 29319.61563438177.

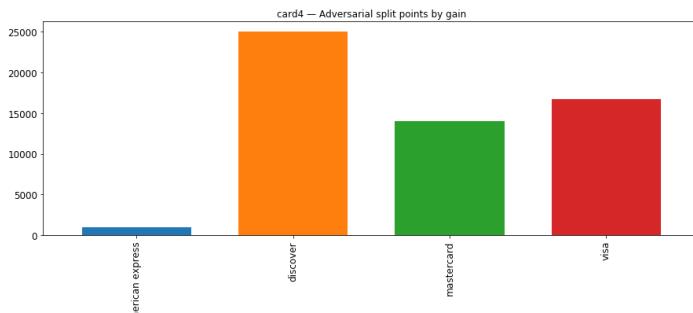
102 split point values used. Most widespread is 1.0000000180025095e-35 with gain of 7608.756909370422.



card4

Used 3847 times, total gain is 56647.4757591486.

4 split point values used. Most prevalent is discover with gain of 25001.350955307484.

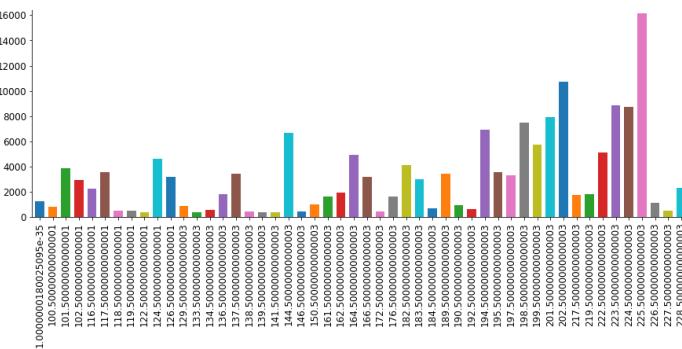


card5

Used 12641 times, total gain is 164563.96667945385.

106 split point values used. Most permeant is 225.5000000000003 with gain of 16143.541038393974

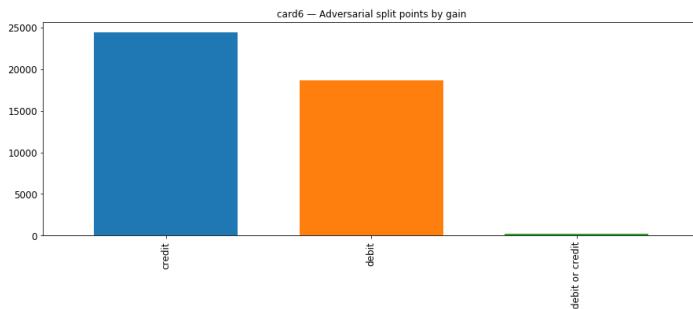




card6

Used 3159 times, total gain is 43292.7411441803.

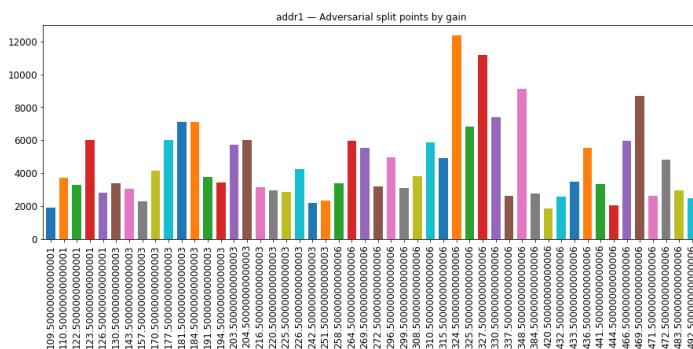
3 split point values used. Most marked is credit with gain of
24445.71588385105.



addr1

Used 29773 times, total gain is 256261.89598238468.

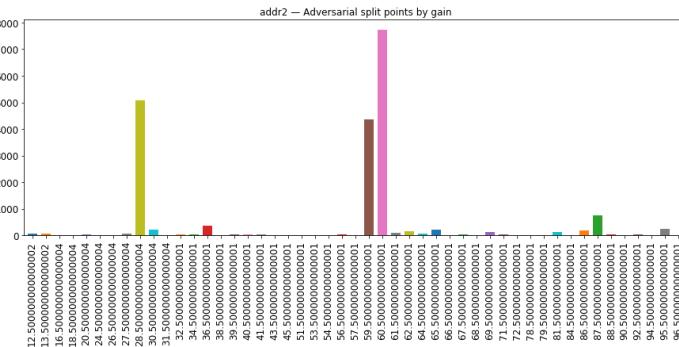
97 split point values used. Most fashionable is 324.50000000000006 with gain of 12367.778772473335.



addr2

Used 484 times, total gain is 20323.694277584553.

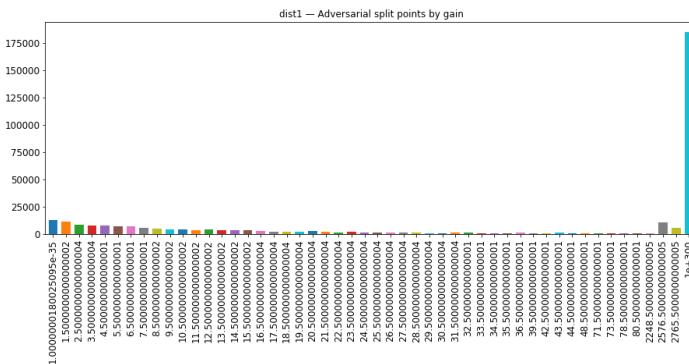
49 split point values used. Most fashionable is 60.50000000000001 with gain of 7721.225754857063.



dist1

Used 26132 times, total gain is 403000.83928096294.

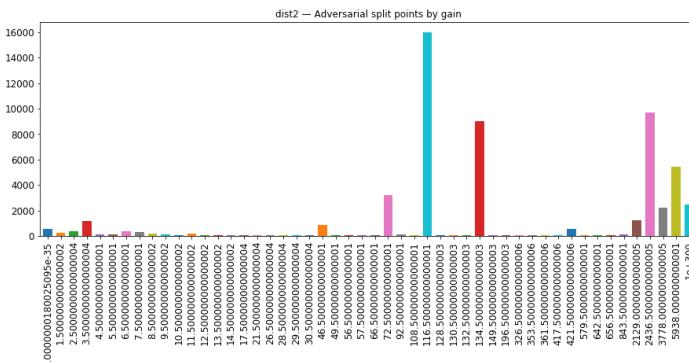
254 split point values used. Most prevalent is 1e+300 with gain of 184667.1056280136.



dist2

Used 1449 times, total gain is 58717.63701701164.

234 split point values used. Most omnipresent is 116.50000000000001 with gain of 15994.766300320625.

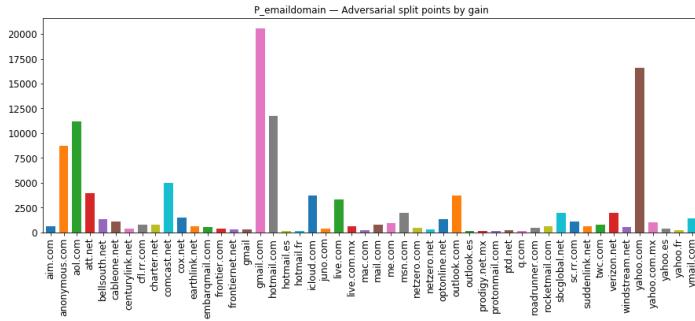


P_emaildomain

Used 16245 times, total gain is 116147.77913445234.

57 split point values used. Most widespread is gmail.com with gain of

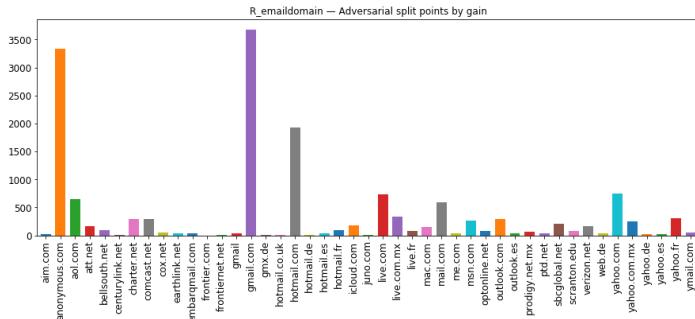




R_emaildomain

Used 2175 times, total gain is 15585.220767080784.

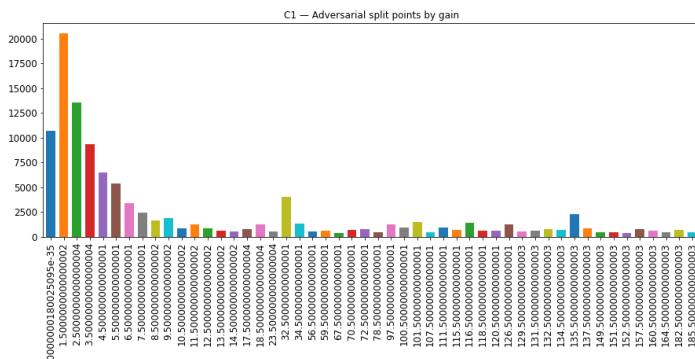
45 split point values used. Most ubiquitous is gmail.com with gain of 3678.150267124176.



C1

Used 9634 times, total gain is 125400.10309255123.

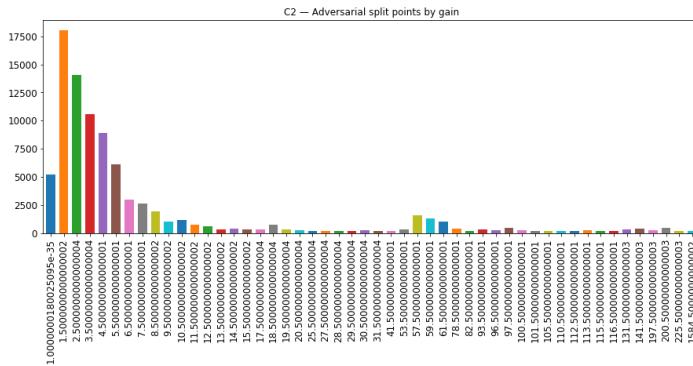
193 split point values used. Most prevalent is 1.5000000000000002 with gain of 20538.45765888691.



C2

Used 10042 times, total gain is 97039.95013958216.

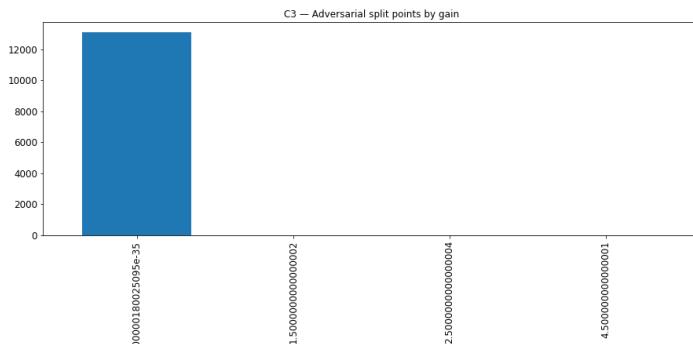
191 split point values used. Most prevalent is 1.5000000000000002 with gain of 18032.743148446083.



C3

Used 179 times, total gain is 13125.590671360493.

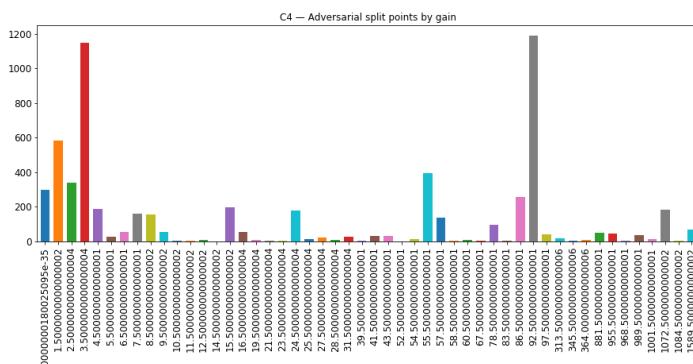
4 split point values used. Most common is 1.000000180025095e-35 with gain of 13090.193818747997.



C4

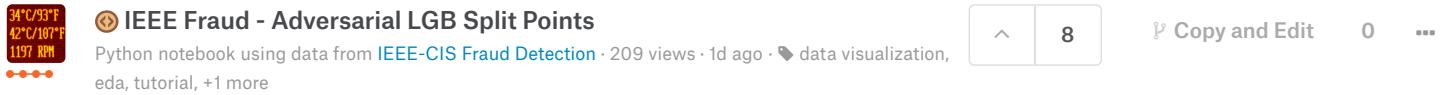
Used 520 times, total gain is 6191.895752251148.

50 split point values used. Most frequent is 92.50000000000001 with gain of 1189.1618411540985.

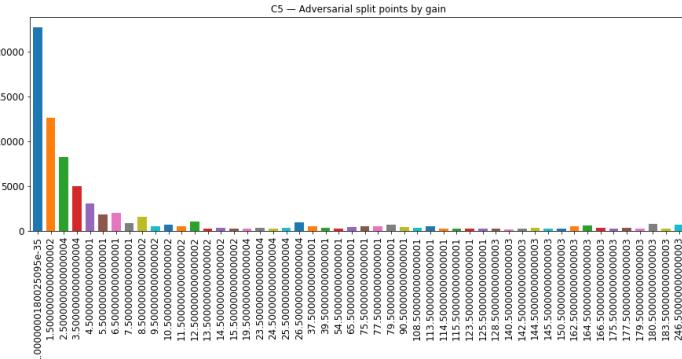


C5

Used 7840 times, total gain is 85606.0208504796.



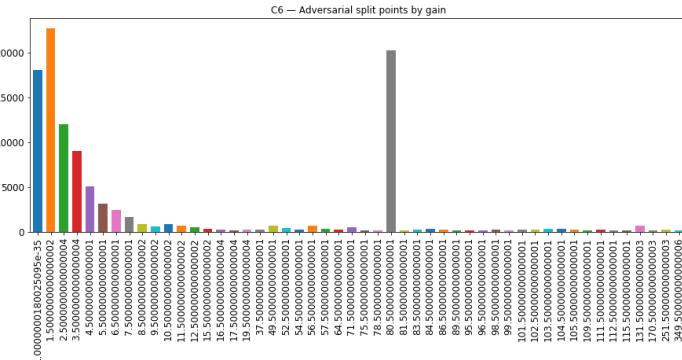
Ver
G 1



C6

Used 9347 times, total gain is 115285.31126695871.

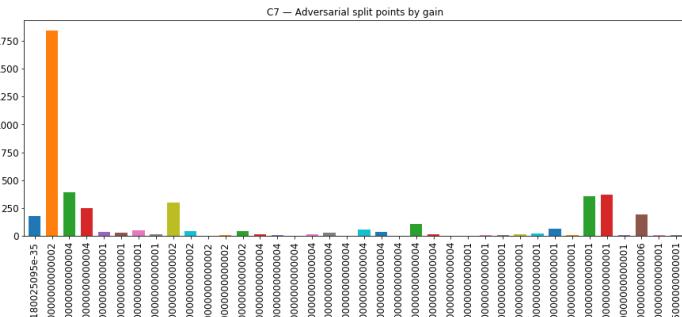
158 split point values used. Most common is 1.5000000000000002 with gain of 22691.363609790802.

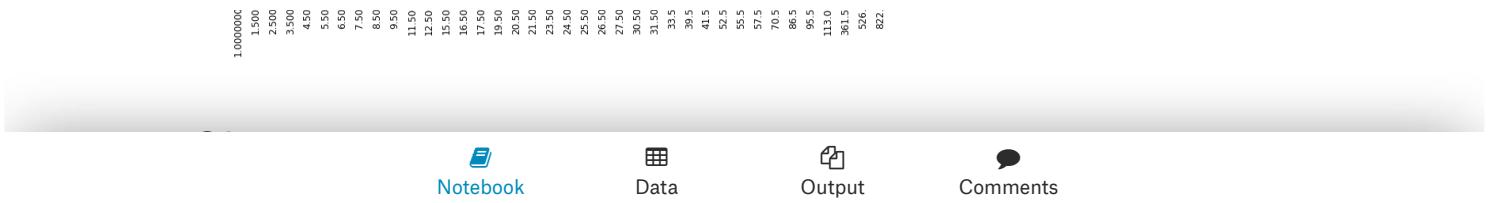


C7

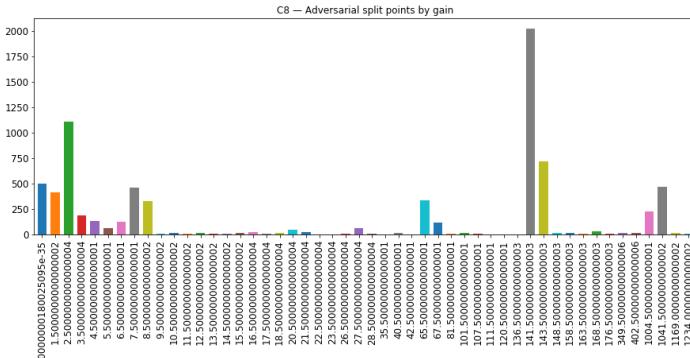
Used 296 times, total gain is 4508.615918874741.

38 split point values used. Most prevalent is 1.5000000000000002 with gain of 1842.8632644414902.





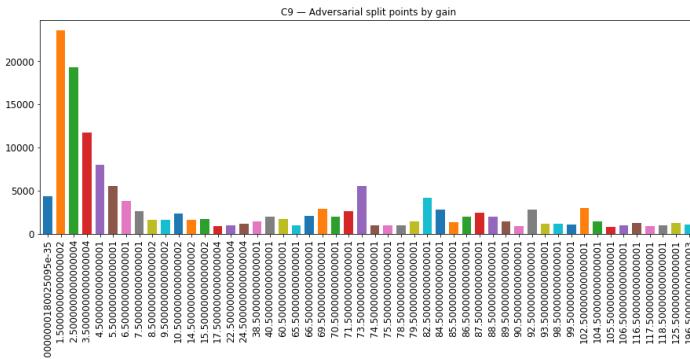
53 split point values used. Most abundant is 141.5000000000003 with gain of 2021.6981136798859.



C9

Used 10834 times, total gain is 180983.25834572315.

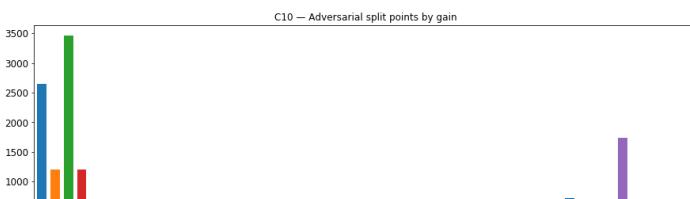
166 split point values used. Most frequent is 1.5000000000000002 with gain of 23592.666761159897.

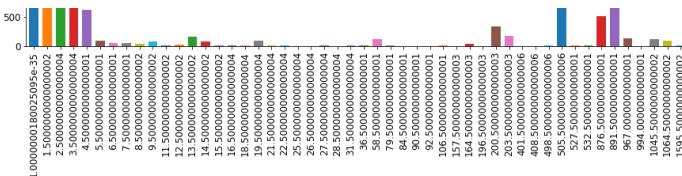


C10

Used 952 times, total gain is 13999.618431210518.

55 split point values used. Most prevalent is 2.5000000000000004 with gain of 3464.0627009272575.

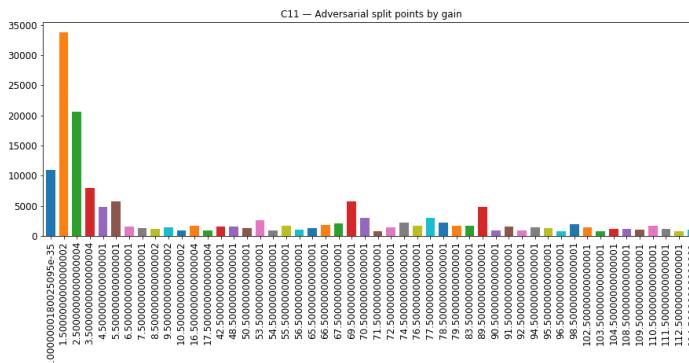




C11

Used 8945 times, total gain is 176098.2341042757.

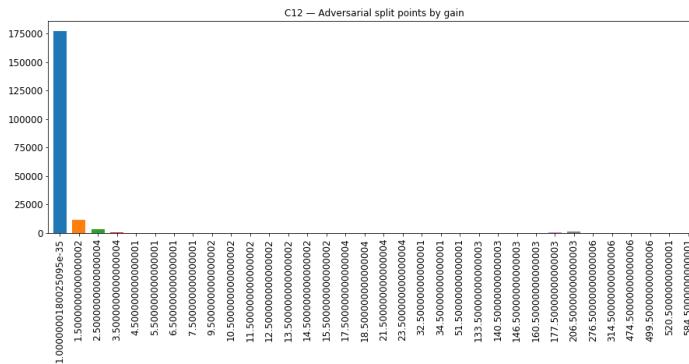
167 split point values used. Most frequent is 1.5000000000000002 with gain of 33785.51872956753.



C12

Used 3319 times, total gain is 194810.0408140421.

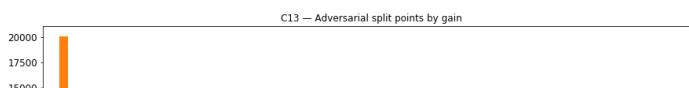
34 split point values used. Most repetitive is 1.0000000180025095e-35 with gain of 177195.27428519726.

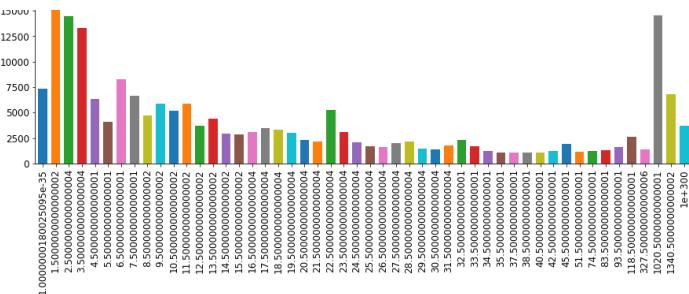


C13

Used 18918 times, total gain is 252317.1316409707.

251 split point values used. Most popular is 1.5000000000000002 with gain of 20044.59220856428.

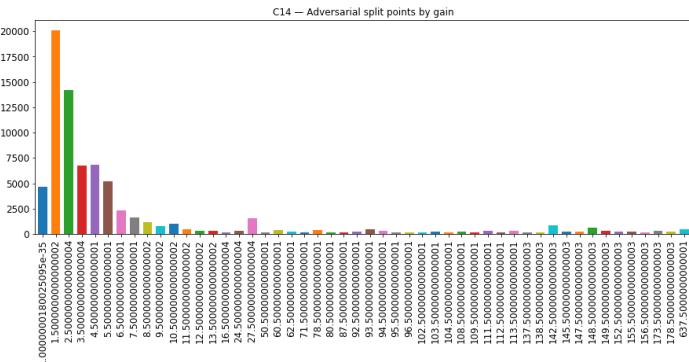




C14

Used 8567 times, total gain is 82624.6978392601.

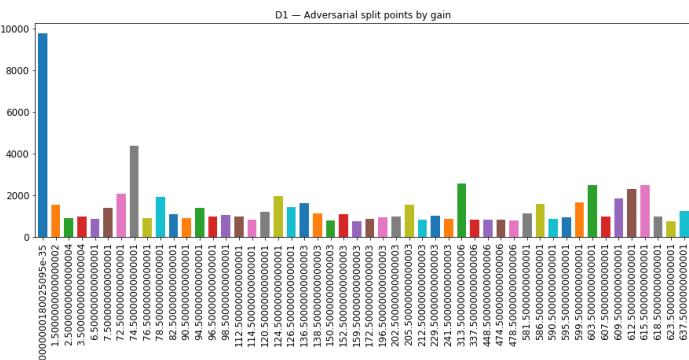
166 split point values used. Most recurrent is 1.5000000000000002 with gain of 20090.252142190933.



D1

Used 16543 times, total gain is 174401.45500093699.

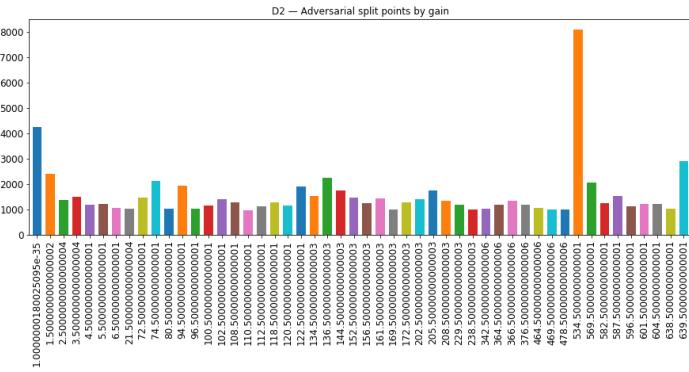
254 split point values used. Most predominant is 1.0000000180025095e-35 with gain of 9763.251786589622.



D2

Used 21093 times, total gain is 202941.4184308052.

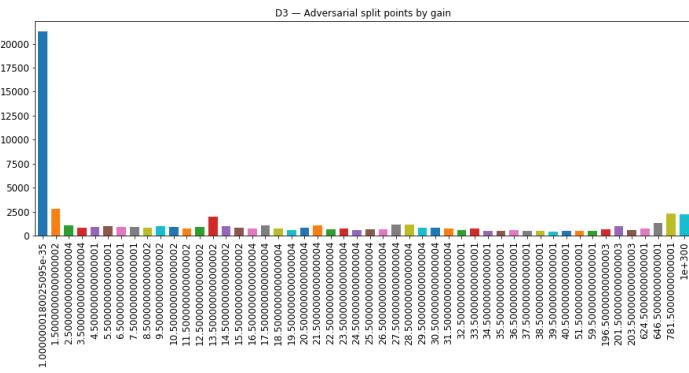
254 split point values used. Most predominant is 534.5000000000001 with gain of 8085.674043893814.



D3

Used 11456 times, total gain is 97643.502548635.

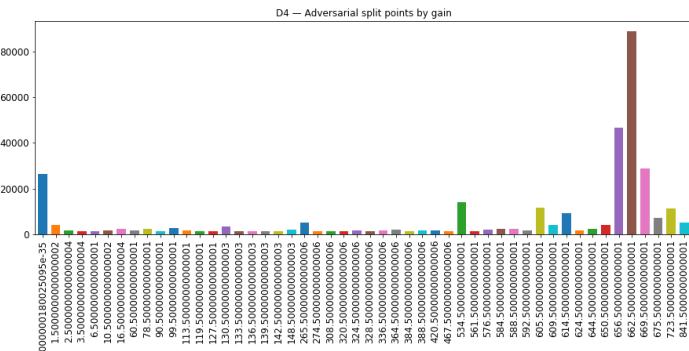
254 split point values used. Most marked is 1.000000180025095e-35 with gain of 21272.60170596838.



D4

Used 22094 times, total gain is 462295.28063976765.

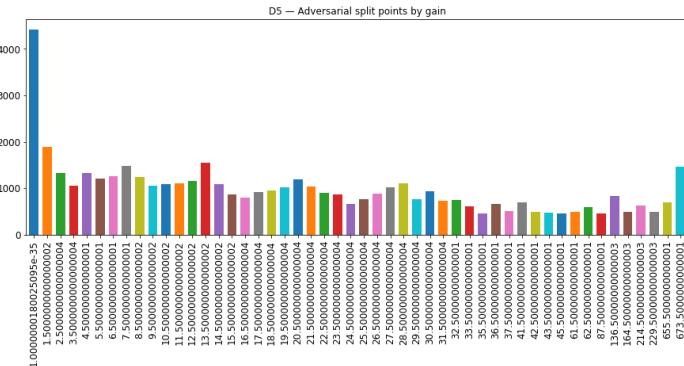
245 split point values used. Most frequent is 662.500000000001 with gain of 88801.90844243765.



D5

Used 13969 times, total gain is 87637.63159918785.

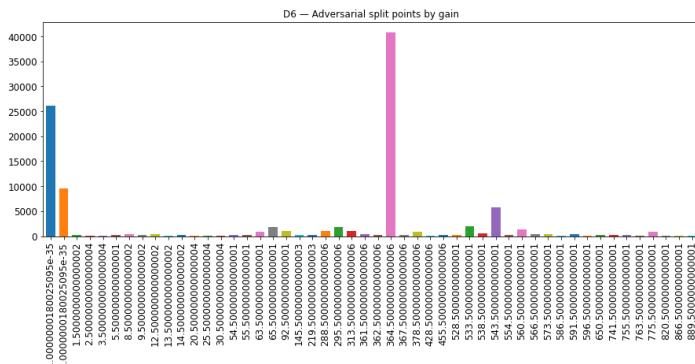
253 split point values used. Most prevalent is 1.000000180025095e-35 with gain of 4416.394515573978.



D6

Used 1602 times, total gain is 108157.63439172506.

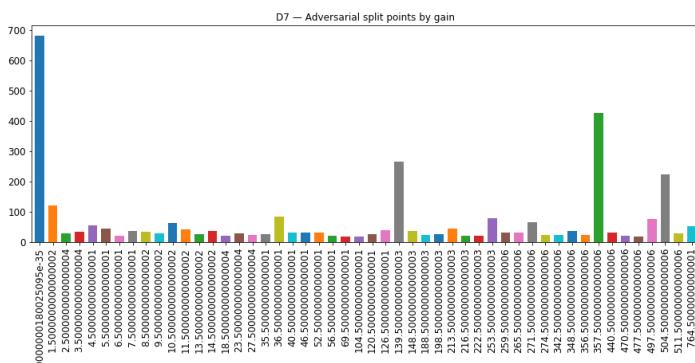
235 split point values used. Most ubiquitous is 364.50000000000006 with gain of 40848.95568275452.



D7

Used 763 times, total gain is 4521.403549969196.

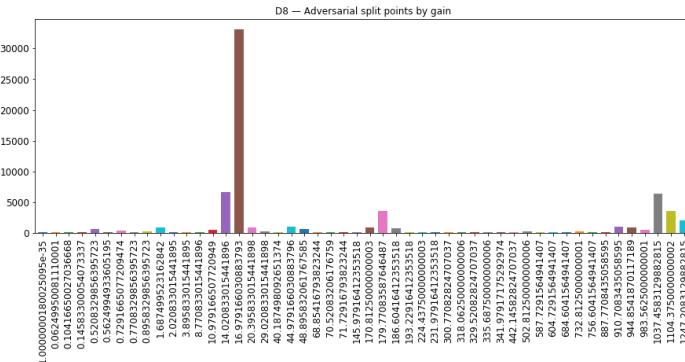
206 split point values used. Most rampant is 1.000000180025095e-35 with gain of 681.5980417728424.



D8

Used 2529 times, total gain is 74753.188154459.

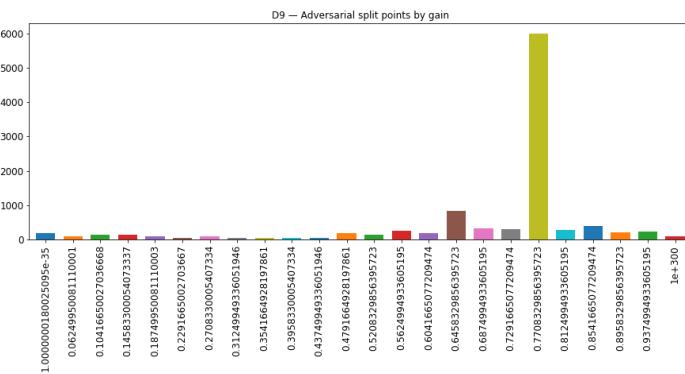
252 split point values used. Most marked is 16.979166030883793 with gain of 33110.949120759964.



D9

Used 920 times, total gain is 10345.573375463486.

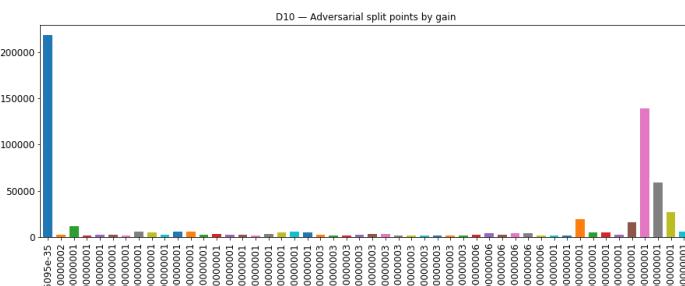
24 split point values used. Most permeant is 0.7708329856395723 with gain of 5992.900786221027.



D10

Used 21659 times, total gain is 777723.3581698537.

250 split point values used. Most prevalent is 1.000000180025095e-35 with gain of 218412.14364302158.

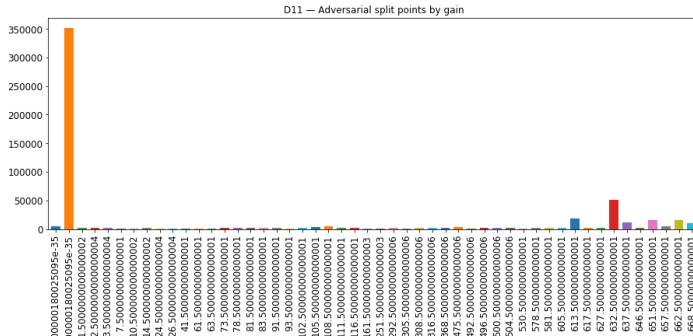




D11

Used 22728 times, total gain is 694656.6273384094.

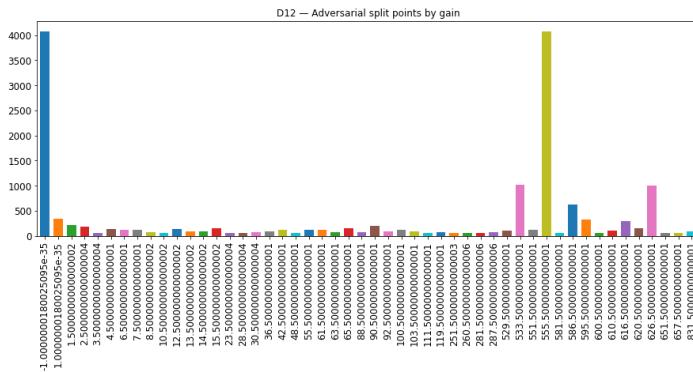
241 split point values used. Most legendary is 1.0000000180025095e-35 with gain of 351887.7202029824.



D12

Used 1125 times, total gain is 18571.856088221073.

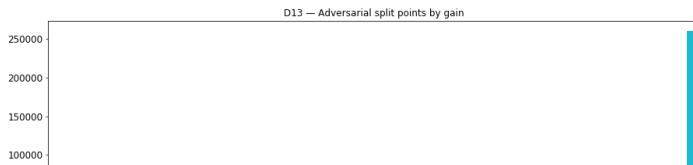
212 split point values used. Most permeant is 555.5000000000001 with gain of 4080.123885154724.

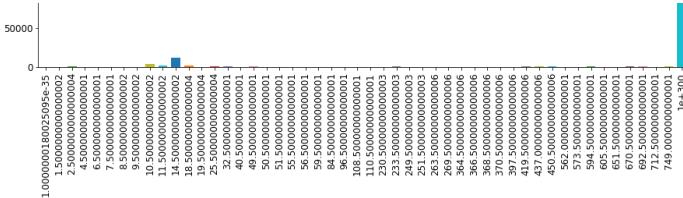


D13

Used 872 times, total gain is 295736.534360528.

211 split point values used. Most repetitious is 1e+300 with gain of 260108.55028903484.

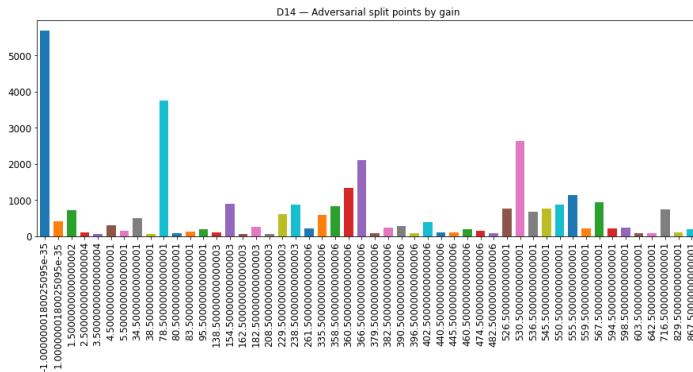




D14

Used 1533 times, total gain is 35019.19658702612.

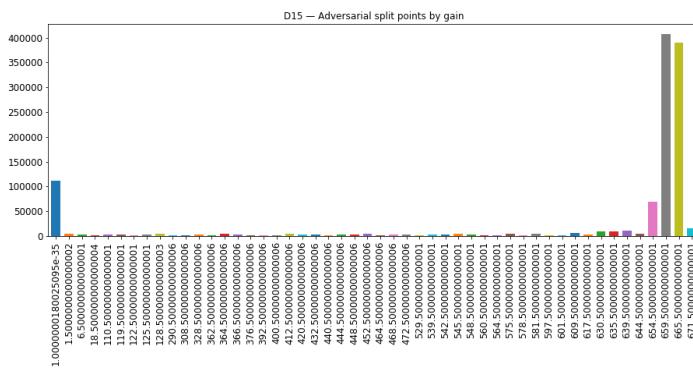
245 split point values used. Most omnipresent is $-1.0000000180025095e-35$ with gain of 5691.5376209020615.



D15

Used 24224 times, total gain is 1307592.5807458162.

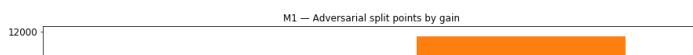
248 split point values used. Most useful is 659.5000000000001 with gain of 407086.3410087824.



M1

Used 301 times, total gain is 11751.720702290535.

2 split point values used. Most repetitious is T with gain of 11730.355393648148.

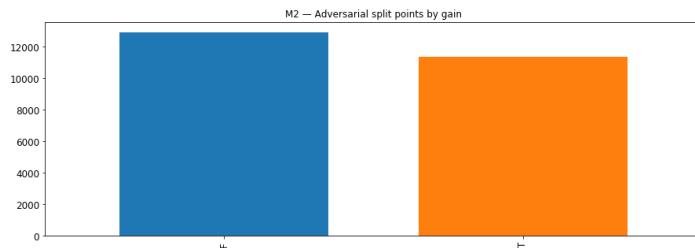




M2

Used 1851 times, total gain is 24304.470523178577.

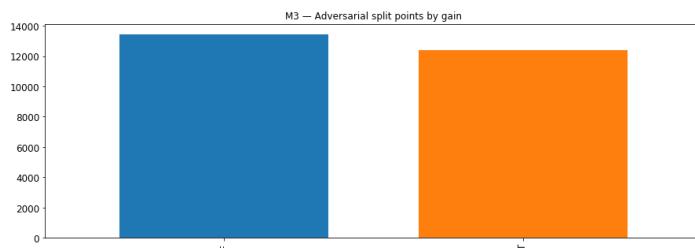
2 split point values used. Most legendary is F with gain of 12943.764265477657.



M3

Used 2801 times, total gain is 25827.426543176174.

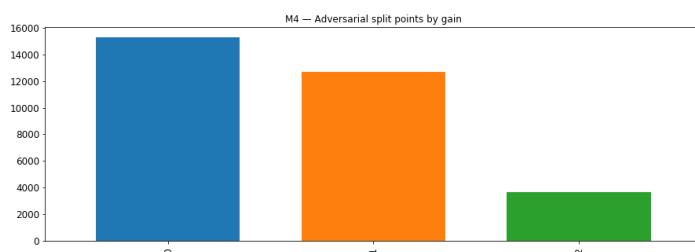
2 split point values used. Most prevalent is F with gain of 13453.130078017712.



M4

Used 4120 times, total gain is 31632.90115046501.

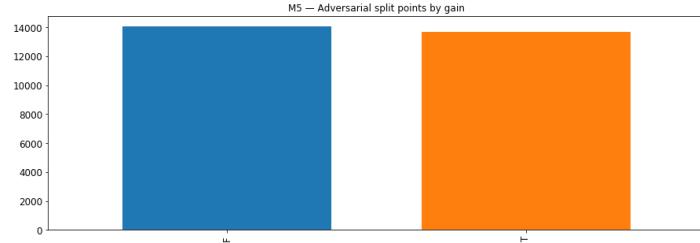
3 split point values used. Most common is M0 with gain of 15279.66448044777.



M5

Used 3895 times, total gain is 27757.17631328106.

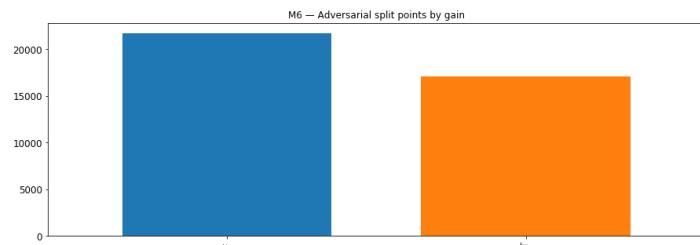
2 split point values used. Most prevalent is F with gain of 14083.58747547865.



M6

Used 4719 times, total gain is 38803.984395205975.

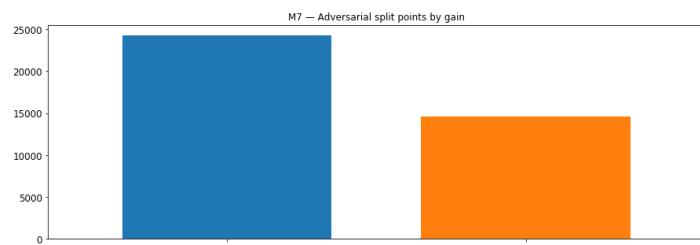
2 split point values used. Most predominant is F with gain of 21743.943099677563.



M7

Used 3296 times, total gain is 38877.38343065977.

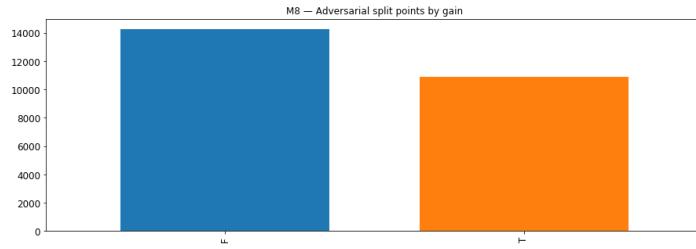
2 split point values used. Most permeant is F with gain of 24313.672574043274.



M8

Used 3481 times, total gain is 25169.873684942722.

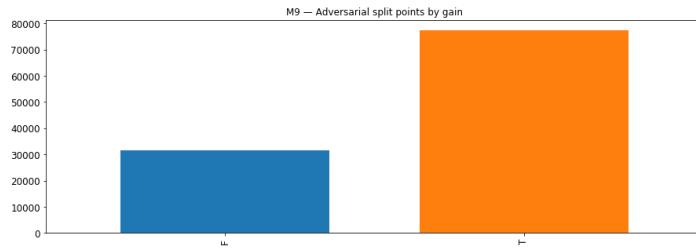
2 split point values used. Most frequent is F with gain of 14285.884580612183.



M9

Used 3162 times, total gain is 108937.16567200422.

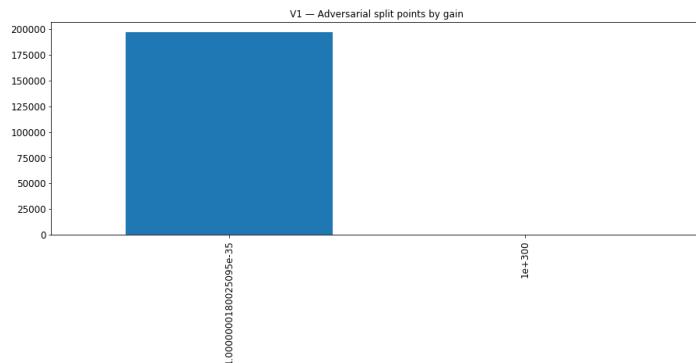
2 split point values used. Most widespread is T with gain of 77464.01338392496.



V1

Used 130 times, total gain is 197366.43957221508.

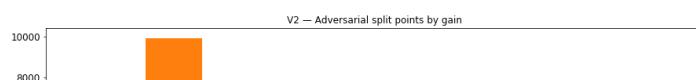
2 split point values used. Most predominant is 1.0000000180025095e-35 with gain of 197119.69404780865.

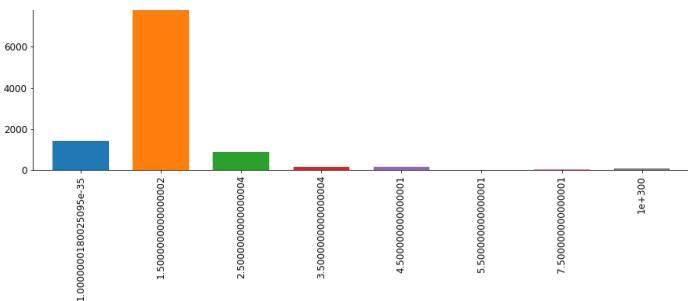


V2

Used 1089 times, total gain is 12578.568874418736.

8 split point values used. Most ubiquitous is 1.5000000000000002 with gain of 9919.46149545908.

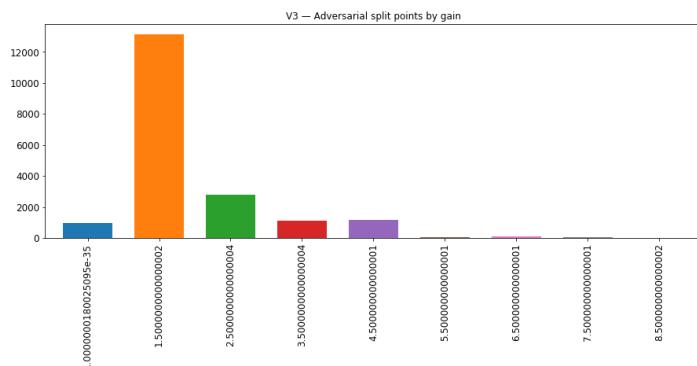




V3

Used 1693 times, total gain is 19277.7842797637.

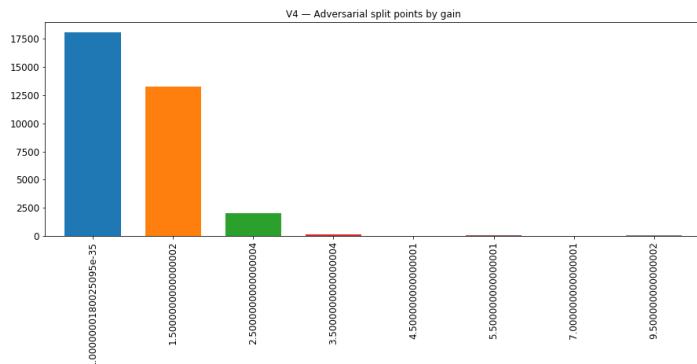
9 split point values used. Most useful is 1.5000000000000002 with gain of 13138.305290043354.



V4

Used 2532 times, total gain is 33702.87941020727.

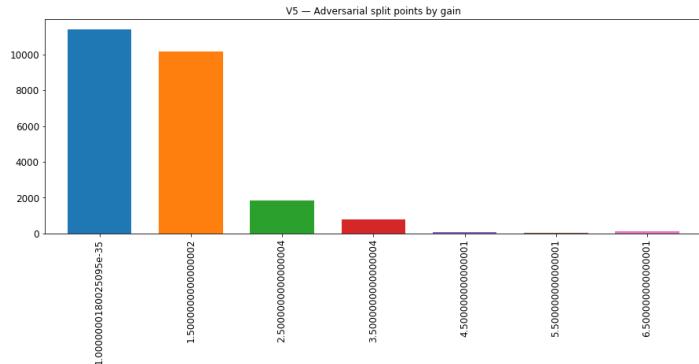
8 split point values used. Most repetitive is 1.000000180025095e-35 with gain of 18076.869130432606.



V5

Used 2659 times, total gain is 24417.379495620728.

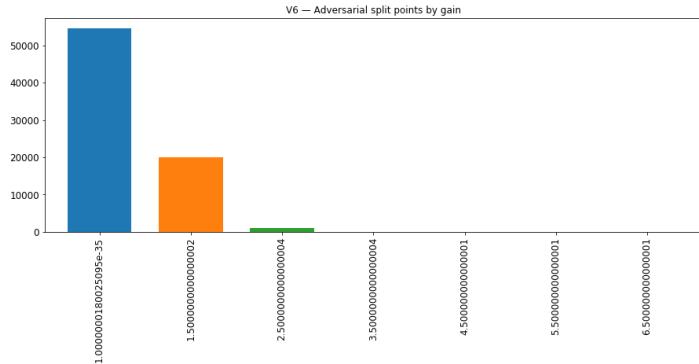
7 split point values used. Most omnipresent is 1.000000180025095e-35 with gain of 11387.88492333889.



V6

Used 1261 times, total gain is 75813.64600986242.

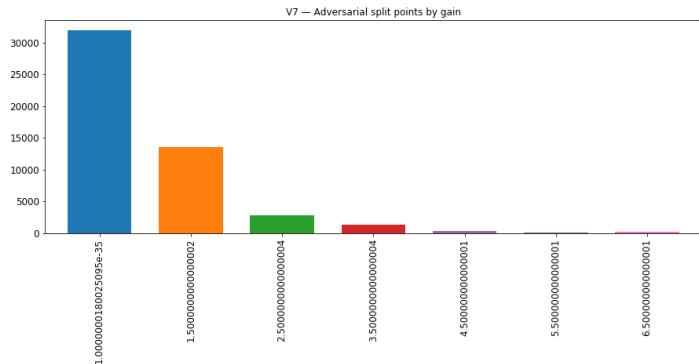
7 split point values used. Most repetitious is $1.0000000180025095e-35$ with gain of 54529.83078491688.



V7

Used 1705 times, total gain is 50314.62897181511.

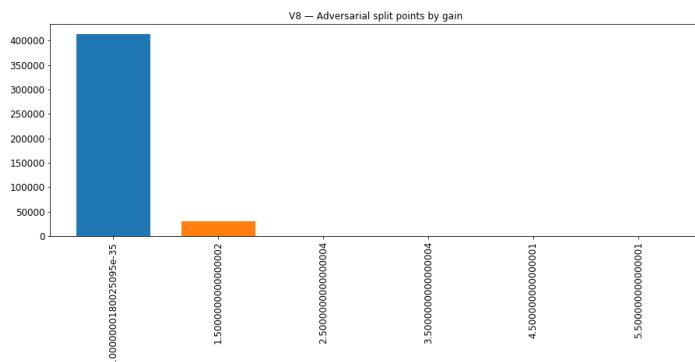
7 split point values used. Most widespread is $1.0000000180025095e-35$ with gain of 31941.398604869843.



V8

Used 741 times, total gain is 443538.9647501111.

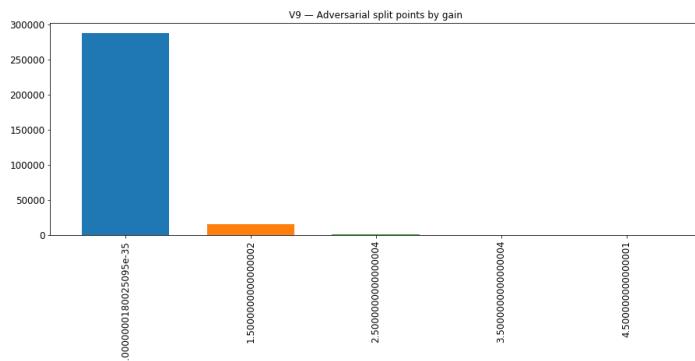
6 split point values used. Most omnipresent is $1.0000000180025095e-35$ with gain of 413024.93414354324.



V9

Used 969 times, total gain is 305057.7426453829.

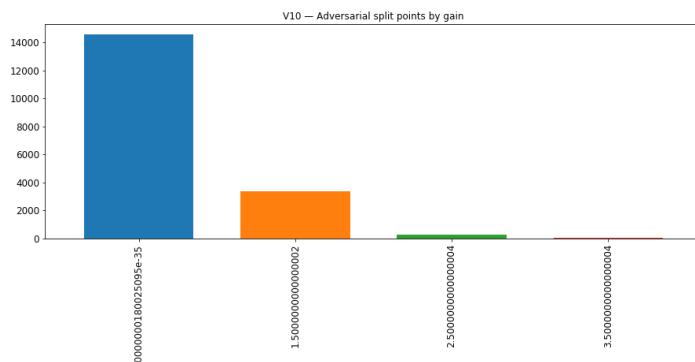
5 split point values used. Most common is $1.0000000180025095e-35$ with gain of 287738.4413137436.



V10

Used 2140 times, total gain is 18274.072870731354.

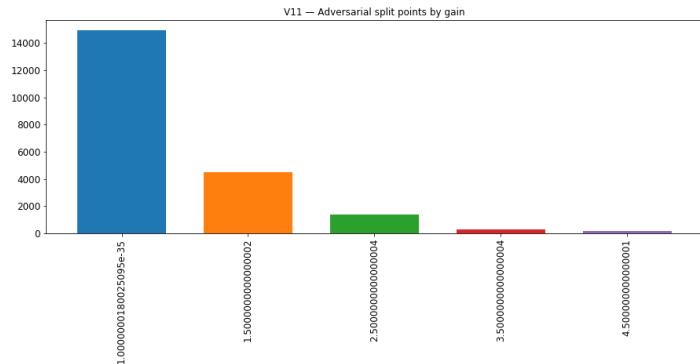
4 split point values used. Most rife is $1.0000000180025095e-35$ with gain of 14565.34134888649.



V11

Used 1834 times, total gain is 21265.74315416813.

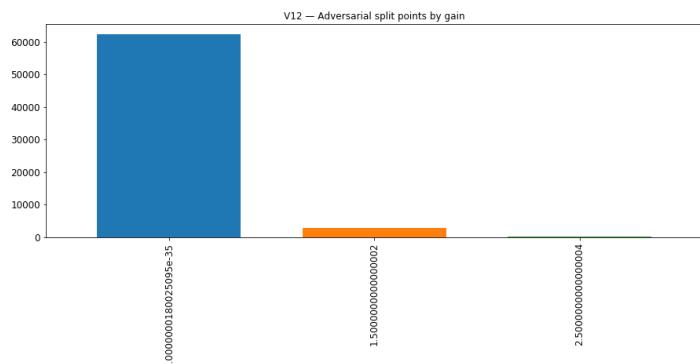
5 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 14942.67973715067.



V12

Used 2622 times, total gain is 65490.99117422104.

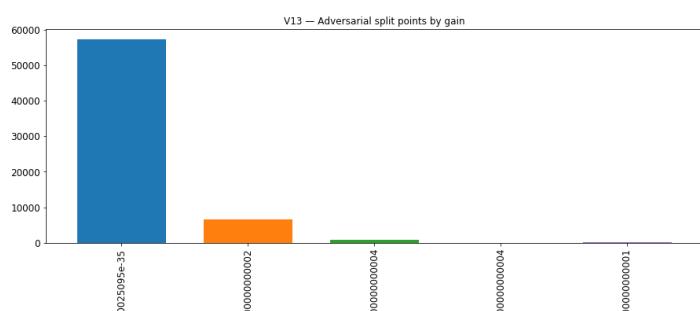
3 split point values used. Most popular is 1.0000000180025095e-35 with gain of 62271.17864155769.



V13

Used 2674 times, total gain is 65091.84780097008.

5 split point values used. Most omnipresent is 1.0000000180025095e-35 with gain of 57252.288760483265.

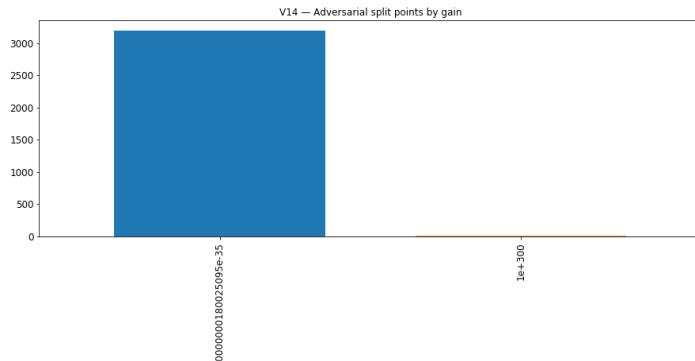




V14

Used 35 times, total gain is 3205.297068834305.

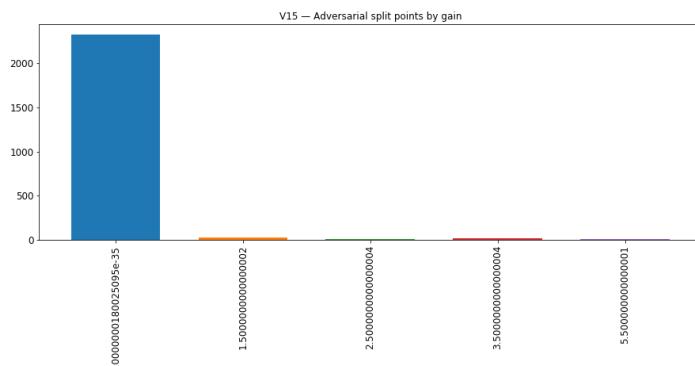
2 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 3194.3141107559204.



V15

Used 91 times, total gain is 2380.7429687976837.

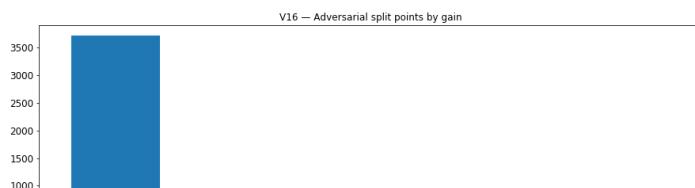
5 split point values used. Most repetitious is 1.0000000180025095e-35 with gain of 2323.575026035309.

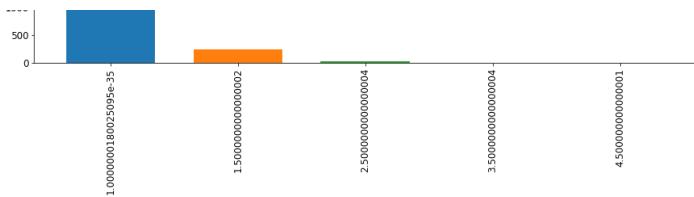


V16

Used 82 times, total gain is 3985.8423600792885.

5 split point values used. Most frequent is 1.0000000180025095e-35 with gain of 3718.9231224656105.

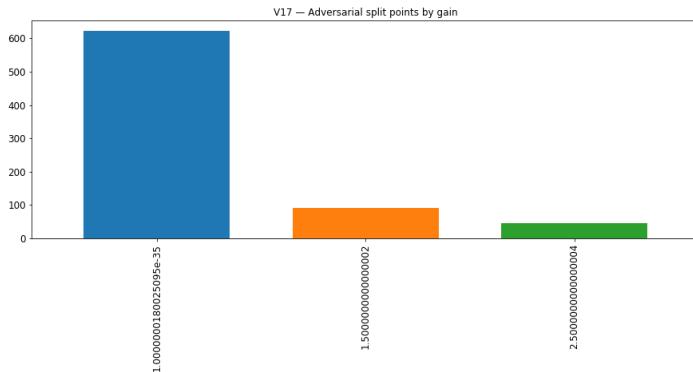




V17

Used 90 times, total gain is 759.7448108196259.

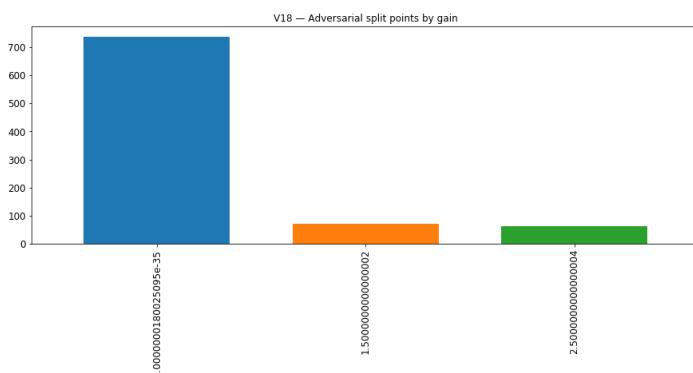
3 split point values used. Most common is 1.0000000180025095e-35 with gain of 622.27773219347.



V18

Used 72 times, total gain is 870.6559357643127.

3 split point values used. Most popular is 1.0000000180025095e-35 with gain of 737.1770958900452.

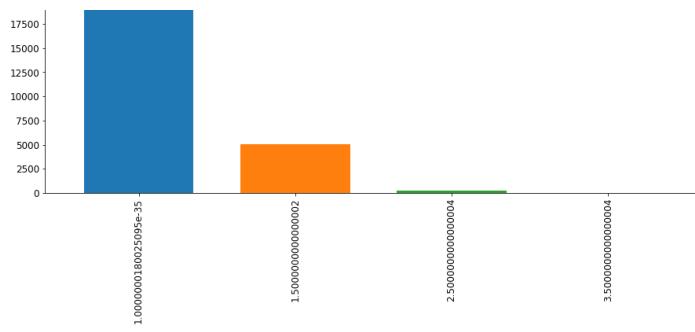


V19

Used 1923 times, total gain is 26376.573436379433.

4 split point values used. Most omnipresent is 1.0000000180025095e-35 with gain of 21080.437629044056.

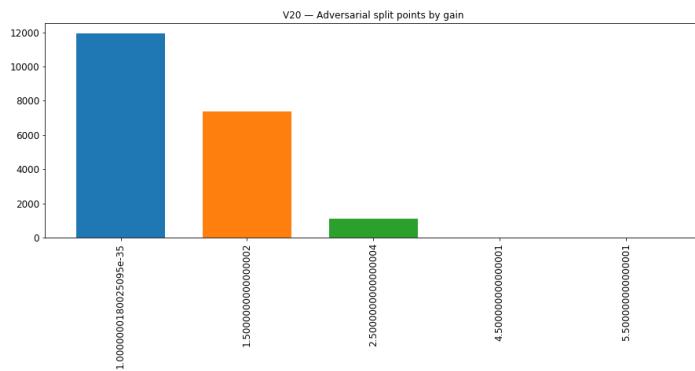




V20

Used 2105 times, total gain is 20390.82603442669.

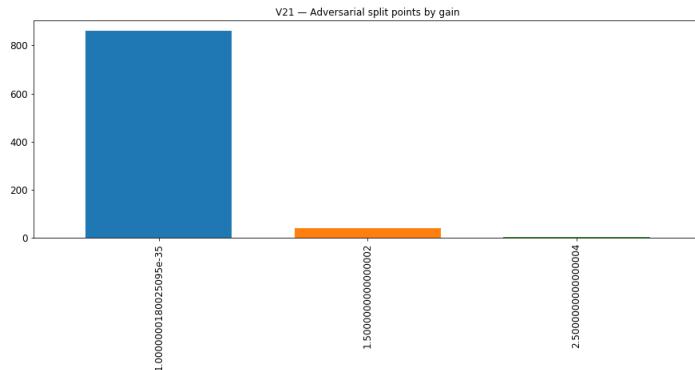
5 split point values used. Most useful is $1.0000000180025095e-35$ with gain of 11930.619119882584.



V21

Used 80 times, total gain is 905.5001949071884.

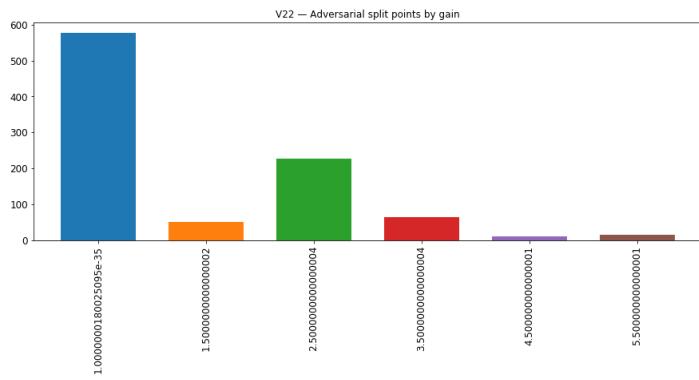
3 split point values used. Most recurrent is $1.0000000180025095e-35$ with gain of 861.0460886955261.



V22

Used 106 times, total gain is 945.0052220225334.

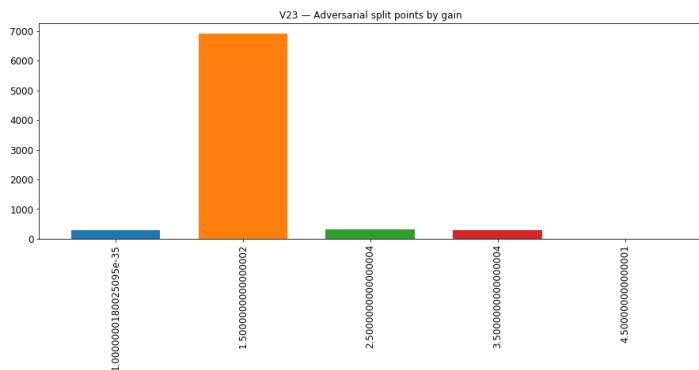
6 split point values used. Most predominant is $1.0000000180025095e-35$ with gain of 577.034532725811.



V23

Used 928 times, total gain is 7845.914085030556.

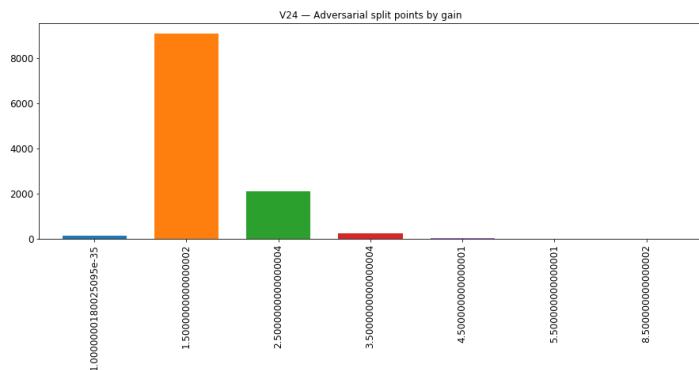
5 split point values used. Most widespread is 1.5000000000000002 with gain of 6915.63644105196.



V24

Used 1294 times, total gain is 11608.563282251358.

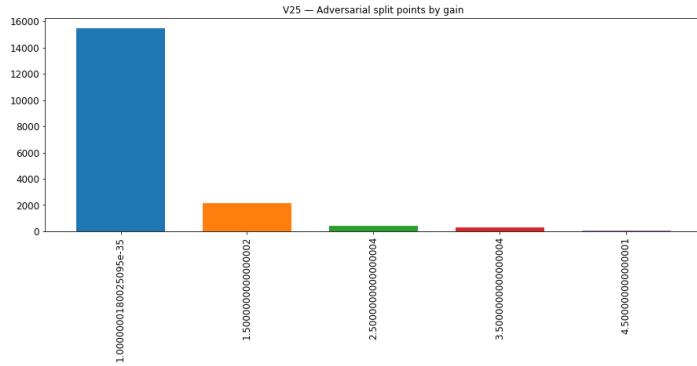
7 split point values used. Most useful is 1.5000000000000002 with gain of 9068.785975277424.



V25

Used 755 times, total gain is 18317.203464508057.

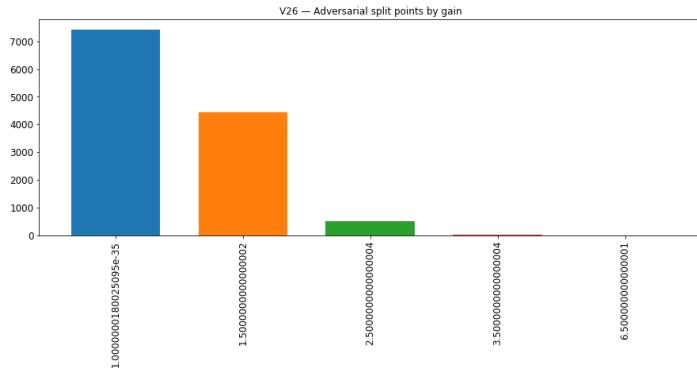
5 split point values used. Most widespread is 1.0000000180025095e-35 with gain of 15481.873806655407.



V26

Used 760 times, total gain is 12380.492507457733.

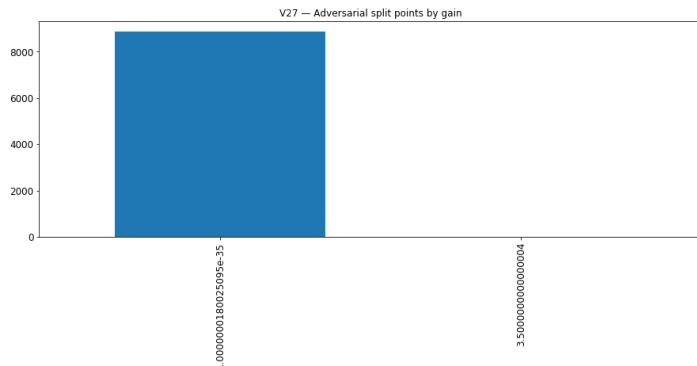
5 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 7417.666780292988.



V27

Used 49 times, total gain is 8871.869192123413.

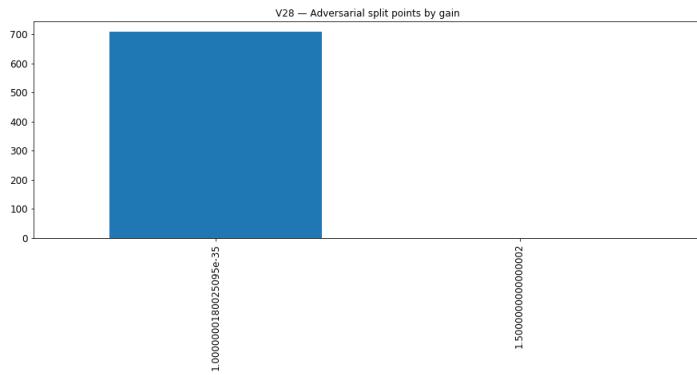
2 split point values used. Most recurrent is 1.0000000180025095e-35 with gain of 8870.161244869232.



V28

Used 34 times, total gain is 708.9311826825142.

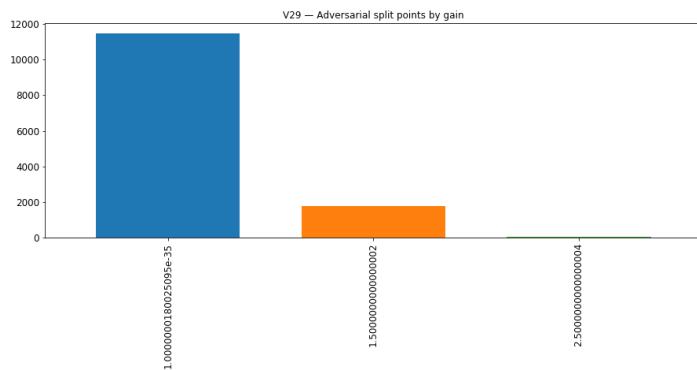
2 split point values used. Most usual is $1.0000000180025095e-35$ with gain of 707.9908078312874.



V29

Used 1215 times, total gain is 13275.387563824654.

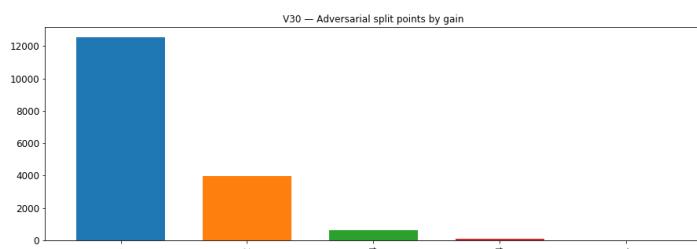
3 split point values used. Most repetitious is $1.0000000180025095e-35$ with gain of 11471.03008455038.



V30

Used 1358 times, total gain is 17197.777567029.

5 split point values used. Most predominant is $1.0000000180025095e-35$ with gain of 12550.009726762772.

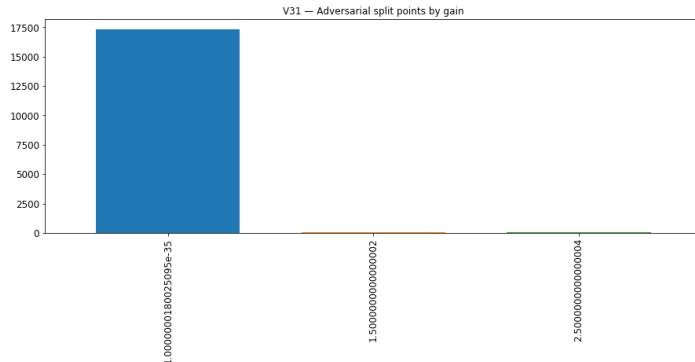


1.0000000180025095e-35:
150000000000000:
2.50000000000000:
3.50000000000000:
4.50000000000000:

V31

Used 61 times, total gain is 17431.327341854572.

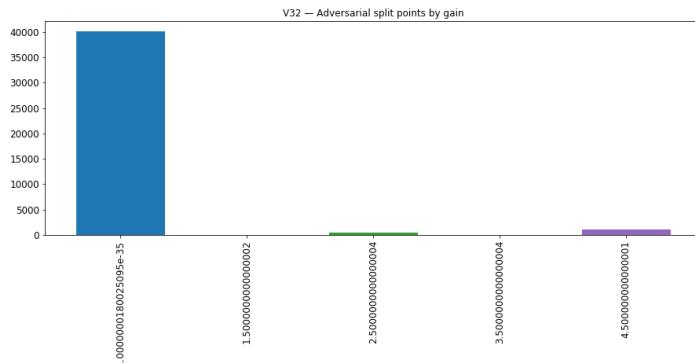
3 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 17323.429617464542.



V32

Used 65 times, total gain is 41571.7515604496.

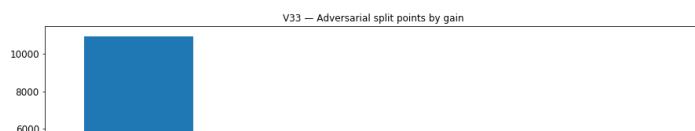
5 split point values used. Most usual is 1.0000000180025095e-35 with gain of 40108.82513129711.

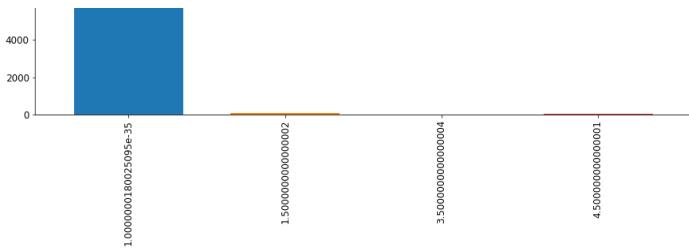


V33

Used 513 times, total gain is 11061.40159380436.

4 split point values used. Most legendary is 1.0000000180025095e-35 with gain of 10942.02270925045.

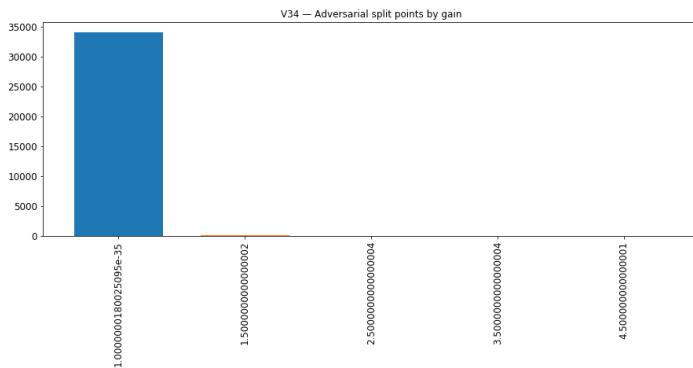




V34

Used 934 times, total gain is 34279.10362517834.

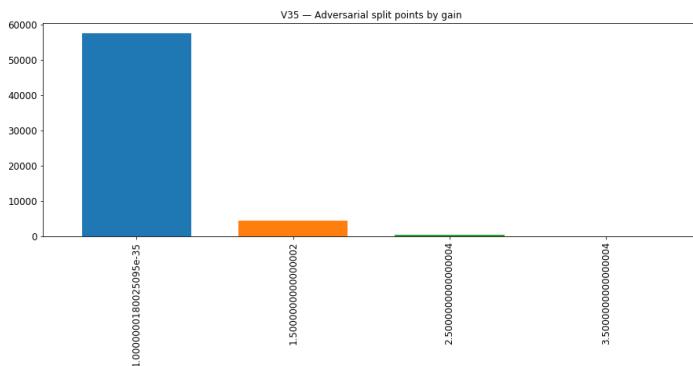
5 split point values used. Most predominant is $1.000000180025095e-35$ with gain of 34086.176283836365.



V35

Used 3174 times, total gain is 62348.50111043453.

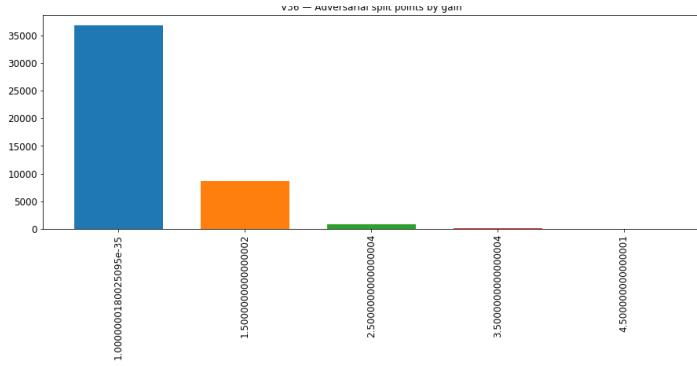
4 split point values used. Most usual is $1.000000180025095e-35$ with gain of 57436.51920312643.



V36

Used 3223 times, total gain is 46594.584846794605.

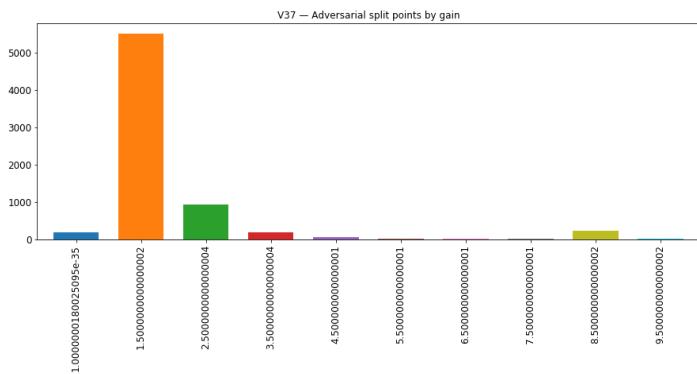
5 split point values used. Most abundant is $1.000000180025095e-35$ with gain of 36829.3697745204.



V37

Used 1039 times, total gain is 7199.52895963192.

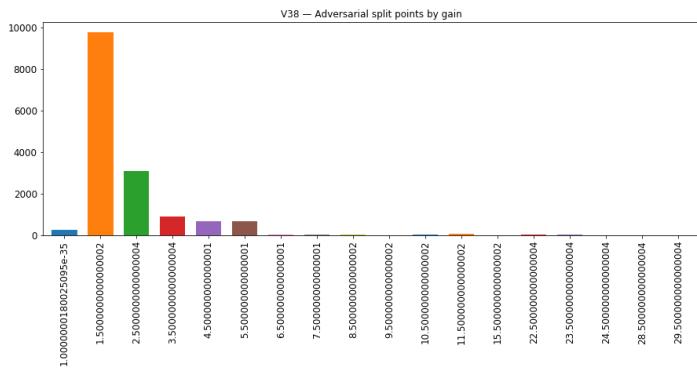
10 split point values used. Most permeant is 1.5000000000000002 with gain of 5508.737702429295.



V38

Used 1766 times, total gain is 15763.130647301674.

18 split point values used. Most legendary is 1.5000000000000002 with gain of 9784.41684538126.

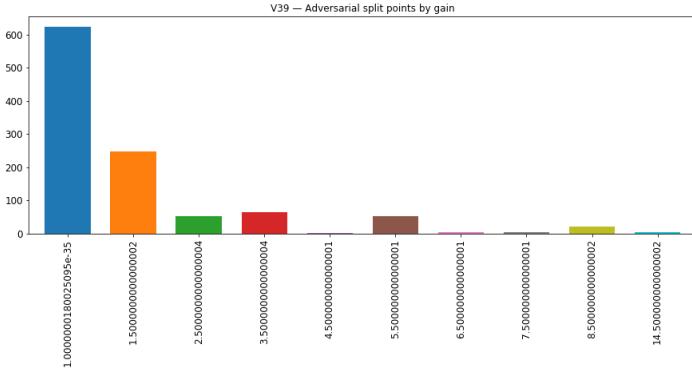


V39

Used 210 times, total gain is 1080.8589016199112.

10 split point values used. Most abundant is 1.0000000180025095e-35 with

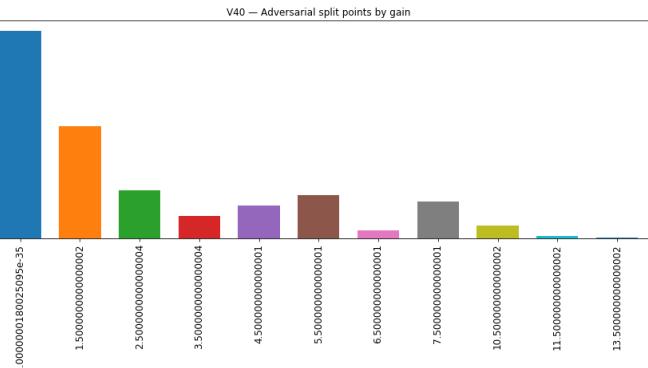
gain of 622.8705506324768.



V40

Used 254 times, total gain is 1677.7630633115768.

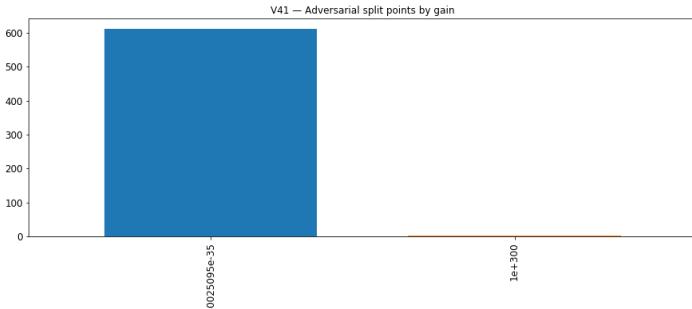
11 split point values used. Most frequent is 1.0000000180025095e-35 with gain of 661.1899659633636.



V41

Used 28 times, total gain is 614.6470977067947.

2 split point values used. Most widespread is 1.0000000180025095e-35 with gain of 611.9298447370529.

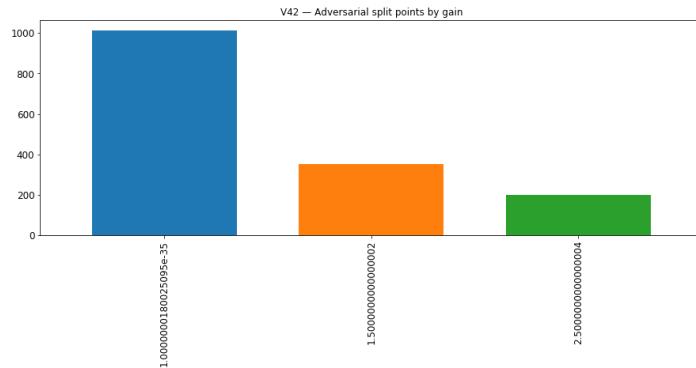


V42

V42

Used 231 times, total gain is 1564.4468393325806.

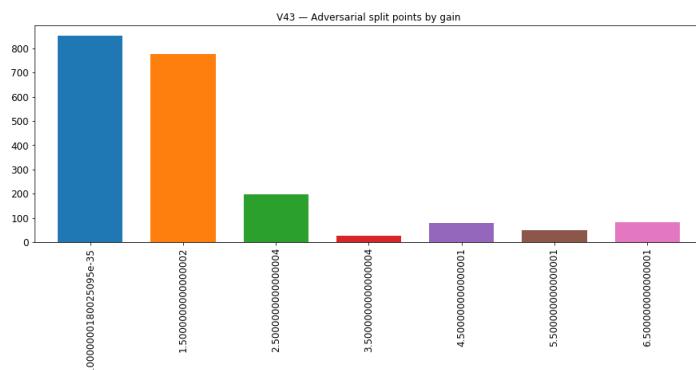
3 split point values used. Most fashionable is $1.0000000180025095e-35$ with gain of 1012.8421640396118.



V43

Used 239 times, total gain is 2061.3382611870766.

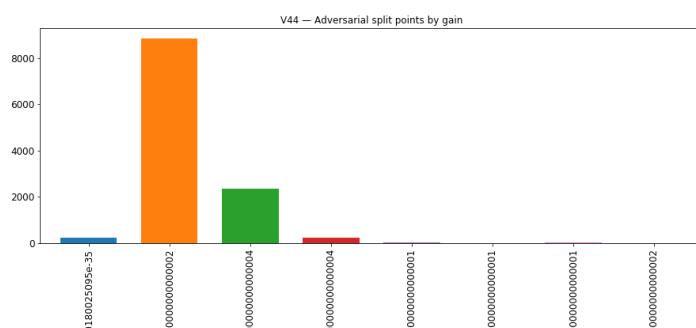
7 split point values used. Most marked is $1.0000000180025095e-35$ with gain of 852.4057729244232.



V44

Used 1162 times, total gain is 11730.457573831081.

8 split point values used. Most repetitive is 1.5000000000000002 with gain of 8836.684682548046.

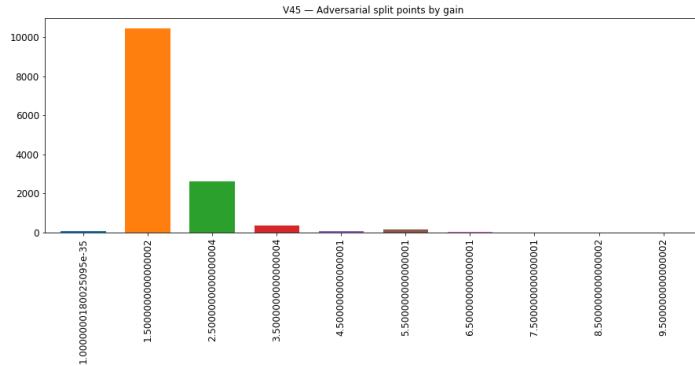




V45

Used 1635 times, total gain is 13813.060402989388.

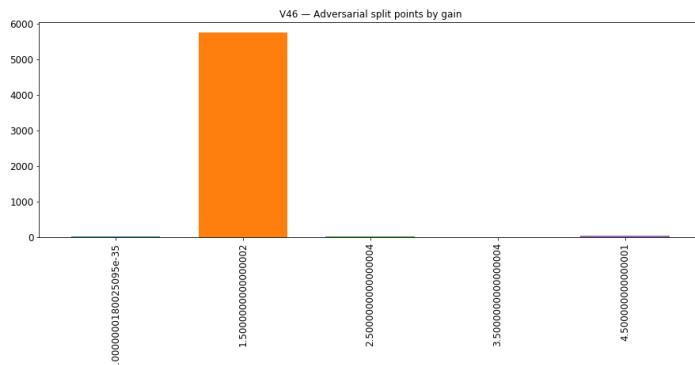
10 split point values used. Most widespread is 1.5000000000000002 with gain of 10456.777909696102.



V46

Used 570 times, total gain is 5881.209347724915.

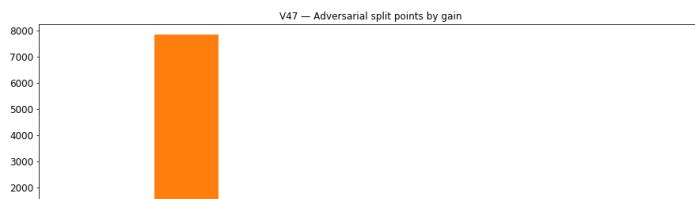
5 split point values used. Most ubiquitous is 1.5000000000000002 with gain of 5762.788044691086.

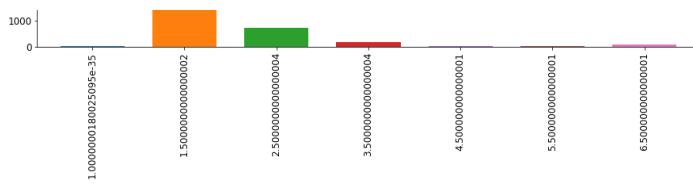


V47

Used 872 times, total gain is 8903.240005910397.

7 split point values used. Most ubiquitous is 1.5000000000000002 with gain of 7832.956826150417.

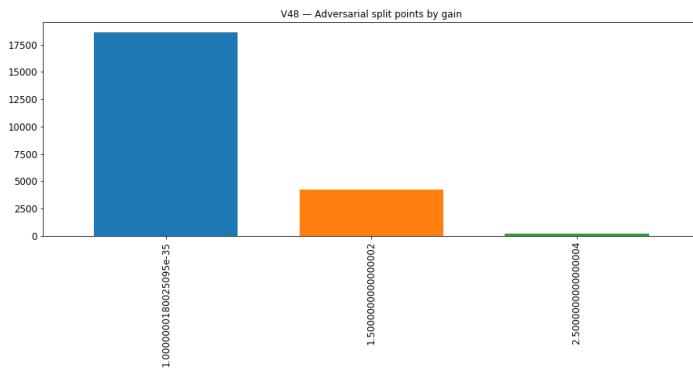




V48

Used 2115 times, total gain is 23105.245903372765.

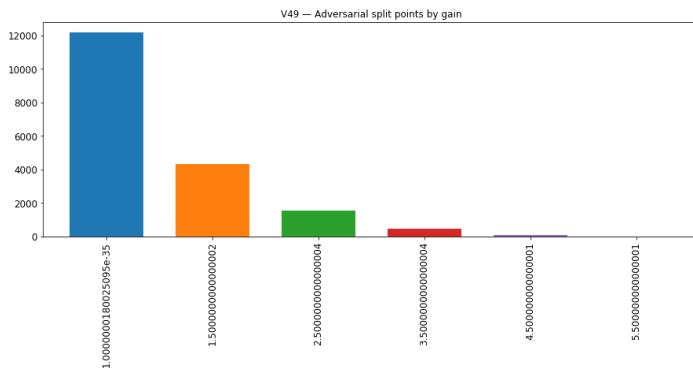
3 split point values used. Most abundant is 1.000000180025095e-35 with gain of 18621.516490638256.



V49

Used 1847 times, total gain is 18574.868987202644.

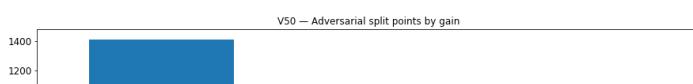
6 split point values used. Most rampant is 1.000000180025095e-35 with gain of 12181.838911175728.

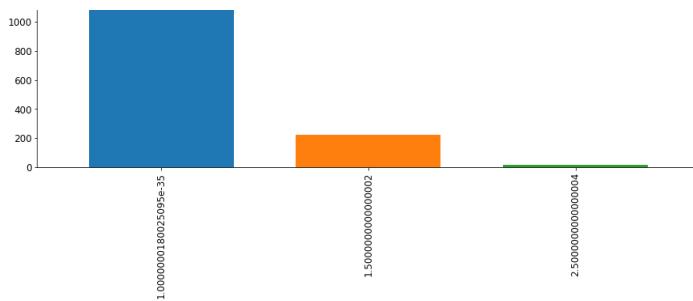


V50

Used 163 times, total gain is 1649.0395347476006.

3 split point values used. Most popular is 1.000000180025095e-35 with gain of 1409.3473838567734.

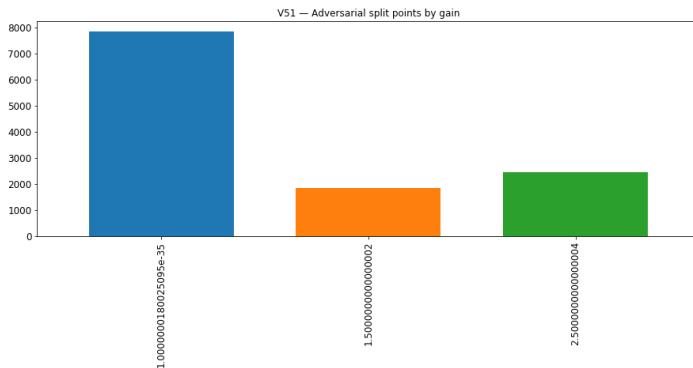




V51

Used 650 times, total gain is 12140.586068987846.

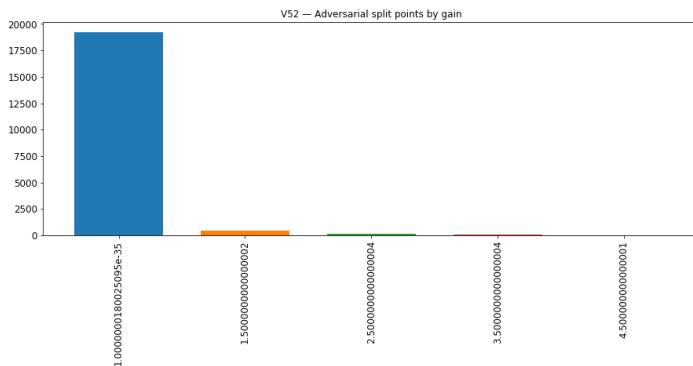
3 split point values used. Most permeant is $1.0000000180025095e-35$ with gain of 7856.693163752556.



V52

Used 1028 times, total gain is 19847.06314843893.

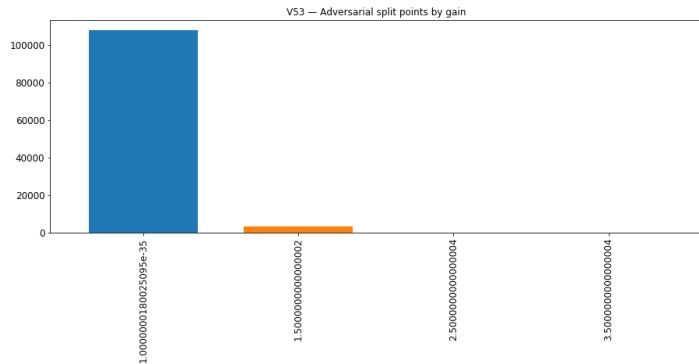
5 split point values used. Most legendary is $1.0000000180025095e-35$ with gain of 19214.92813038826.



V53

Used 2714 times, total gain is 111283.74944519997.

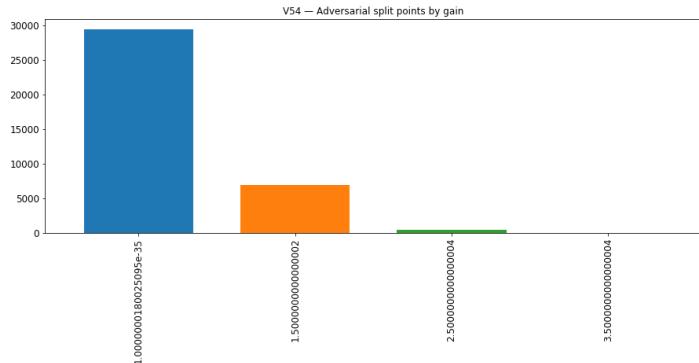
4 split point values used. Most permeant is $1.0000000180025095e-35$ with gain of 107920.97670096159.



V54

Used 2570 times, total gain is 36808.58652663231.

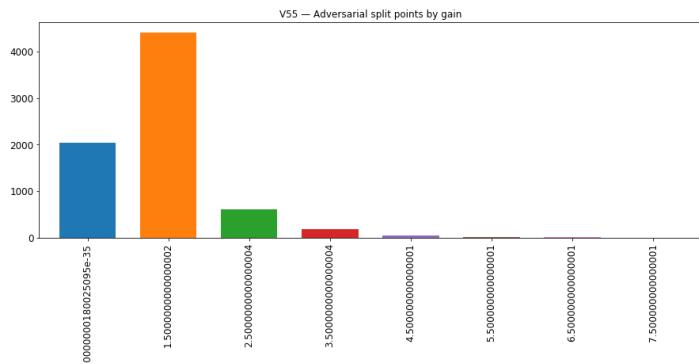
4 split point values used. Most legendary is $1.0000000180025095e-35$ with gain of 29417.272151470184.



V55

Used 882 times, total gain is 7310.796647906303.

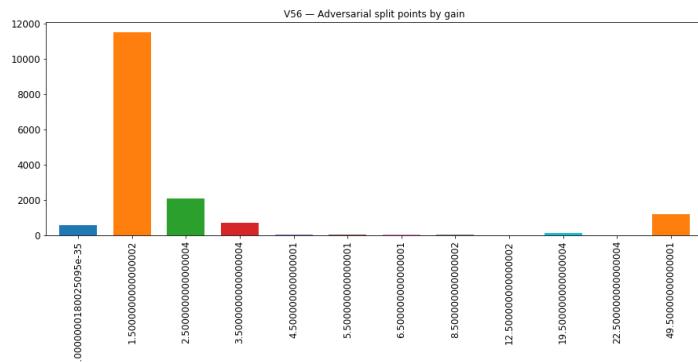
8 split point values used. Most widespread is 1.5000000000000002 with gain of 4408.1848212480545.



V56

Used 1486 times, total gain is 16326.376942515373.

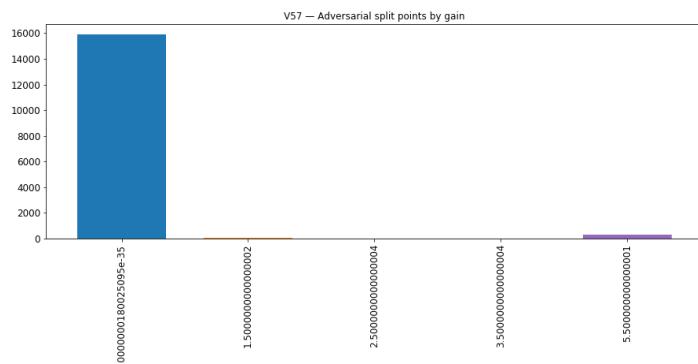
12 split point values used. Most frequent is 1.5000000000000002 with gain of 11523.721050143242.



V57

Used 96 times, total gain is 16271.684746742249.

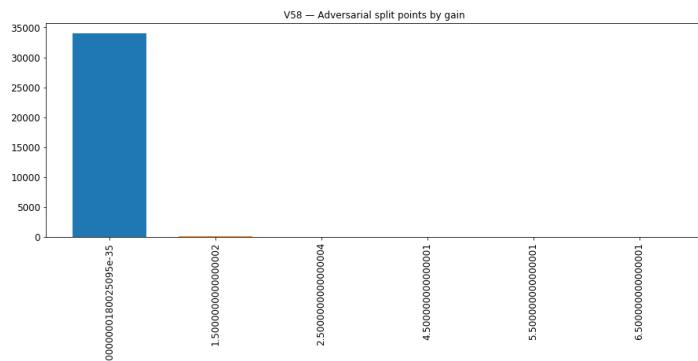
5 split point values used. Most common is 1.0000000180025095e-35 with gain of 15897.844977140427.



V58

Used 132 times, total gain is 34217.445145368576.

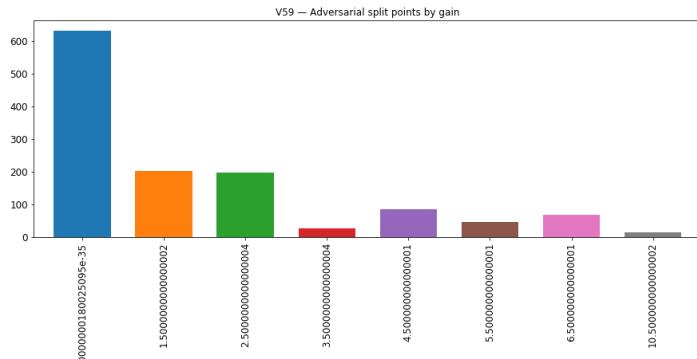
6 split point values used. Most abundant is 1.0000000180025095e-35 with gain of 34001.337042450905.



V59

Used 138 times, total gain is 1273.5068561434746.

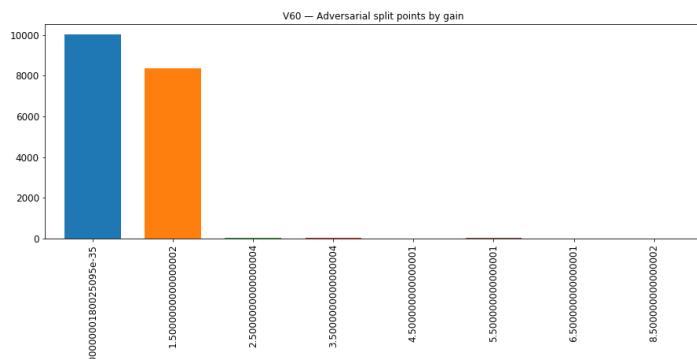
8 split point values used. Most recurrent is $1.0000000180025095e-35$ with gain of 631.9798471331596.



V60

Used 178 times, total gain is 18515.267180919647.

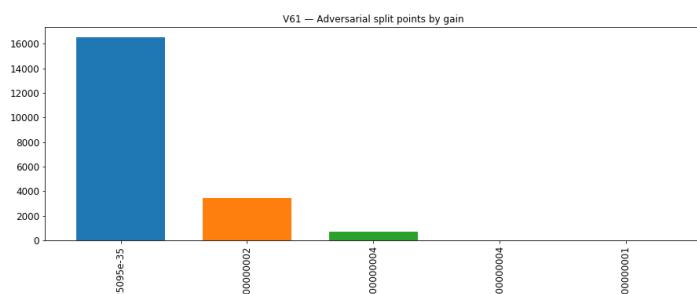
8 split point values used. Most rampant is $1.0000000180025095e-35$ with gain of 10028.27625477314.



V61

Used 1905 times, total gain is 20683.792530417442.

5 split point values used. Most ubiquitous is $1.0000000180025095e-35$ with gain of 16533.066715717316.



1.0000000180025095e-35:

1.5000000000000002:

2.5000000000000004:

3.5000000000000004:

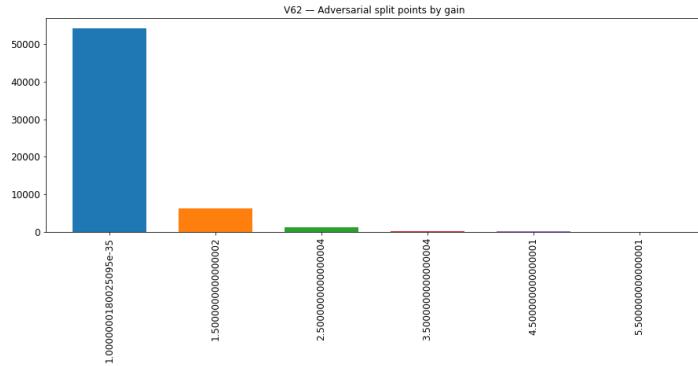
4.5000000000000001:

5.5000000000000001:

V62

Used 2081 times, total gain is 61898.40448319912.

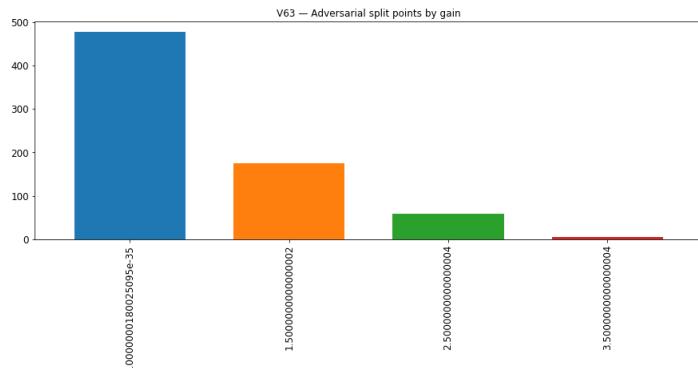
6 split point values used. Most frequent is 1.0000000180025095e-35 with gain of 54181.22927707434.



V63

Used 121 times, total gain is 716.5621800422668.

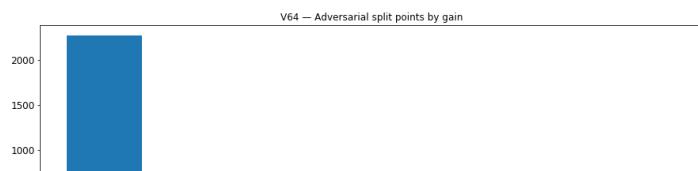
4 split point values used. Most widespread is 1.0000000180025095e-35 with gain of 477.4444699883461.

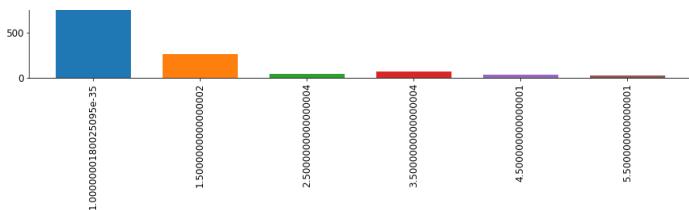


V64

Used 135 times, total gain is 2705.4361358880997.

6 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 2273.856533885002.

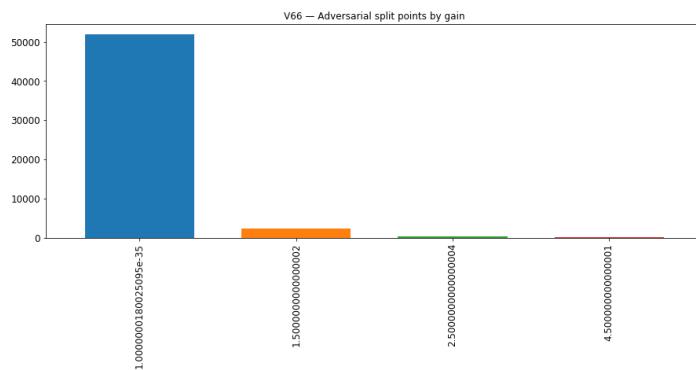




V66

Used 821 times, total gain is 54912.584412932396.

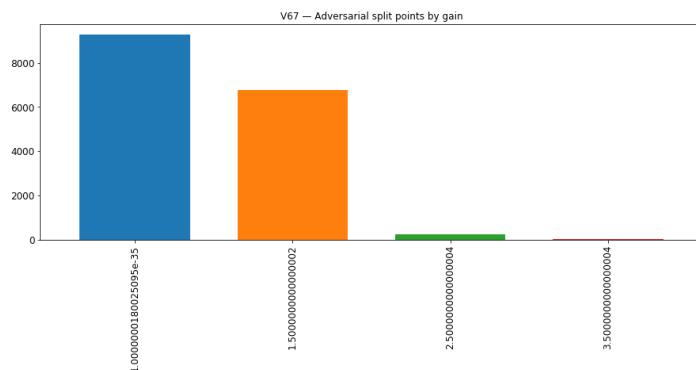
4 split point values used. Most ubiquitous is $1.0000000180025095e-35$ with gain of 51916.61961877346.



V67

Used 993 times, total gain is 16336.415401816368.

4 split point values used. Most abundant is $1.0000000180025095e-35$ with gain of 9276.319591999054.

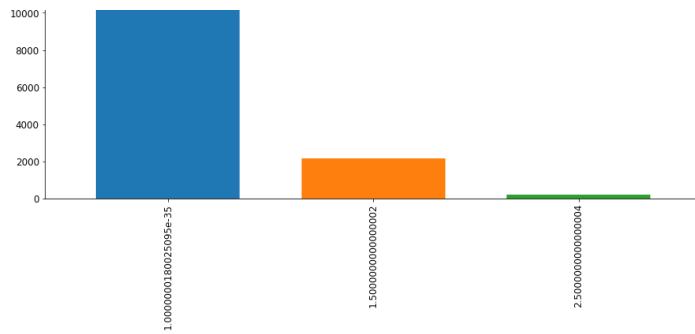


V69

Used 1212 times, total gain is 13358.410326480865.

3 split point values used. Most ubiquitous is $1.0000000180025095e-35$ with gain of 10994.280693292618.

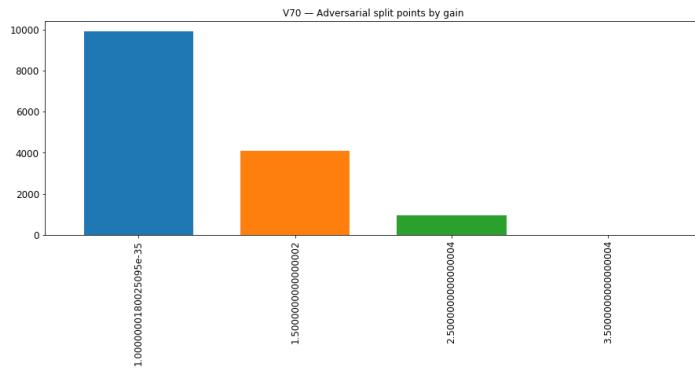




V70

Used 1281 times, total gain is 14957.445440351963.

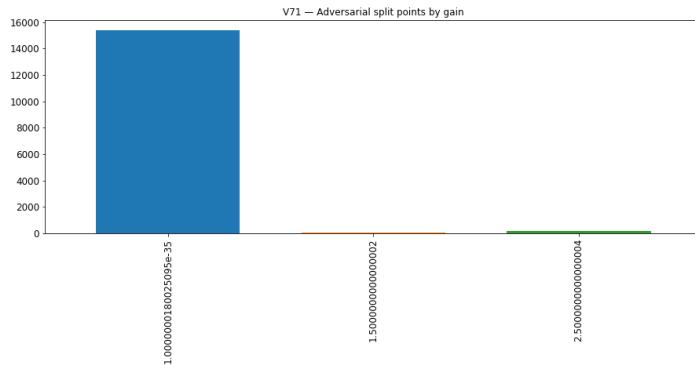
4 split point values used. Most rampant is 1.0000000180025095e-35 with gain of 9911.351143956184.



V71

Used 94 times, total gain is 15640.698775947094.

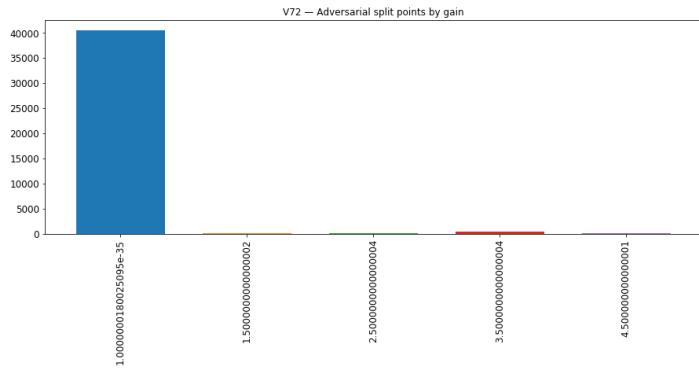
3 split point values used. Most predominant is 1.0000000180025095e-35 with gain of 15380.576752007008.



V72

Used 103 times, total gain is 41451.38654398918.

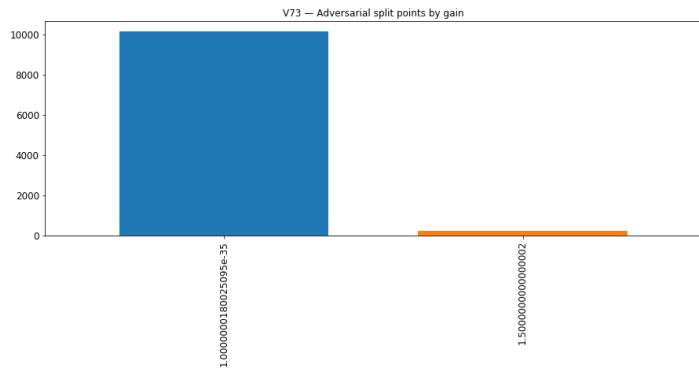
5 split point values used. Most useful is 1.0000000180025095e-35 with gain of 40535.276235342026.



V73

Used 566 times, total gain is 10359.368358075619.

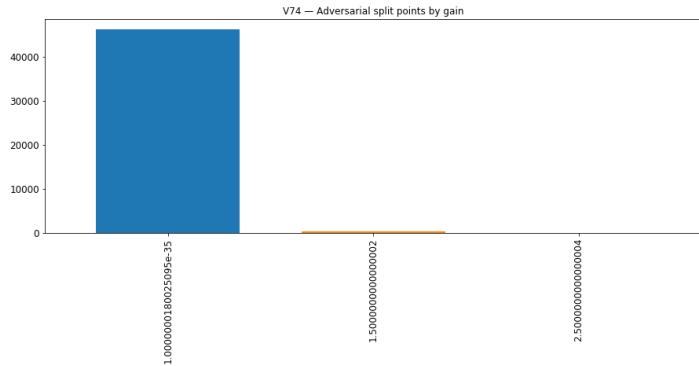
2 split point values used. Most ubiquitous is 1.0000000180025095e-35 with gain of 10135.499849557877.



V74

Used 1041 times, total gain is 46587.832282304764.

3 split point values used. Most abundant is 1.0000000180025095e-35 with gain of 46174.5838432312.

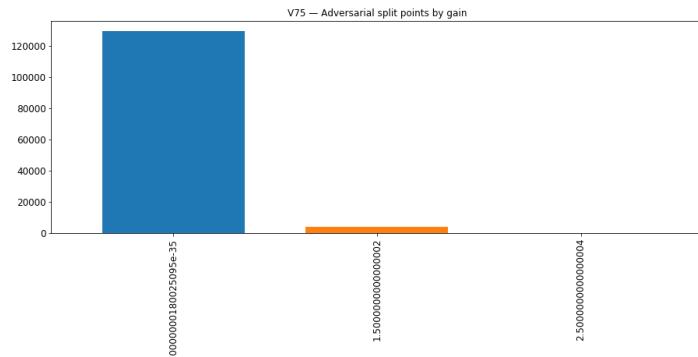


V75

Used 2741 times, total gain is 122518.96792204510

Used 2741 times, total gain is 155540.00/02294012.

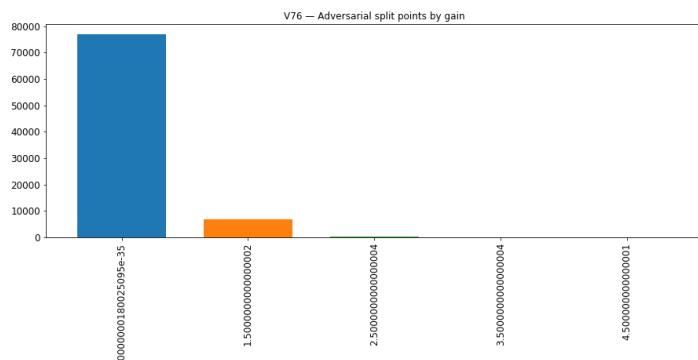
3 split point values used. Most rampant is $1.0000000180025095e-35$ with gain of 129436.0321033597.



V76

Used 2787 times, total gain is 84234.04692429304.

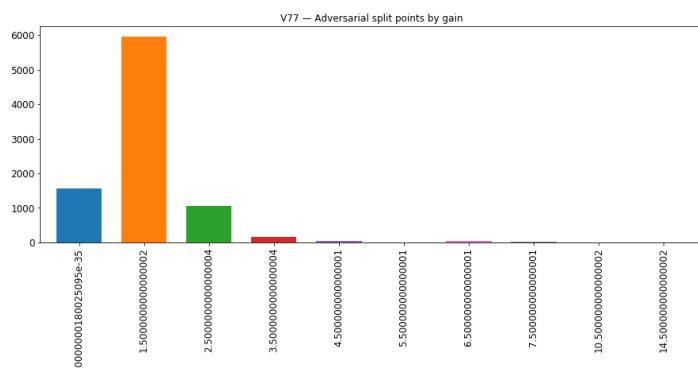
5 split point values used. Most useful is $1.0000000180025095e-35$ with gain of 76941.7878999114.



V77

Used 993 times, total gain is 8866.024340867996.

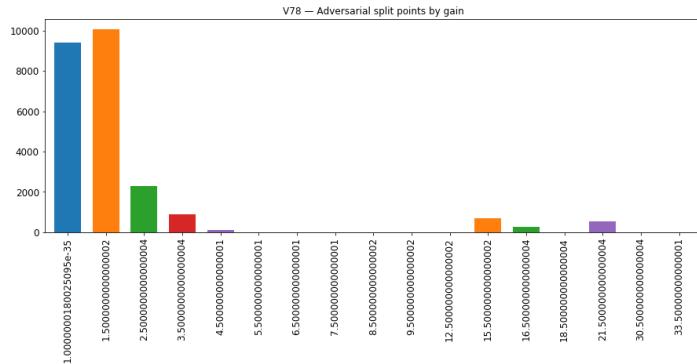
10 split point values used. Most permeant is 1.5000000000000002 with gain of 5954.853100597858.



V78

Used 1694 times, total gain is 24379.60537070036.

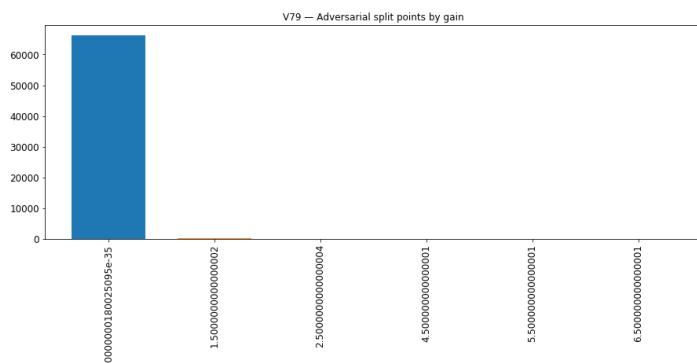
17 split point values used. Most legendary is 1.5000000000000002 with gain of 10059.492718160152.



V79

Used 111 times, total gain is 66818.34407800436.

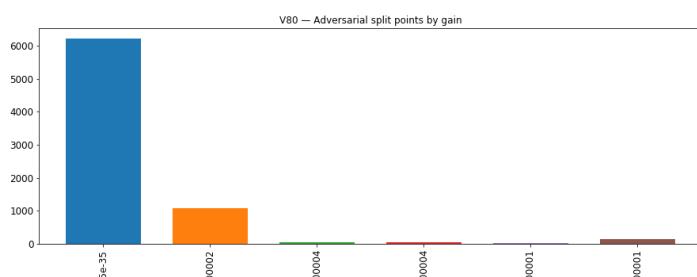
6 split point values used. Most predominant is 1.000000180025095e-35 with gain of 66246.11995494366.



V80

Used 196 times, total gain is 7548.1409485936165.

6 split point values used. Most predominant is 1.000000180025095e-35 with gain of 6215.665709257126.

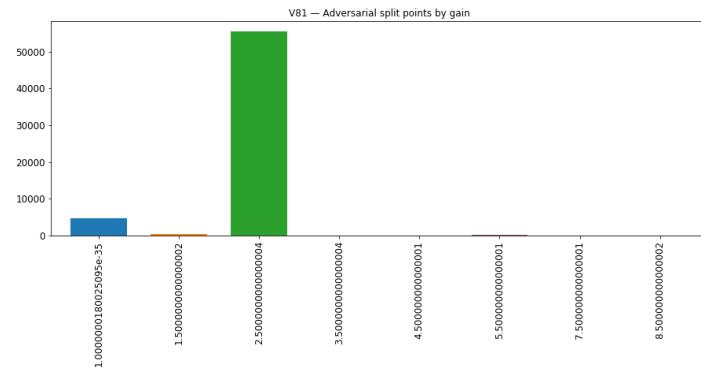




V81

Used 194 times, total gain is 60573.384538948536.

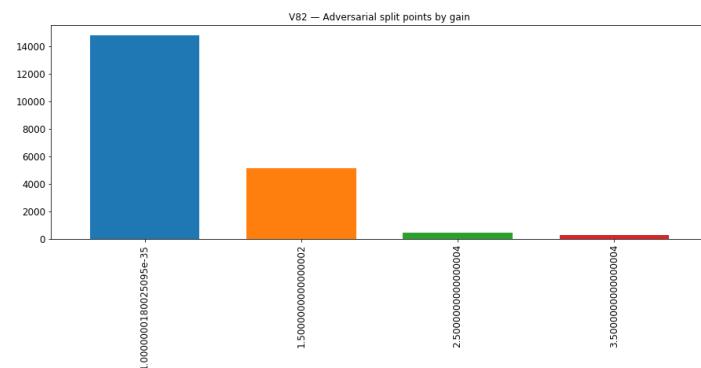
8 split point values used. Most popular is 2.500000000000004 with gain of 55469.806085944176.



V82

Used 2201 times, total gain is 20672.999230980873.

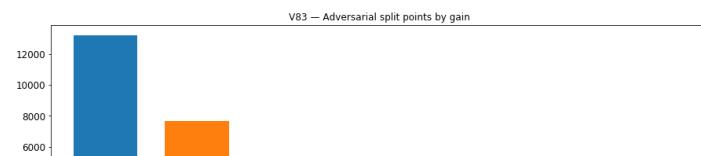
4 split point values used. Most usual is 1.0000000180025095e-35 with gain of 14783.651099264622.

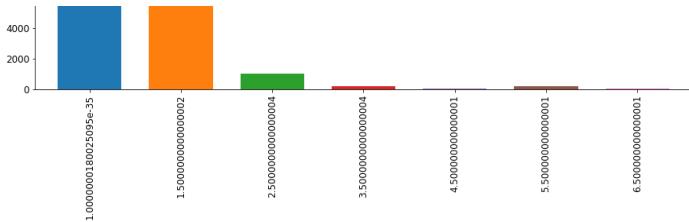


V83

Used 2305 times, total gain is 22382.497394025326.

7 split point values used. Most marked is 1.0000000180025095e-35 with gain of 13235.45173072815.

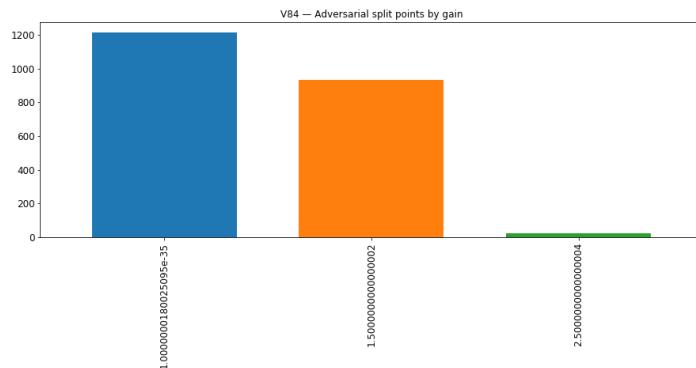




V84

Used 164 times, total gain is 2166.376595377922.

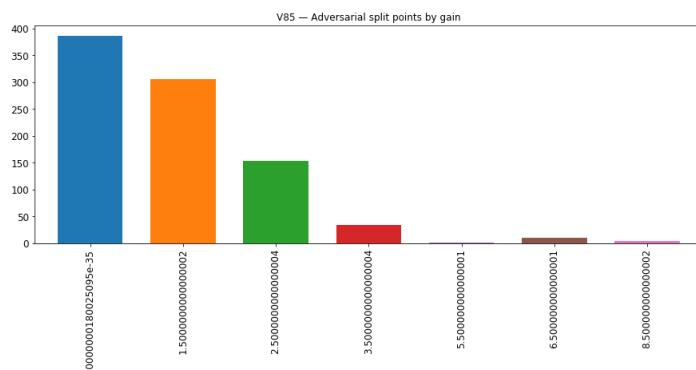
3 split point values used. Most permeant is 1.0000000180025095e-35 with gain of 1213.2649921178818.



V85

Used 164 times, total gain is 894.9530627131462.

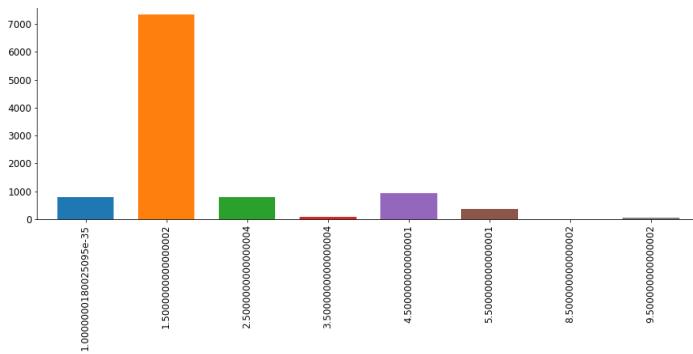
7 split point values used. Most repetitive is 1.0000000180025095e-35 with gain of 386.39363491535187.



V86

Used 1147 times, total gain is 10374.760645627975.

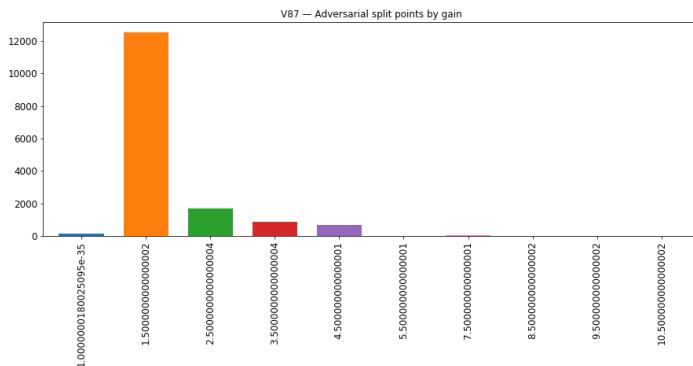
8 split point values used. Most prevalent is 1.5000000000000002 with gain of 7341.774327039719.



V87

Used 1582 times, total gain is 15927.250253856182.

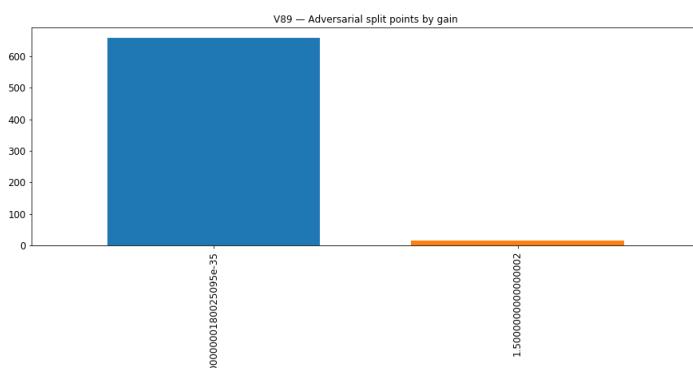
10 split point values used. Most omnipresent is 1.5000000000000002 with gain of 12520.84464097023.



V89

Used 51 times, total gain is 674.0241422653198.

2 split point values used. Most rampant is 1.000000180025095e-35 with gain of 658.4971532821655.

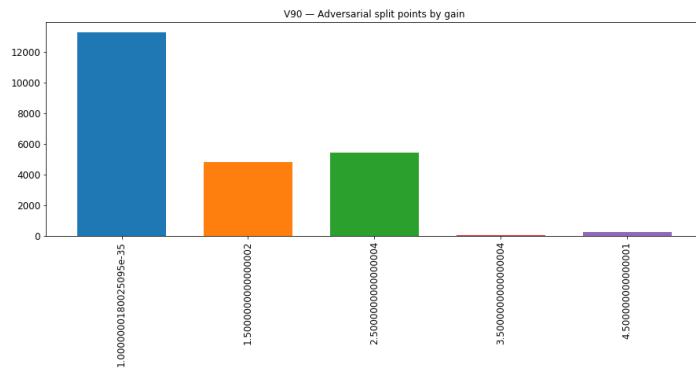


V90

Used 1285 times, total gain is 23782.937911987305.

5 split point values used. Most permeant is 1.000000180025095e-35 with

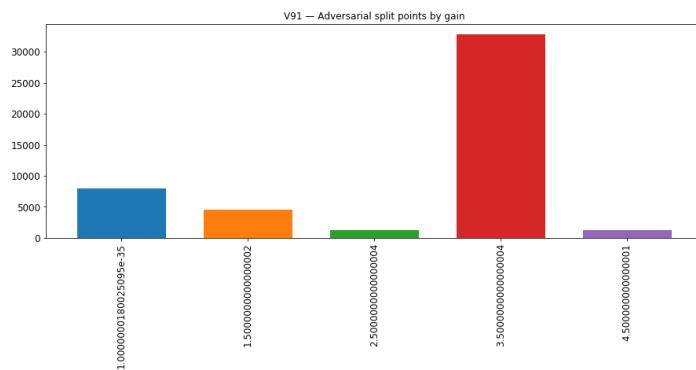
gain of 13269.464 / 23169804.



V91

Used 1413 times, total gain is 47845.272241830826.

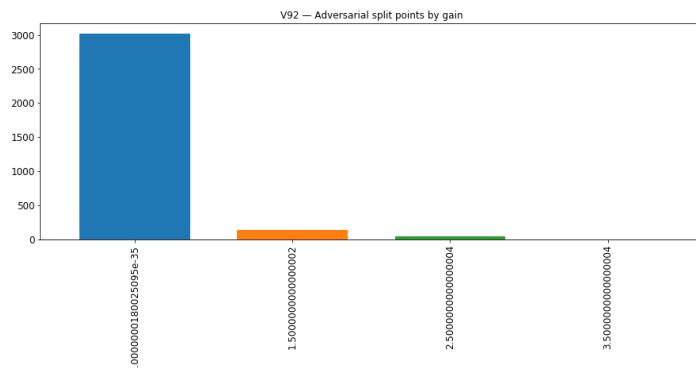
5 split point values used. Most usual is 3.5000000000000004 with gain of 32818.85611116886.



V92

Used 89 times, total gain is 3198.0424461960793.

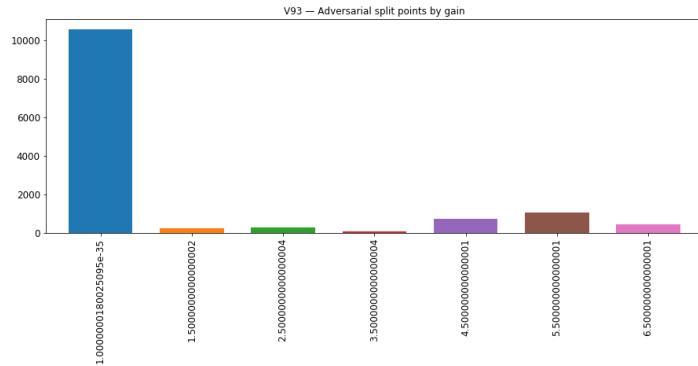
4 split point values used. Most predominant is 1.000000180025095e-35 with gain of 3017.974201798439.



V93

Used 141 times, total gain is 13376.264519810677.

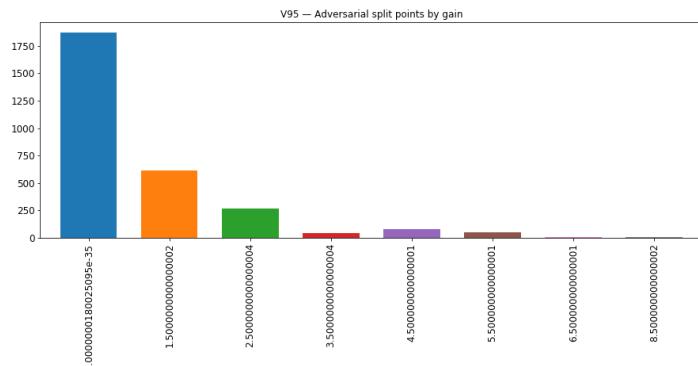
7 split point values used. Most fashionable is 1.0000000180025095e-35 with gain of 10571.563647150993.



V95

Used 287 times, total gain is 2940.042728126049.

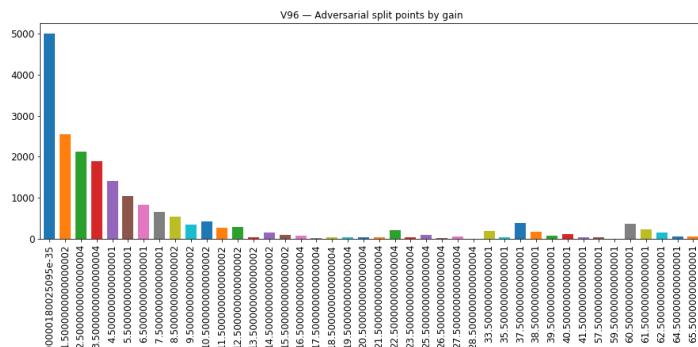
8 split point values used. Most omnipresent is 1.0000000180025095e-35 with gain of 1871.195622086525.



V96

Used 1825 times, total gain is 20193.90614938736.

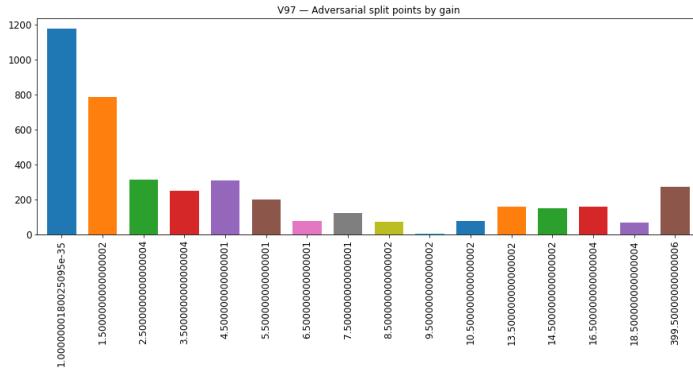
42 split point values used. Most usual is 1.0000000180025095e-35 with gain of 4997.05488049984.



V97

Used 462 times, total gain is 4188.4034061431885.

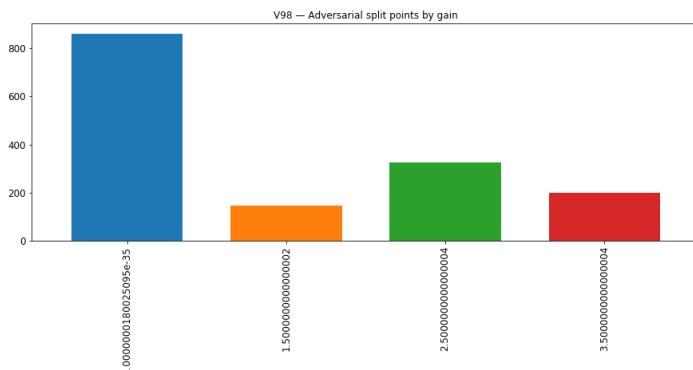
16 split point values used. Most permeant is $1.0000000180025095e-35$ with gain of 1176.1794661283493.



V98

Used 149 times, total gain is 1532.0706385970116.

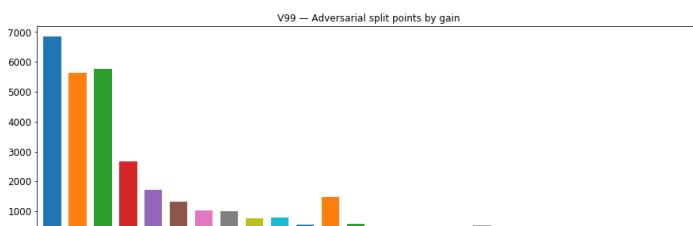
4 split point values used. Most marked is $1.0000000180025095e-35$ with gain of 860.1649265289307.

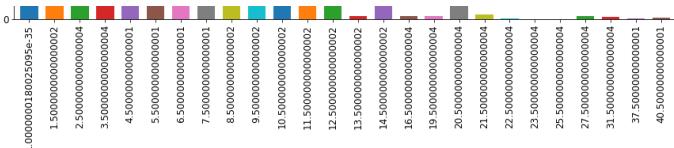


V99

Used 2204 times, total gain is 31950.080172598362.

26 split point values used. Most prevalent is $1.0000000180025095e-35$ with gain of 6852.367869257927.

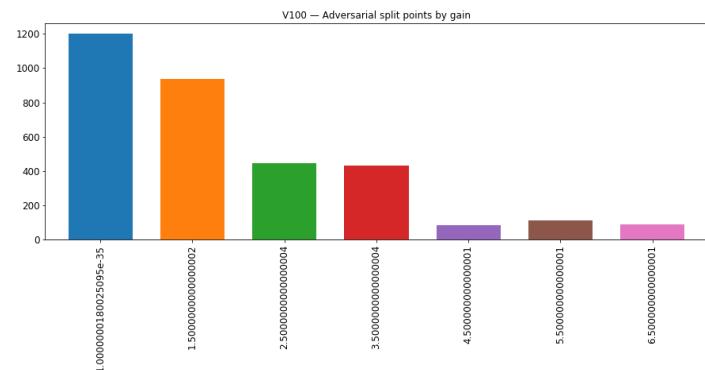




V100

Used 447 times, total gain is 3295.3555133342743.

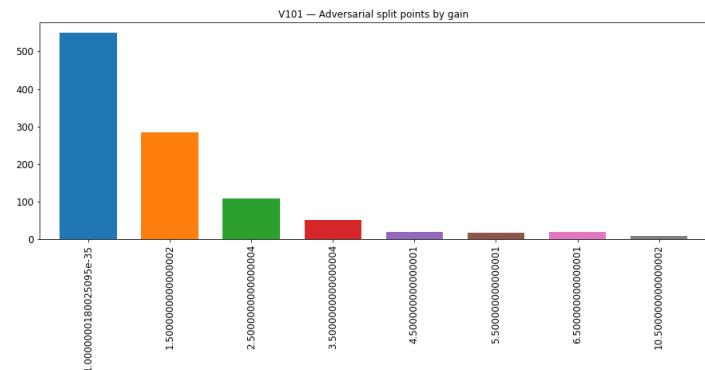
7 split point values used. Most common is 1.0000000180025095e-35 with gain of 1201.1435292959213.



V101

Used 166 times, total gain is 1053.1995166540146.

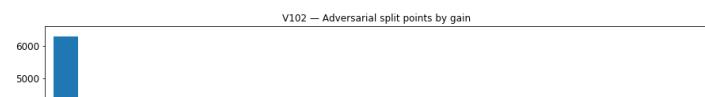
8 split point values used. Most popular is 1.0000000180025095e-35 with gain of 549.5444159507751.

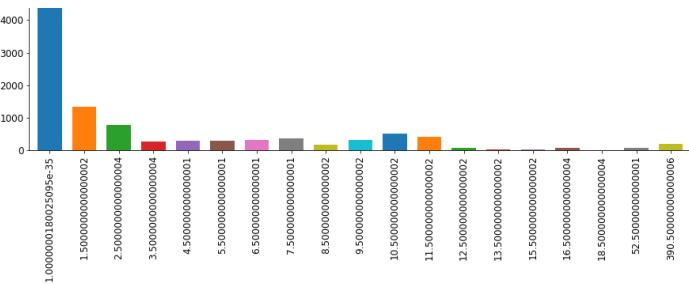


V102

Used 630 times, total gain is 11821.352616786957.

19 split point values used. Most usual is 1.0000000180025095e-35 with gain of 6292.471604704857.

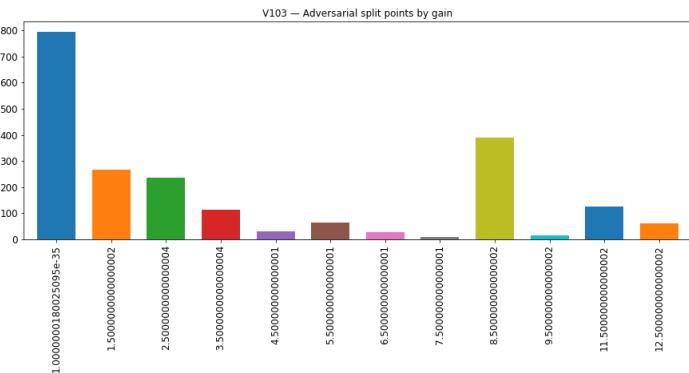




V103

Used 222 times, total gain is 2130.2229268550873.

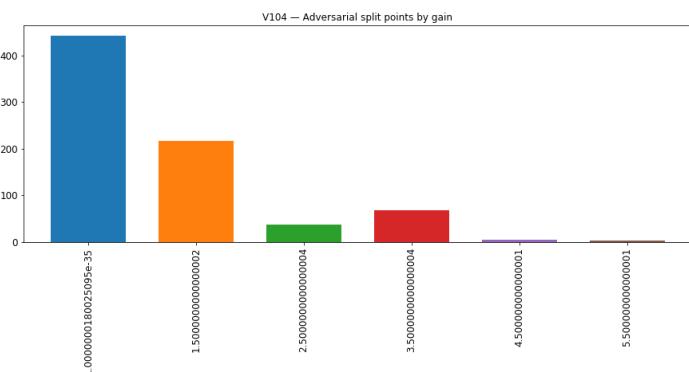
12 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 794.3777661323547.



V104

Used 151 times, total gain is 770.4266728162766.

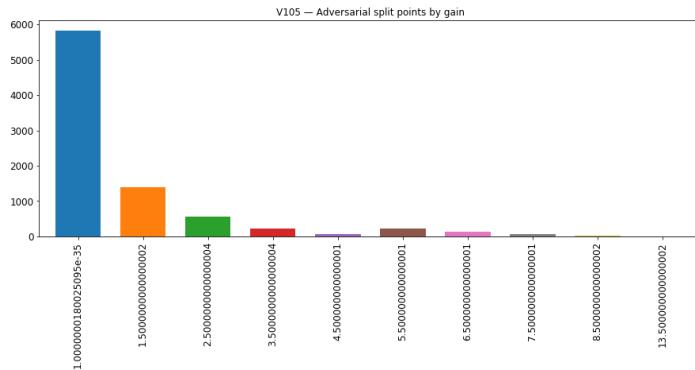
6 split point values used. Most rife is 1.0000000180025095e-35 with gain of 441.87798953056335.



V105

Used 634 times, total gain is 8491.34668380022.

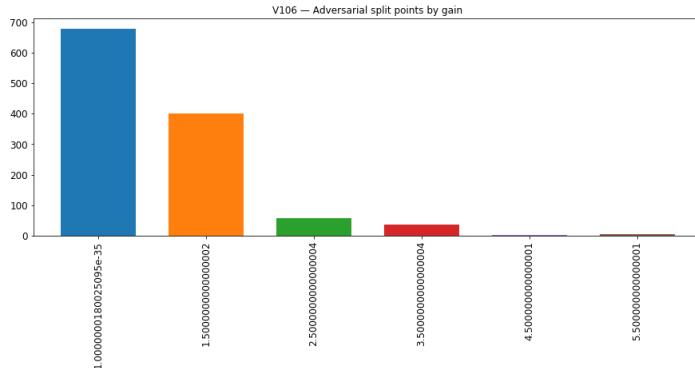
10 split point values used. Most frequent is 1.0000000180025095e-35 with gain of 5824.105298399925.



V106

Used 177 times, total gain is 1182.6297034025192.

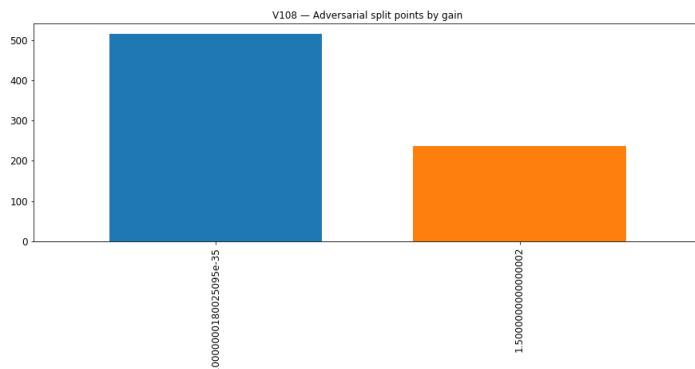
6 split point values used. Most frequent is 1.0000000180025095e-35 with gain of 678.5349035263062.



V108

Used 53 times, total gain is 751.0330501198769.

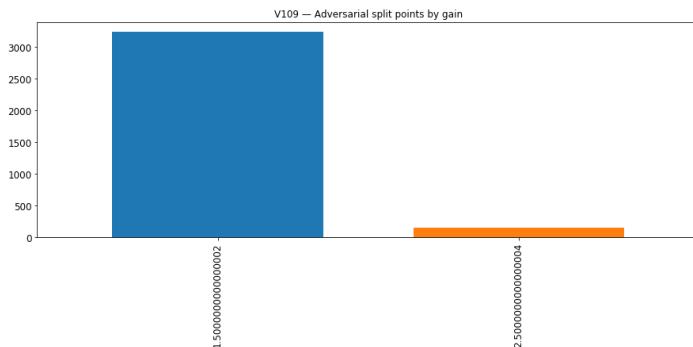
2 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 514.7859439849854.



V109

Used 368 times, total gain is 3379.1207961440086.

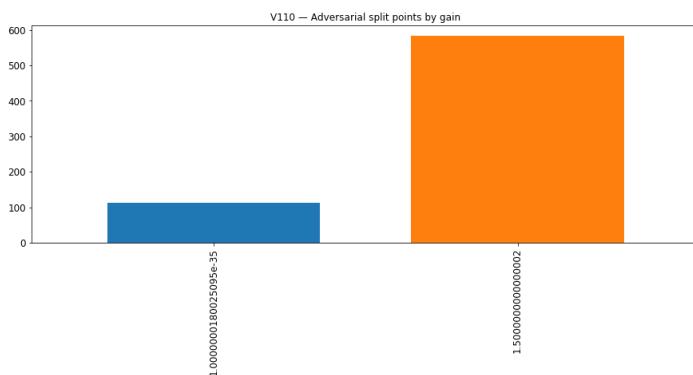
2 split point values used. Most fashionable is 1.5000000000000002 with gain of 3229.0834041833878.



V110

Used 77 times, total gain is 695.4029041528702.

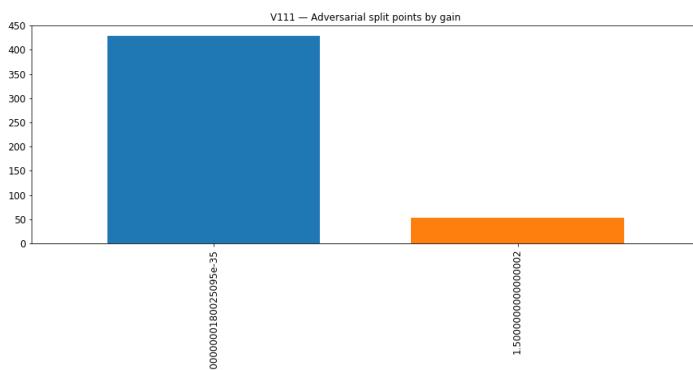
2 split point values used. Most permeant is 1.5000000000000002 with gain of 583.4011722803116.



V111

Used 25 times, total gain is 481.8879317045212.

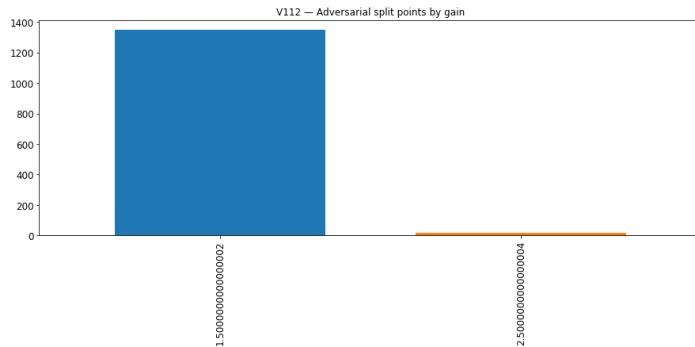
2 split point values used. Most abundant is 1.0000000180025095e-35 with gain of 428.5522954463959.



V112

Used 152 times, total gain is 1364.368455529213.

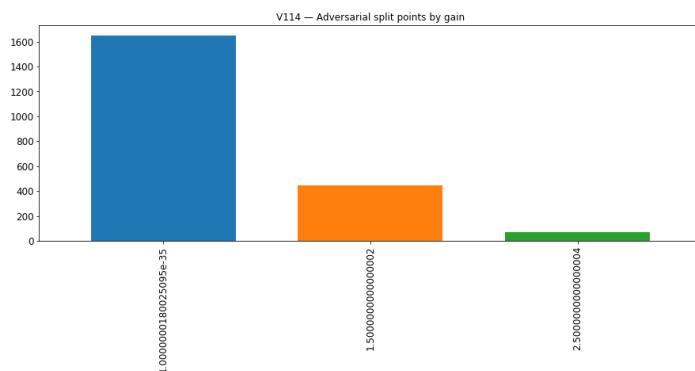
2 split point values used. Most abundant is 1.5000000000000002 with gain of 1346.4655292630196.



V114

Used 88 times, total gain is 2163.483860552311.

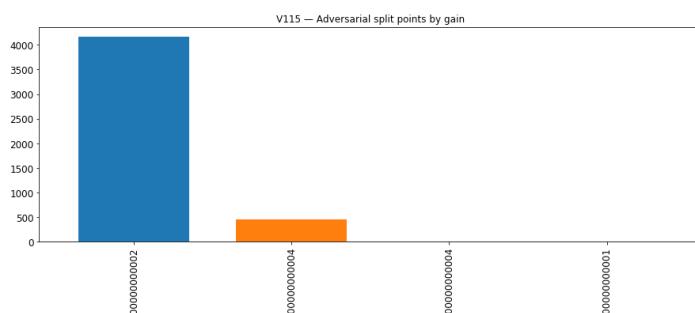
3 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 1647.97695428133.



V115

Used 493 times, total gain is 4628.159396469593.

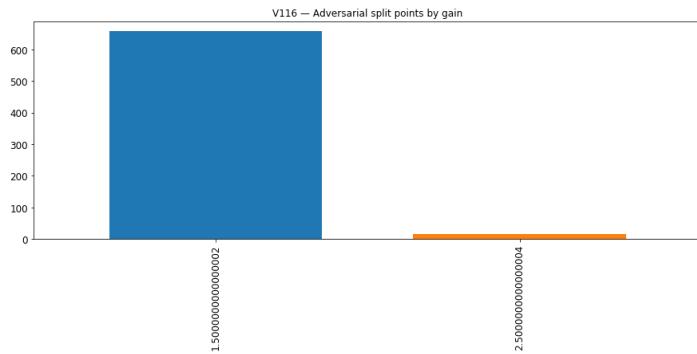
4 split point values used. Most usual is 1.5000000000000002 with gain of 4158.711259782314.



V116

Used 127 times, total gain is 672.6471837759018.

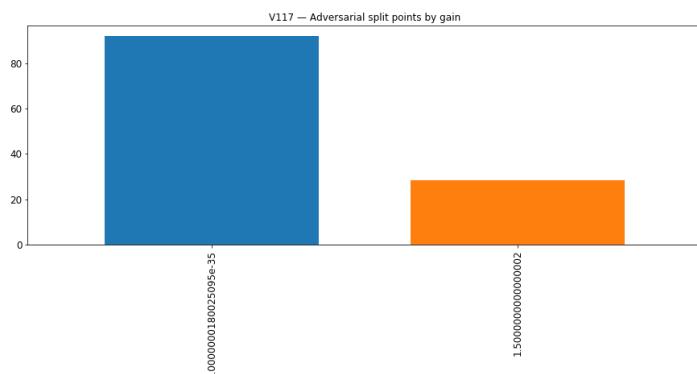
2 split point values used. Most legendary is 1.5000000000000002 with gain of 656.8928404450417.



V117

Used 8 times, total gain is 120.35817527770996.

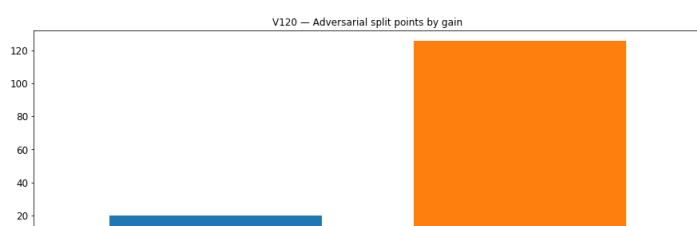
2 split point values used. Most ubiquitous is 1.000000180025095e-35 with gain of 91.94367504119873.

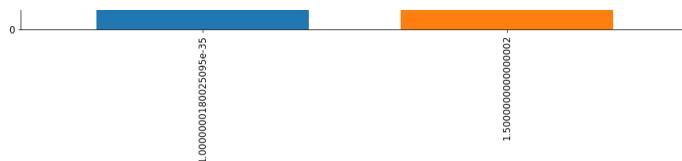


V120

Used 31 times, total gain is 145.54178369045258.

2 split point values used. Most permeant is 1.5000000000000002 with gain of 125.79183101654053.

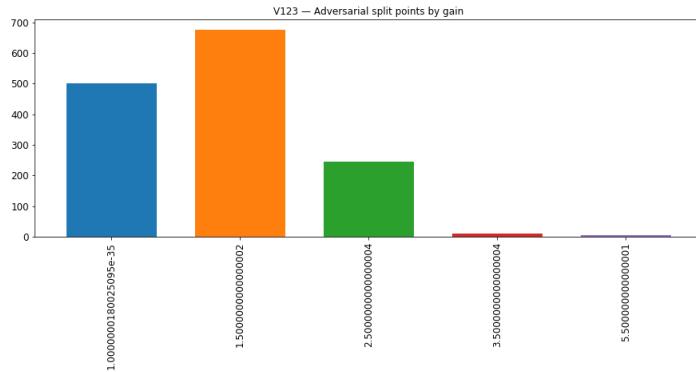




V123

Used 164 times, total gain is 1436.6352239251137.

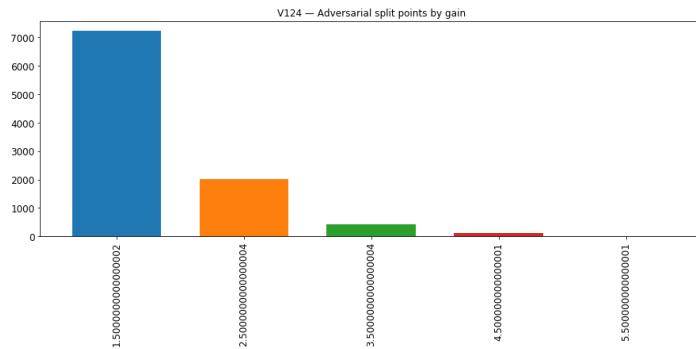
5 split point values used. Most rife is 1.5000000000000002 with gain of 675.5777720212936.



V124

Used 969 times, total gain is 9803.272548794746.

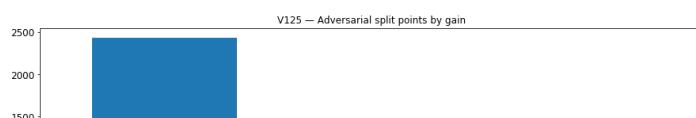
5 split point values used. Most widespread is 1.5000000000000002 with gain of 7220.974331974983.

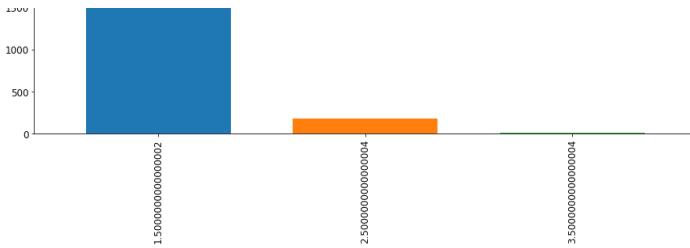


V125

Used 266 times, total gain is 2617.774603664875.

3 split point values used. Most legendary is 1.5000000000000002 with gain of 2427.067763030529.

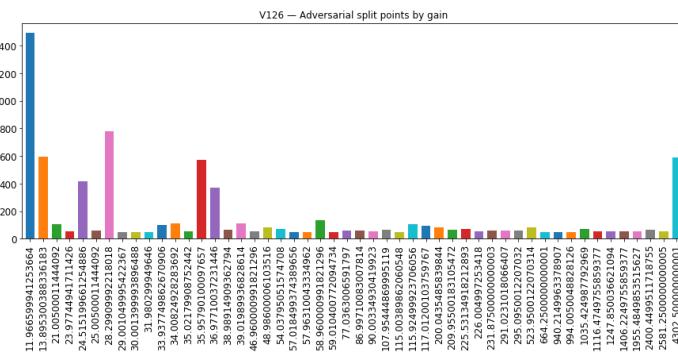




V126

Used 1489 times, total gain is 12163.839347839355.

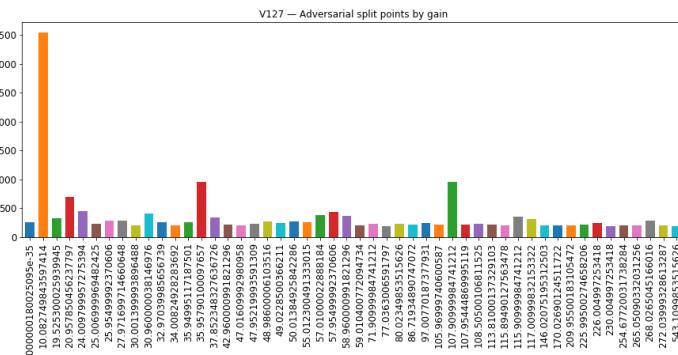
244 split point values used. Most rampant is 11.966599941253664 with gain of 1490.3261444568634.



V127

Used 5732 times, total gain is 41795.20221877098.

252 split point values used. Most abundant is 10.082749843597414 with gain of 3541.0831639766693.

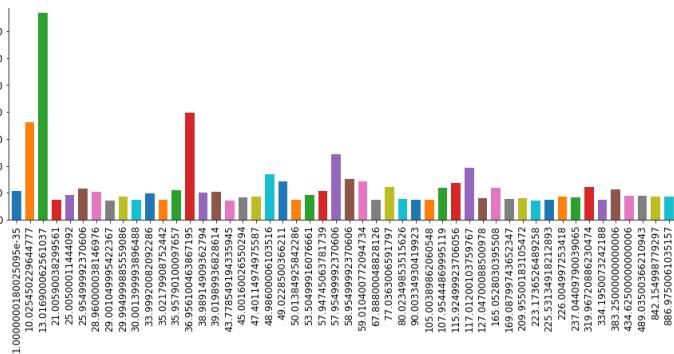


V128

Used 2223 times, total gain is 13850.768410086632.

249 split point values used. Most marked is 13.016900062561037 with gain of 768.3181384801865.

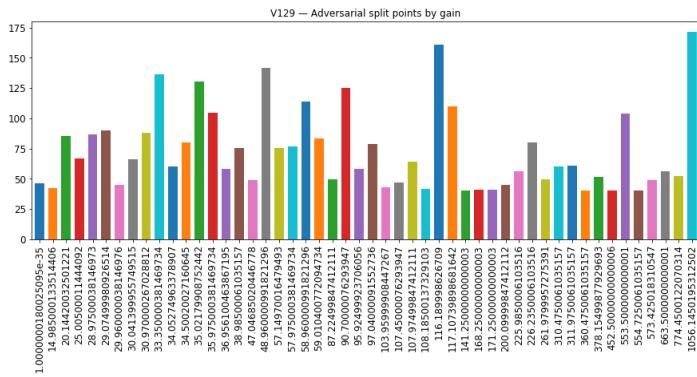




V129

Used 1097 times, total gain is 6706.159159600735.

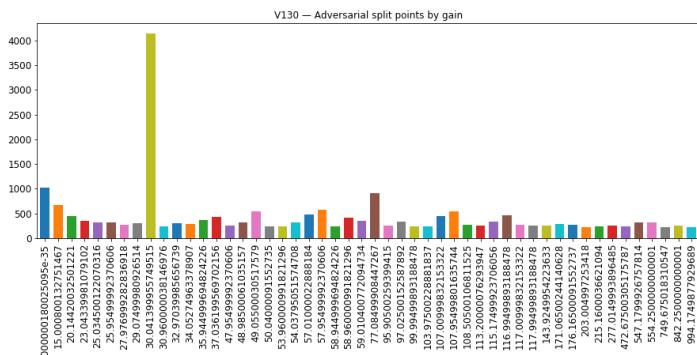
235 split point values used. Most popular is 1056.1450195312502 with gain of 171.43667876720428.



V130

Used 6210 times, total gain is 50222.046667158604.

253 split point values used. Most frequent is 30.041399955749515 with gain of 4140.052008509636.

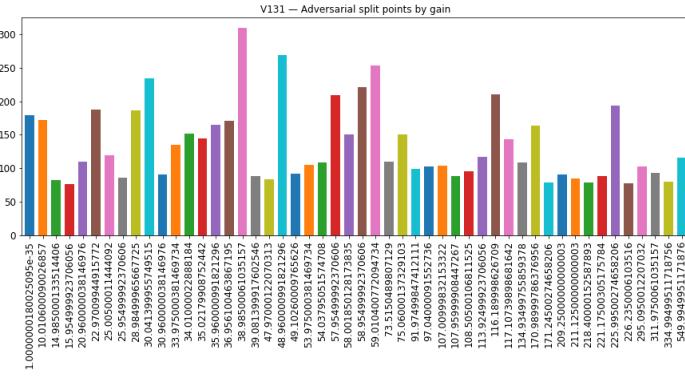


V131

Used 2071 times, total gain is 13704.961916983128.

250 split point values used. Most predominant is 38.985000061035157 with

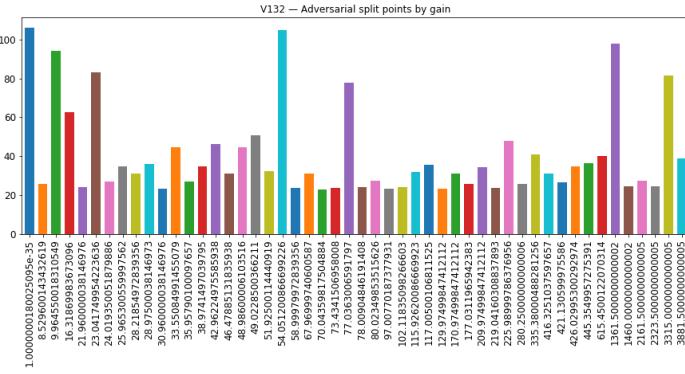
gain of 309.30192029476166.



V132

Used 643 times, total gain is 3878.8450941443443.

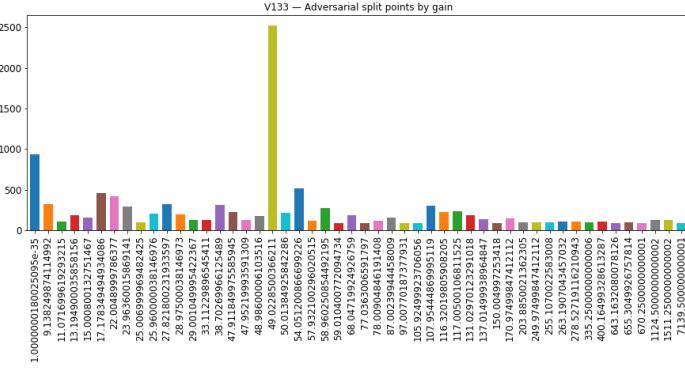
214 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 105.9832935333252.



V133

Used 1625 times, total gain is 18720.836115062237.

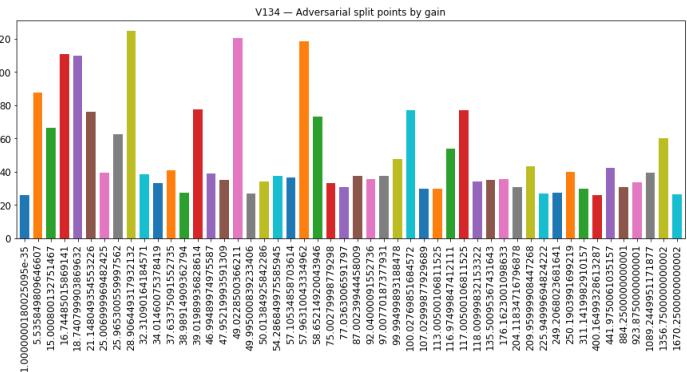
244 split point values used. Most legendary is 49.0228500366211 with gain of 2522.7022045850754.



V134

Used 645 times, total gain is 4449.359211266041.

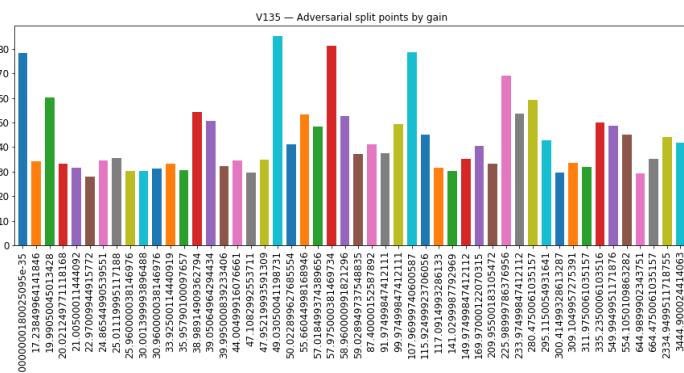
216 split point values used. Most prevalent is 28.906449317932132 with gain of 124.7814998626709.



V135

Used 880 times, total gain is 4651.540787696838.

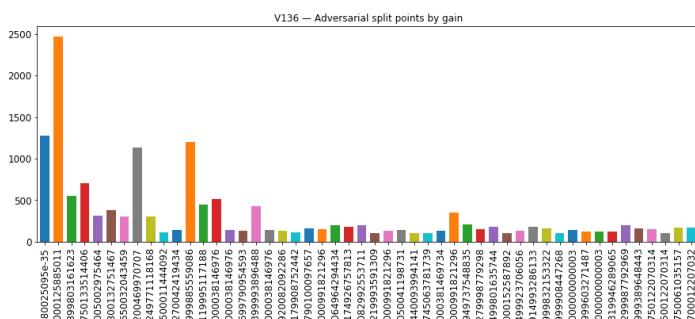
232 split point values used. Most repetitive is 49.03050041198731 with gain of 85.1966302394867.



v136

Used 2072 times, total gain is 23682.499181747437.

243 split point values used. Most repetitive is 6.643000125885011 with gain of 2467.7320885658264.

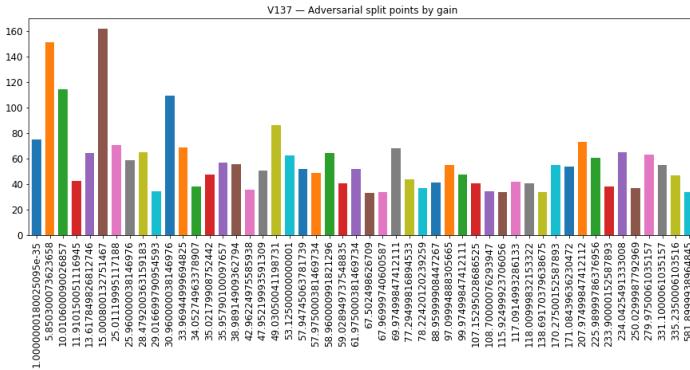


1.0000000180025095e-35 6.64
 5.8030073623658 9.26
 10.0100090073623657 12.20
 11.90150051116945 14.5
 13.61749286812746 15.00
 15.00000013271467 15.99
 25.0111999317188 18.64
 25.9600003168976 20.02
 28.41920003659383 21.0
 30.98000023168976 23.4
 33.06544998654025 24.99
 34.051749633188407 25.0
 35.02179980732442 25.96
 35.95190100097657 26.96
 38.081489362294 28.96
 42.0624975858528 29.01
 47.05219993591399 30.00
 49.010504198731 30.96
 53.125000000000001 33.9
 57.941450678139 35.0
 57.95000381469724 35.9
 58.9600099181236 36.96
 59.0384973148835 39.0
 61.97500381469724 40.0
 67.032498626109 47.9
 67.96997446050987 48.96
 69.09149984746050987 49.0
 71.09349984746050987 54.5
 78.12300232329599 57.9
 88.05699084472667 58.96
 97.0984888305665 59.02
 99.073988447412111 59.02
 107.152952686686525 75.0
 108.000007623947 107.9
 115.02499922706066 108.6
 117.091499286133 115.9
 118.0999932153322 117.0
 118.99170779638675 118.0
 170.750015257893 134.9
 171.08439636230472 169.2
 207.973988447412112 211.9
 225.0899978637656 225.2
 233.3000015257893 226.1
 234.04249433008 245.0
 250.09998122699 256.8
 279.1600001035157 272.2
 331.1600001035157 65.7
 335.250000103516 84.4
 581.8999338944845 87.4

V137

Used 851 times, total gain is 5287.284362733364.

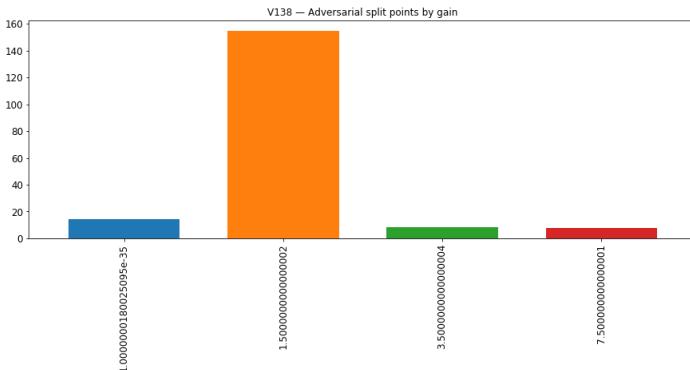
227 split point values used. Most prevalent is 15.000800132751467 with gain of 161.53100752830505.



V138

Used 9 times, total gain is 184.5194330215454.

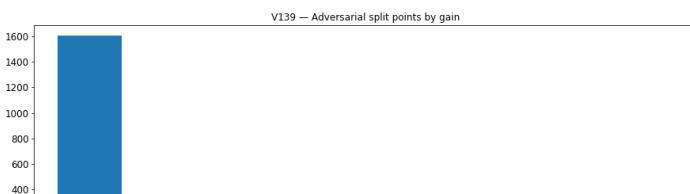
4 split point values used. Most frequent is 1.5000000000000002 with gain of 154.72943782806396.

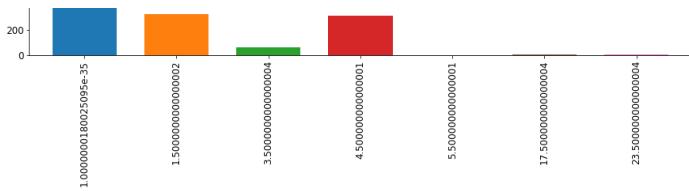


V139

Used 134 times, total gain is 2305.8402042388916.

7 split point values used. Most pernicious is 1.0000000180025095e-35 with gain of 1604.887995660305.

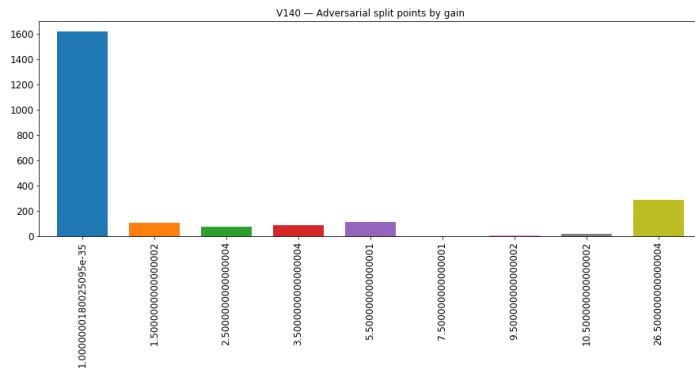




V140

Used 119 times, total gain is 2310.2708373069763.

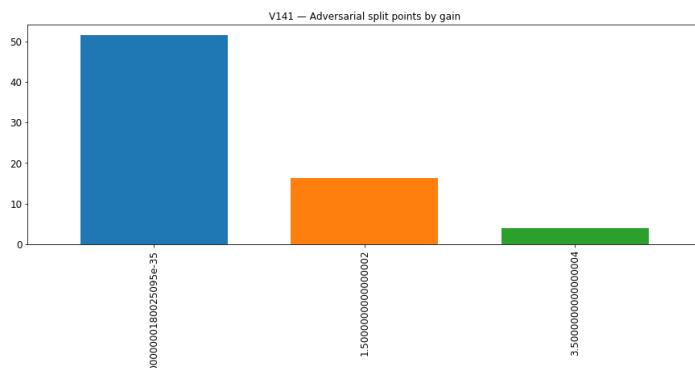
9 split point values used. Most common is 1.0000000180025095e-35 with gain of 1615.7854287028313.



V141

Used 14 times, total gain is 71.88372218608856.

3 split point values used. Most ubiquitous is 1.0000000180025095e-35 with gain of 51.550835371017456.

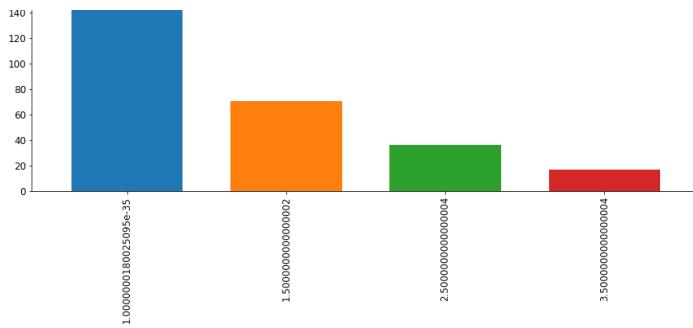


V142

Used 24 times, total gain is 286.1081464290619.

4 split point values used. Most repetitive is 1.0000000180025095e-35 with gain of 162.02595806121826.

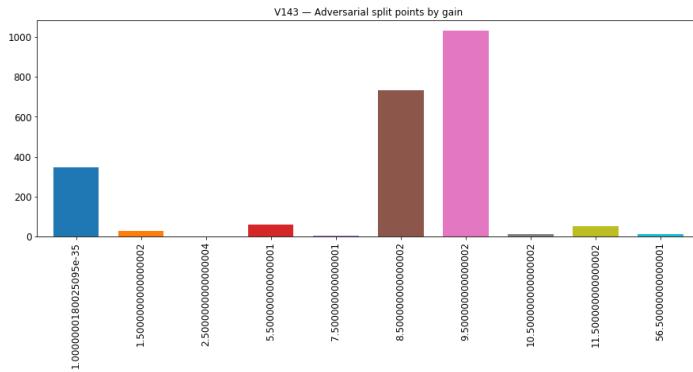




V143

Used 38 times, total gain is 2278.809799313545.

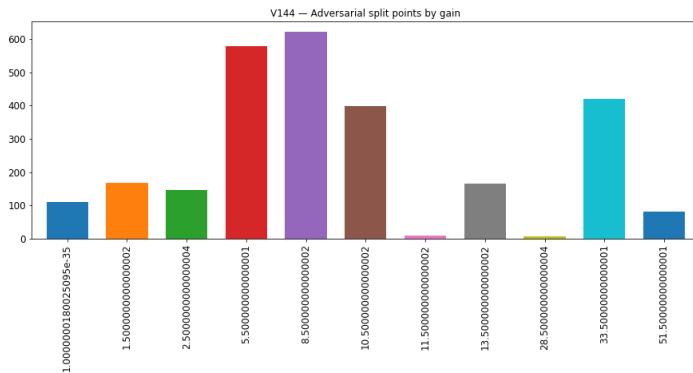
10 split point values used. Most rampant is 9.500000000000002 with gain of 1032.3244171142578.



V144

Used 43 times, total gain is 2707.0112296938896.

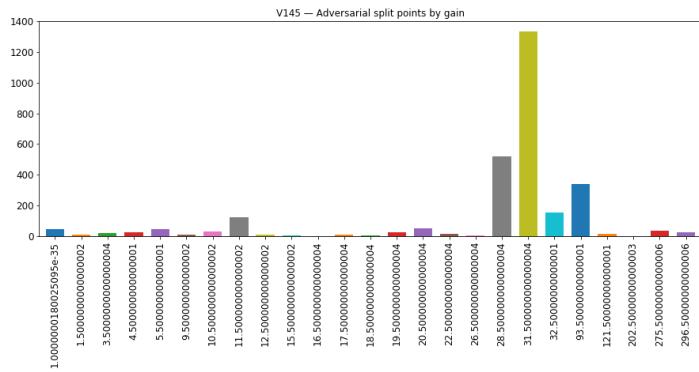
11 split point values used. Most repetitive is 8.500000000000002 with gain of 621.7402496337891.



V145

Used 70 times, total gain is 2861.739062666893.

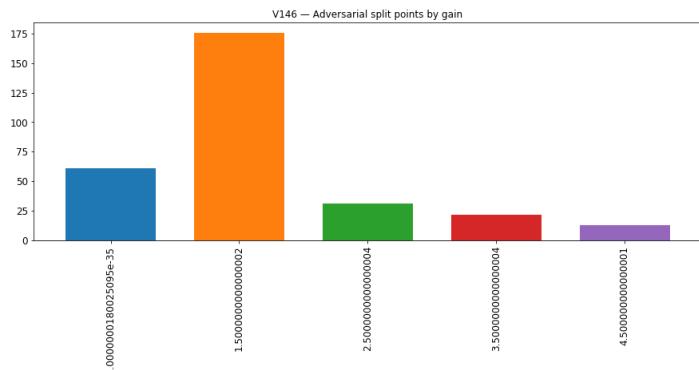
25 split point values used. Most repetitive is 31.500000000000004 with gain of 1333.0140914916992.



V146

Used 47 times, total gain is 302.46310061216354.

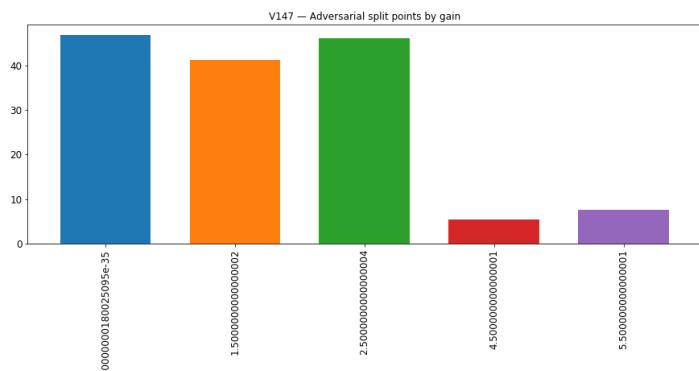
5 split point values used. Most repetitive is 1.5000000000000002 with gain of 175.49922496080399.



V147

Used 26 times, total gain is 146.8823081254959.

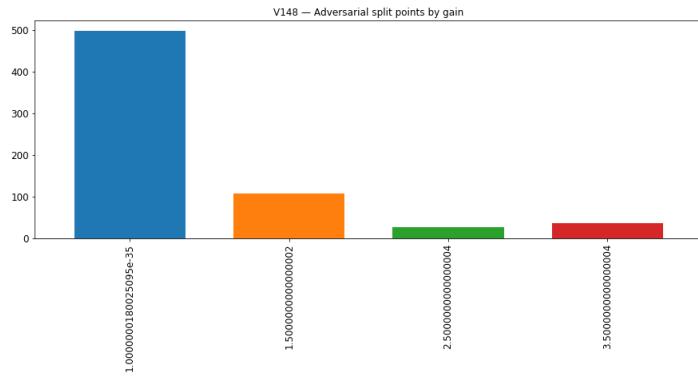
5 split point values used. Most common is 1.0000000180025095e-35 with gain of 46.7964893579483.



V148

Used 71 times, total gain is 668.646540760994.

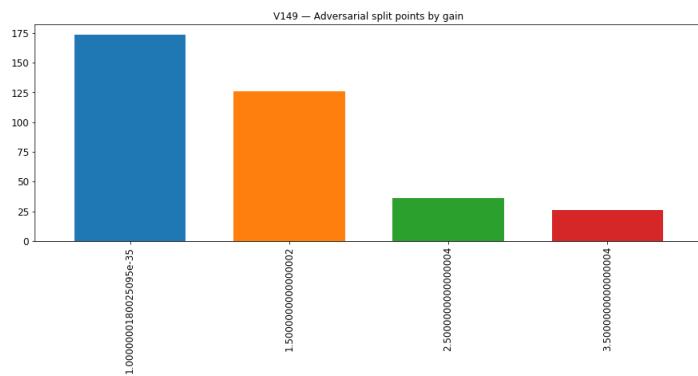
4 split point values used. Most common is 1.0000000180025095e-35 with gain of 497.22843861579895.



V149

Used 37 times, total gain is 361.2942199110985.

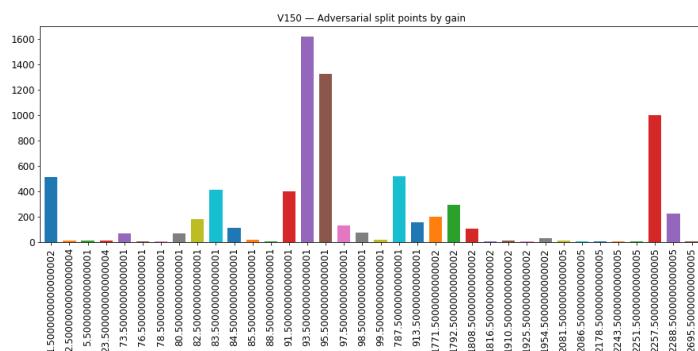
4 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 173.53614097833633.



V150

Used 160 times, total gain is 7541.9647062420845.

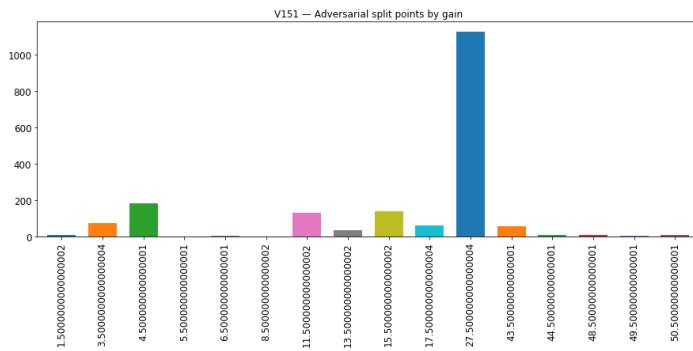
36 split point values used. Most rampant is 93.50000000000001 with gain of 1617.4729235768318.



V151

Used 29 times, total gain is 1857.0969169139862.

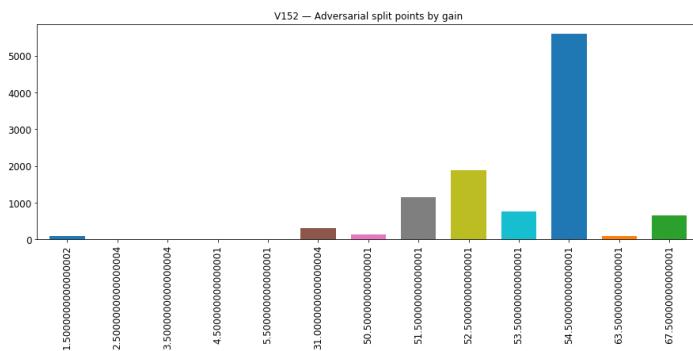
16 split point values used. Most abundant is 27.500000000000004 with gain of 1124.9002685546875.



V152

Used 259 times, total gain is 10655.691968739033.

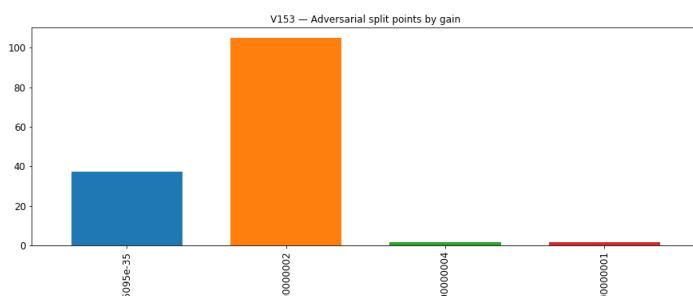
13 split point values used. Most abundant is 54.50000000000001 with gain of 5585.022709608078.



V153

Used 31 times, total gain is 145.58302873373032.

4 split point values used. Most marked is 1.5000000000000002 with gain of 104.90574485063553.

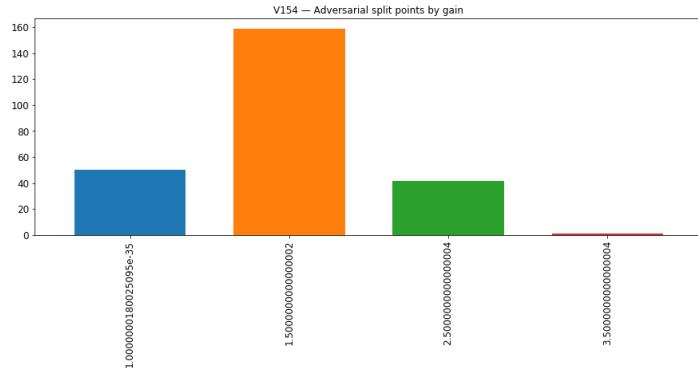




V154

Used 39 times, total gain is 251.5583132505417.

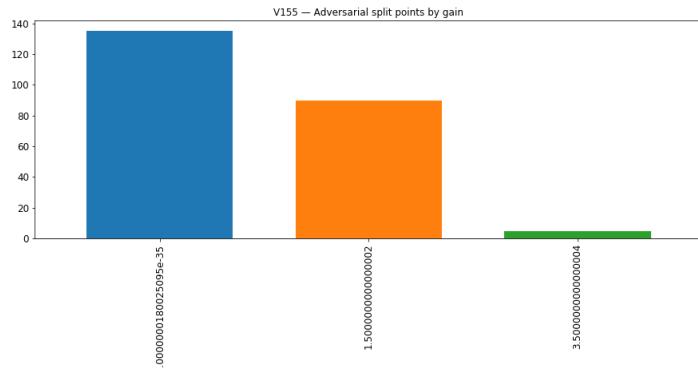
4 split point values used. Most common is 1.5000000000000002 with gain of 158.7373423576355.



V155

Used 24 times, total gain is 229.69562220573425.

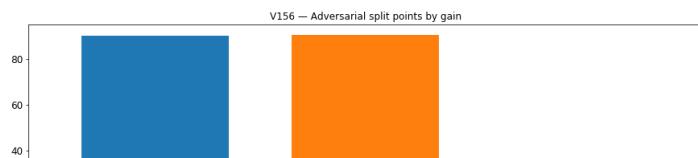
3 split point values used. Most prevalent is 1.000000180025095e-35 with gain of 135.06205487251282.

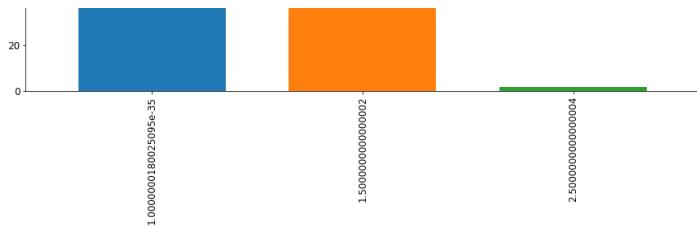


V156

Used 35 times, total gain is 182.16033685207367.

3 split point values used. Most frequent is 1.5000000000000002 with gain of 90.30937278270721.

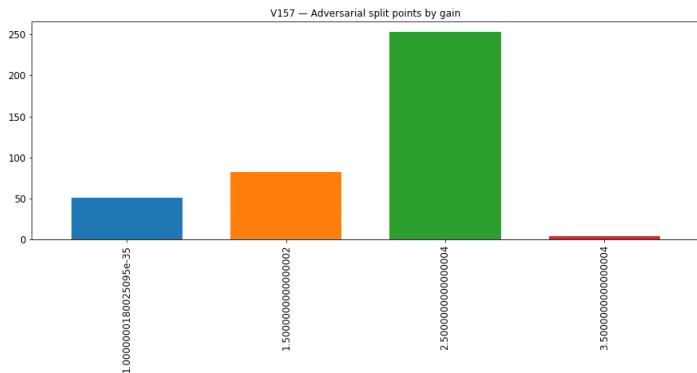




V157

Used 35 times, total gain is 389.4320321083069.

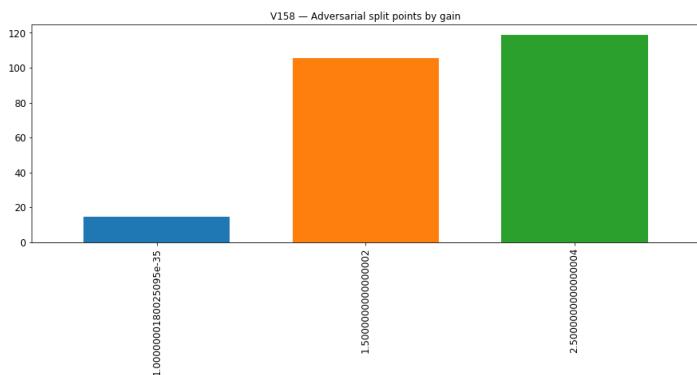
4 split point values used. Most rife is 2.500000000000004 with gain of 253.1150255203247.



V158

Used 37 times, total gain is 239.1963392496109.

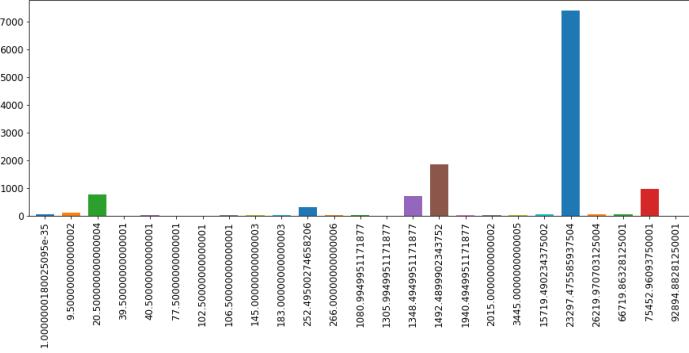
3 split point values used. Most omnipresent is 2.500000000000004 with gain of 118.81532227993011.



V159

Used 45 times, total gain is 12578.463658332825.

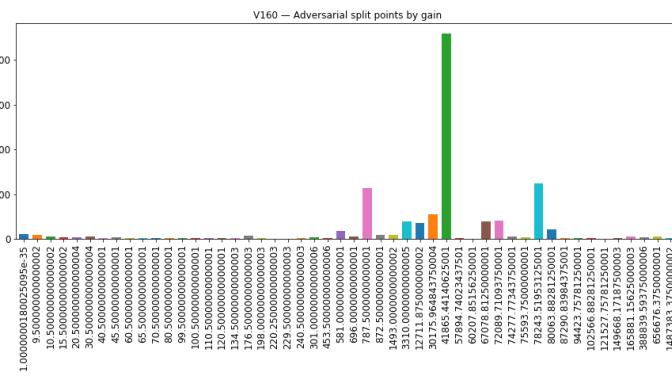
25 split point values used. Most fashionable is 23297.475585937504 with gain of 7386.12109375.



V160

Used 414 times, total gain is 10709.957169353962.

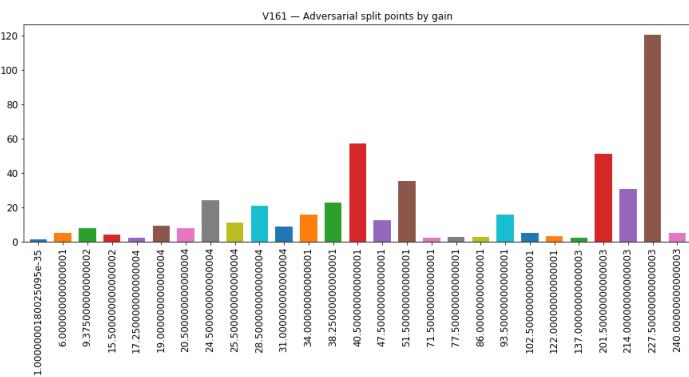
62 split point values used. Most repetitive is 41865.44140625001 with gain of 4589.622197508812.



V161

Used 60 times, total gain is 488.0887179374695.

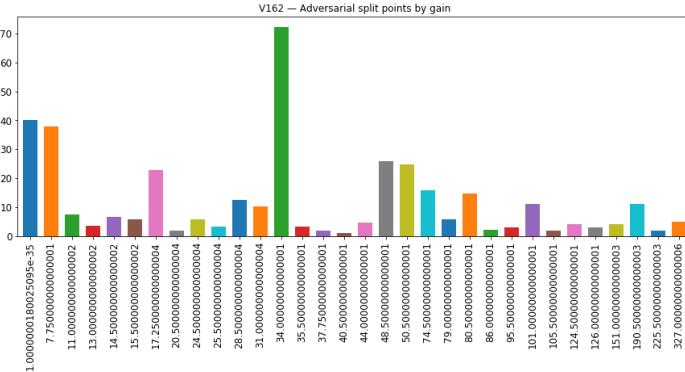
27 split point values used. Most rife is 227.50000000000003 with gain of 120.52004814147949.



V162

Used 58 times, total gain is 376.6337329149246.

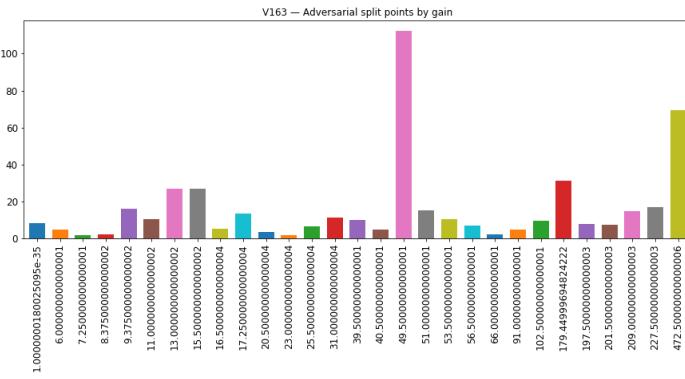
32 split point values used. Most rampant is 34.00000000000001 with gain of



V163

Used 58 times, total gain is 461.48599922657013.

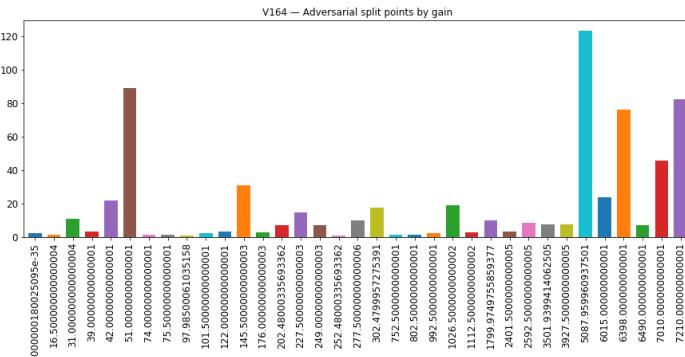
29 split point values used. Most prevalent is 49.500000000000001 with gain of 112.28831660747528.



V164

Used 63 times, total gain is 651.9202945232391.

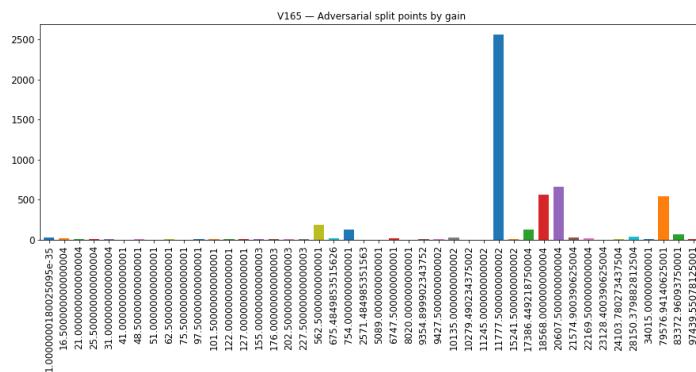
35 split point values used. Most common is 5087.959960937501 with gain of 123.35666048526764.



V165

Used 125 times, total gain is 5245.075797855854.

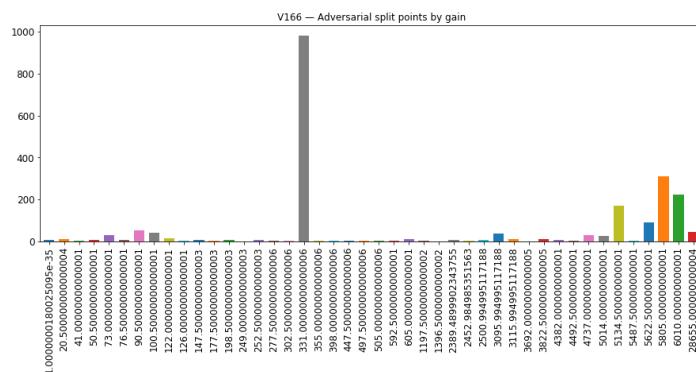
44 split point values used. Most rife is 11777.500000000002 with gain of 2560.396240234375.



V166

Used 85 times, total gain is 2216.277563691139.

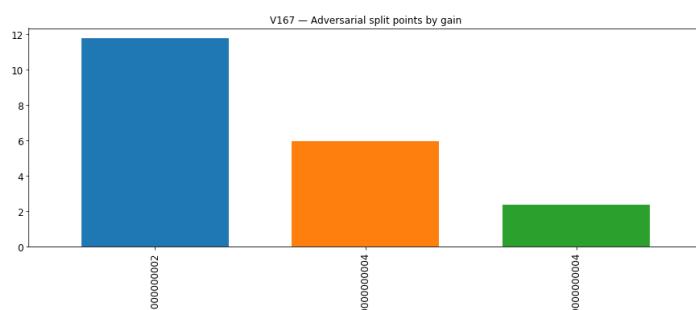
44 split point values used. Most prevalent is 331.00000000000006 with gain of 981.9087858200073.



V167

Used 6 times, total gain is 20.13326585292816.

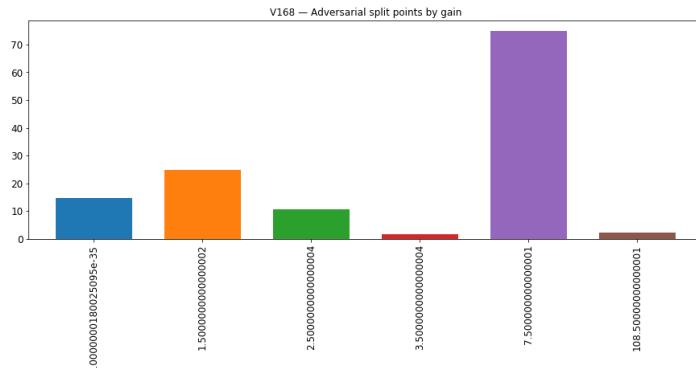
3 split point values used. Most fashionable is 1.5000000000000002 with gain of 11.767049312591553.



V168

Used 17 times, total gain is 129.38873207569122.

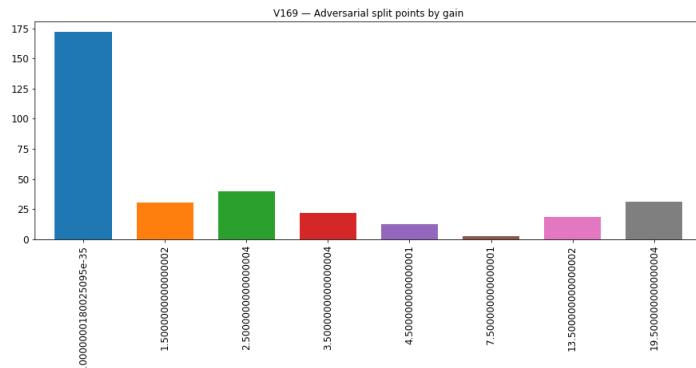
6 split point values used. Most recurrent is 7.500000000000001 with gain of 74.87153625488281.



V169

Used 42 times, total gain is 328.65844547748566.

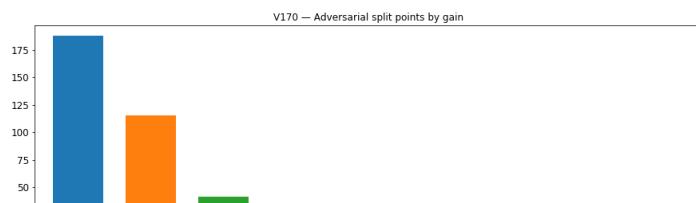
8 split point values used. Most recurrent is 1.0000000180025095e-35 with gain of 171.9863132238388.

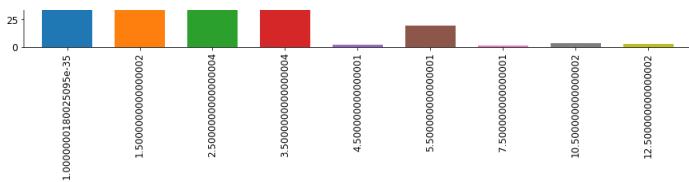


V170

Used 76 times, total gain is 408.4086481332779.

9 split point values used. Most abundant is 1.0000000180025095e-35 with gain of 187.8247835636139.

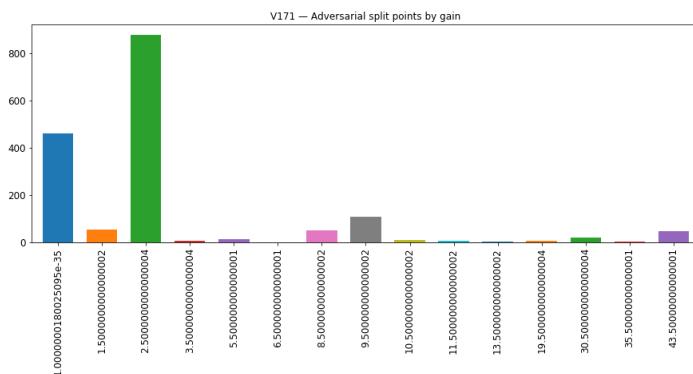




V171

Used 61 times, total gain is 1669.884287238121.

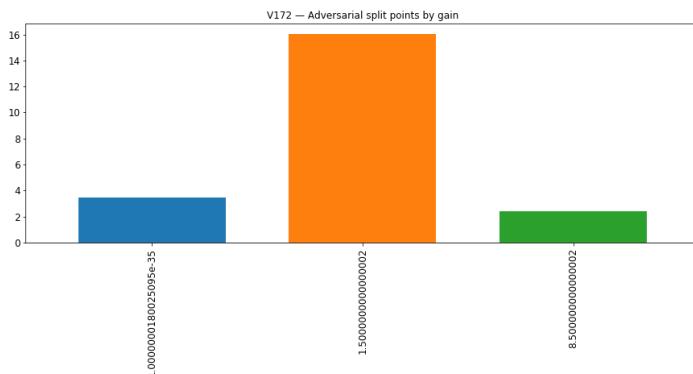
15 split point values used. Most legendary is 2.5000000000000004 with gain of 877.9886518716812.



V172

Used 6 times, total gain is 21.880437791347504.

3 split point values used. Most rife is 1.5000000000000002 with gain of 16.026963353157043.

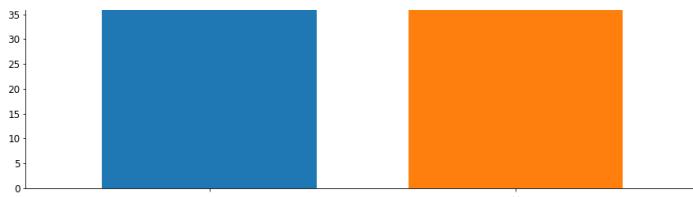


V173

Used 6 times, total gain is 82.56946182250977.

2 split point values used. Most recurrent is 1.5000000000000002 with gain of 42.05925273895264.

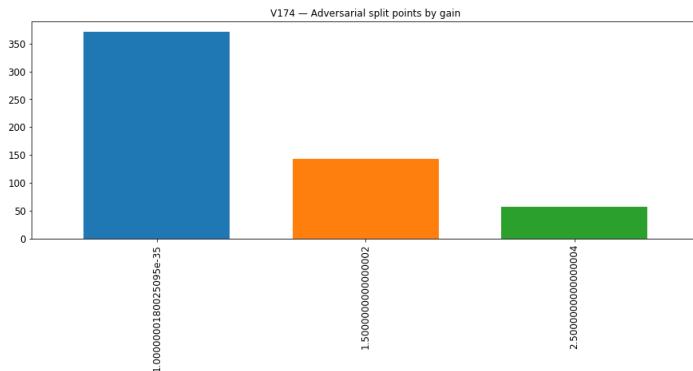




V174

Used 36 times, total gain is 571.5165926218033.

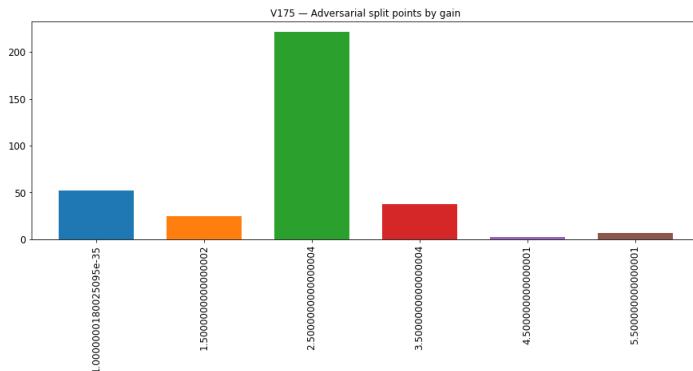
3 split point values used. Most ubiquitous is $1.0000000180025095e-35$ with gain of 370.90488839149475.



V175

Used 41 times, total gain is 345.57332241535187.

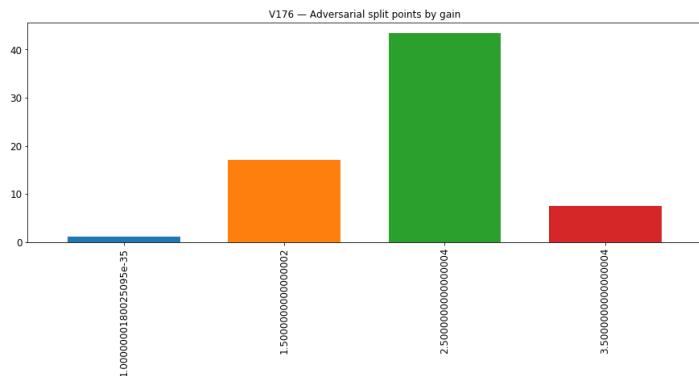
6 split point values used. Most prevalent is 2.5000000000000004 with gain of 221.52172827720642.



V176

Used 12 times, total gain is 69.17613804340363.

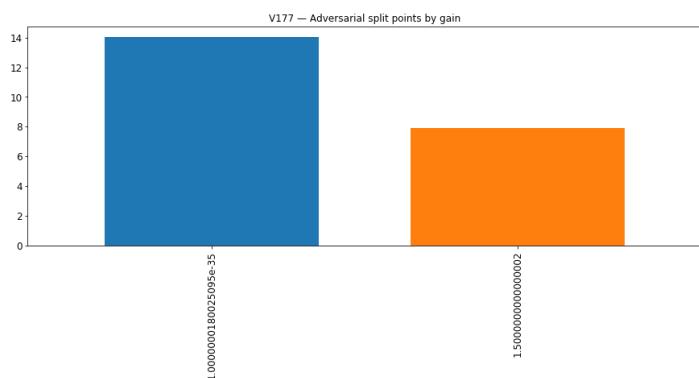
4 split point values used. Most omnipresent is 2.5000000000000004 with gain of 43.42458152770996.



V177

Used 6 times, total gain is 21.947824239730835.

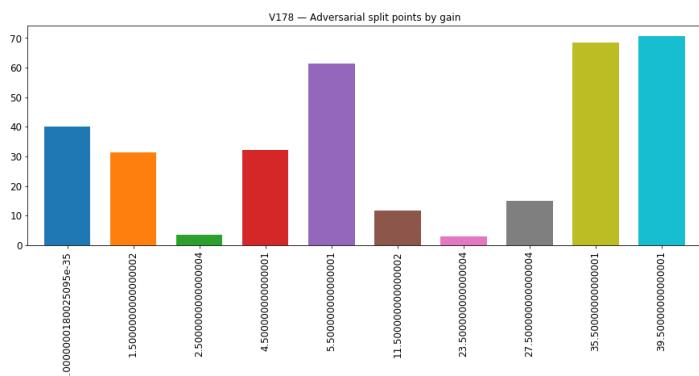
2 split point values used. Most marked is 1.0000000180025095e-35 with gain of 14.030390501022339.



V178

Used 25 times, total gain is 337.23709285259247.

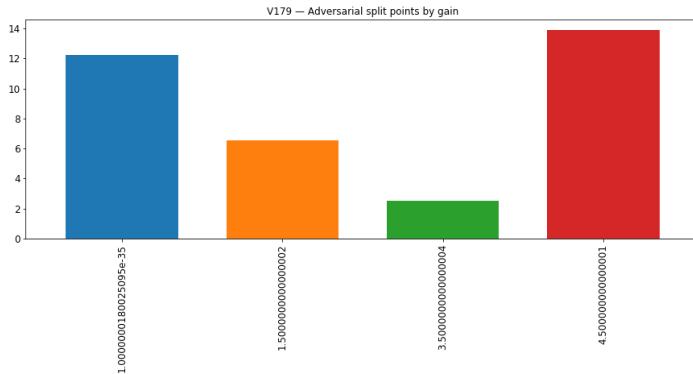
10 split point values used. Most ubiquitous is 39.50000000000001 with gain of 70.65260314941406.



V179

Used 8 times, total gain is 35.203213810920715.

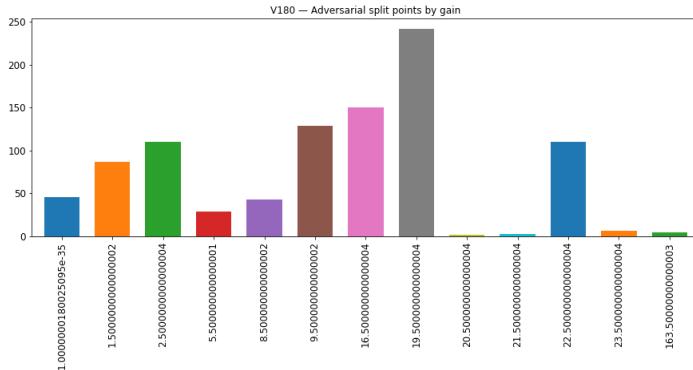
4 split point values used. Most marked is 4.5000000000000001 with gain of 13.898126602172852.



V180

Used 43 times, total gain is 959.7575562000275.

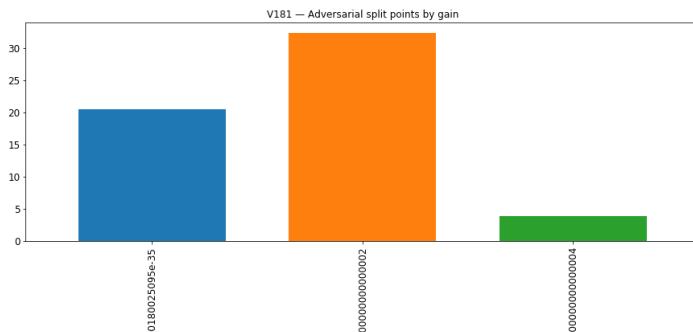
13 split point values used. Most prevalent is 19.50000000000004 with gain of 241.46389770507812.



V181

Used 16 times, total gain is 56.78517270088196.

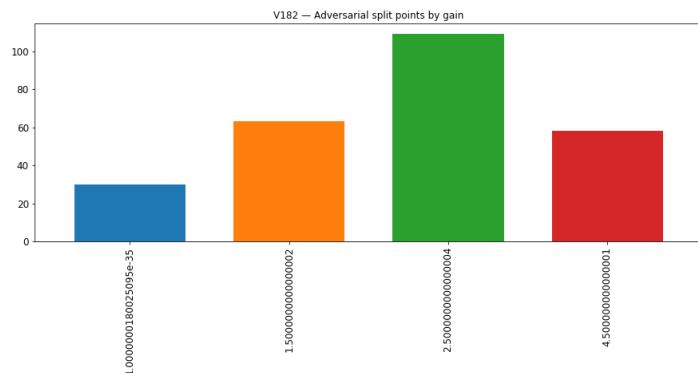
3 split point values used. Most permeant is 1.5000000000000002 with gain of 32.36460983753204.



V182

Used 11 times, total gain is 260.55856466293335.

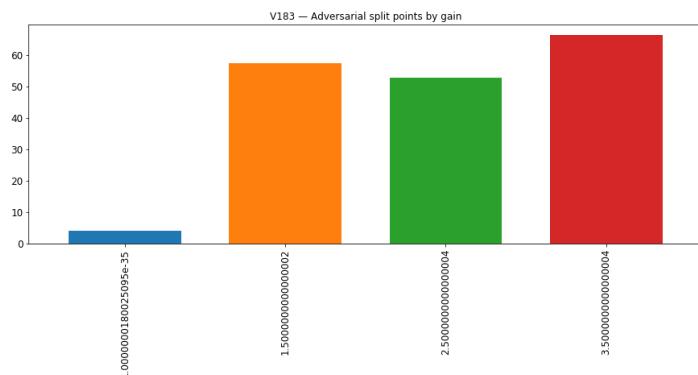
4 split point values used. Most prevalent is 2.5000000000000004 with gain of 109.2130012512207.



V183

Used 12 times, total gain is 181.01929181814194.

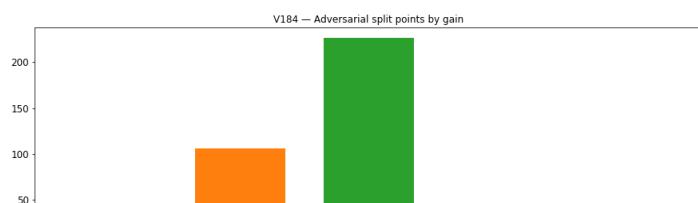
4 split point values used. Most legendary is 3.5000000000000004 with gain of 66.513352394104.



V184

Used 35 times, total gain is 391.5350849032402.

5 split point values used. Most abundant is 2.5000000000000004 with gain of 226.55375397205353.

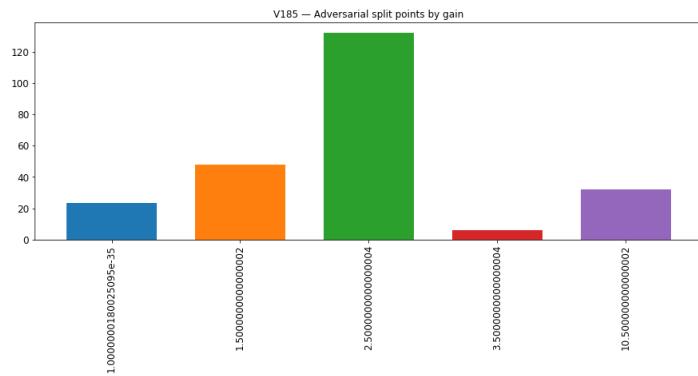




V185

Used 18 times, total gain is 241.61363697052002.

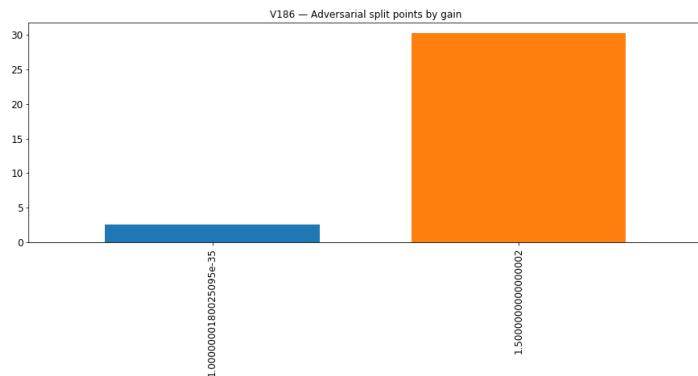
5 split point values used. Most widespread is 2.5000000000000004 with gain of 131.98498797416687.



V186

Used 8 times, total gain is 32.775710701942444.

2 split point values used. Most permeant is 1.5000000000000002 with gain of 30.256731152534485.

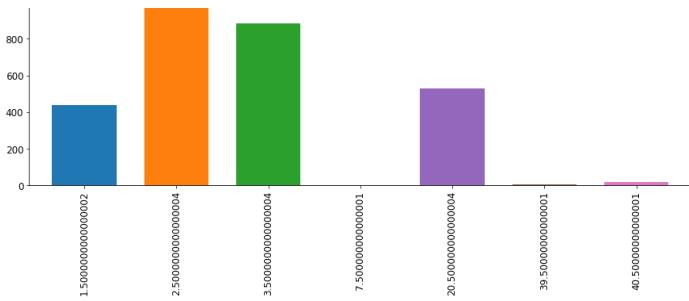


V187

Used 38 times, total gain is 2995.901023387909.

7 split point values used. Most repetitious is 2.5000000000000004 with gain of 1119.006341457367.

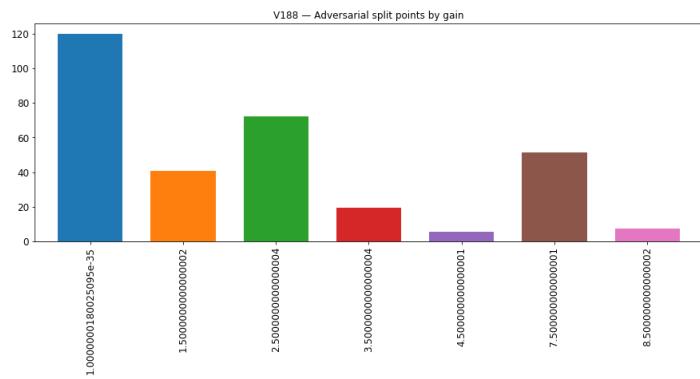




V188

Used 30 times, total gain is 316.5881358385086.

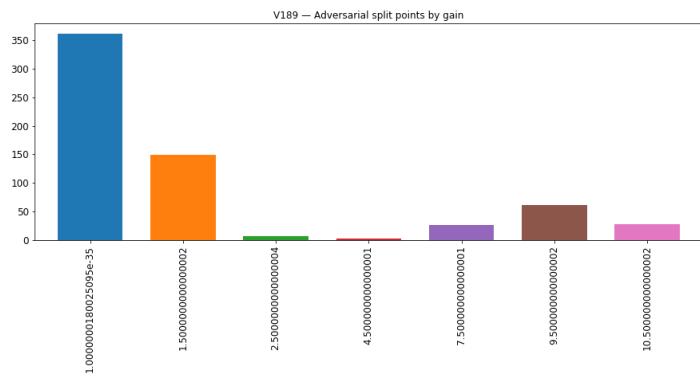
7 split point values used. Most widespread is 1.0000000180025095e-35 with gain of 119.96243727207184.



V189

Used 33 times, total gain is 635.5324568152428.

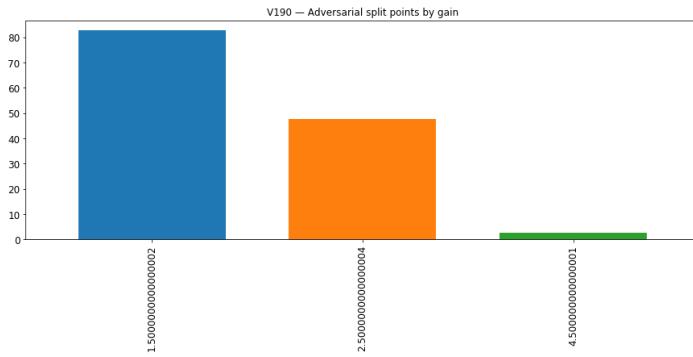
7 split point values used. Most abundant is 1.0000000180025095e-35 with gain of 361.14107245206833.



V190

Used 12 times, total gain is 133.05077171325684.

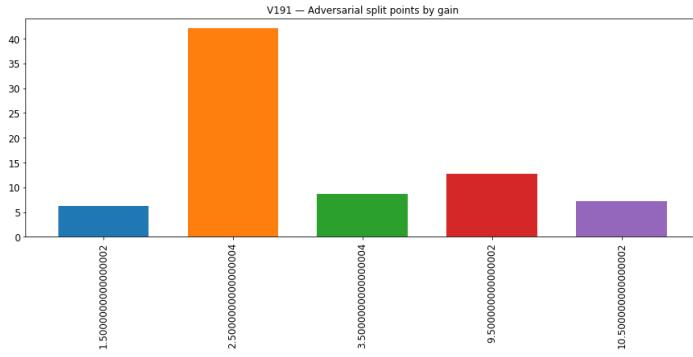
3 split point values used. Most fashionable is 1.5000000000000002 with gain of 82.57937097549438.



V191

Used 8 times, total gain is 76.90320467948914.

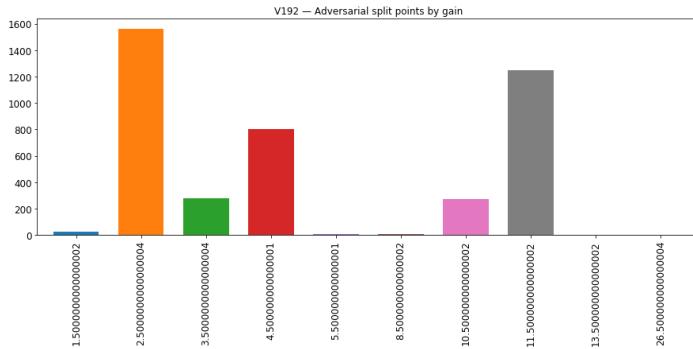
5 split point values used. Most repetitious is 2.5000000000000004 with gain of 42.02522659301758.



V192

Used 28 times, total gain is 4211.277723908424.

10 split point values used. Most popular is 2.5000000000000004 with gain of 1559.3498044013977.

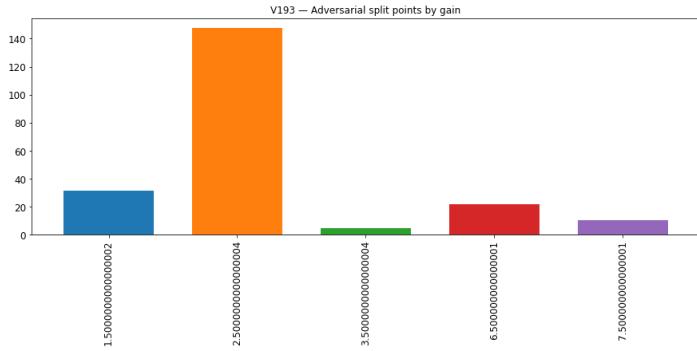


V193

Used 17 times, total gain is 215.9396225810051.

5 split point values used. Most ubiquitous is 2.5000000000000004 with gain

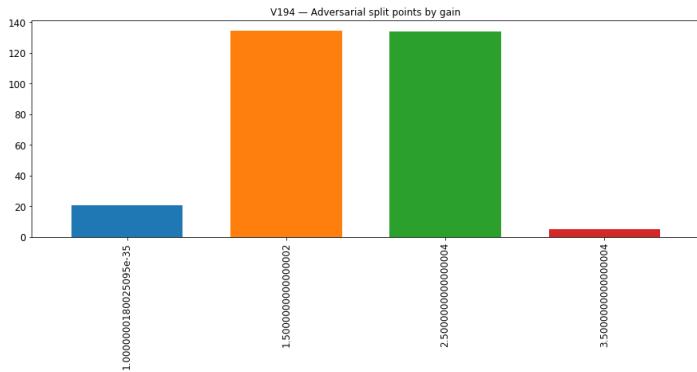
of 147.37289810180664.



V194

Used 26 times, total gain is 294.41020226478577.

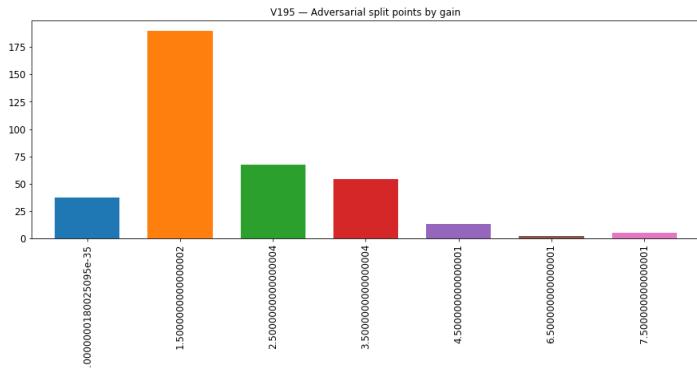
4 split point values used. Most permeant is 1.500000000000002 with gain of 134.5044459104538.



V195

Used 50 times, total gain is 368.8669615983963.

7 split point values used. Most recurrent is 1.500000000000002 with gain of 189.80527675151825.

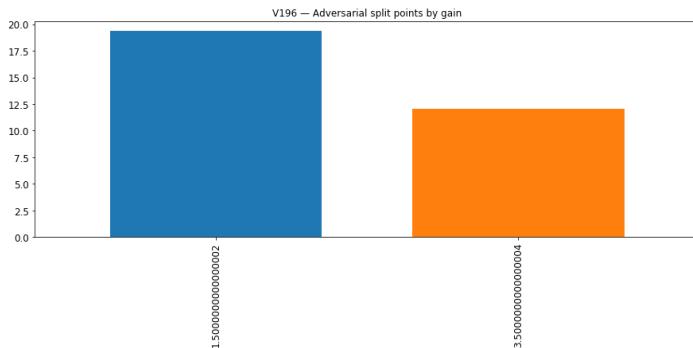


V196

v 196

Used 7 times, total gain is 31.39078712463379.

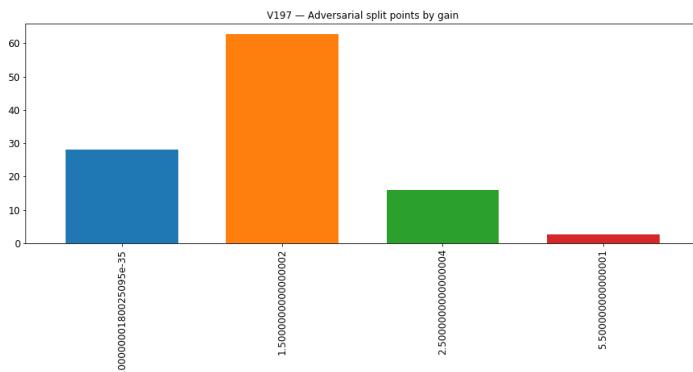
2 split point values used. Most recurrent is 1.5000000000000002 with gain of 19.342175483703613.



V197

Used 13 times, total gain is 109.44070243835449.

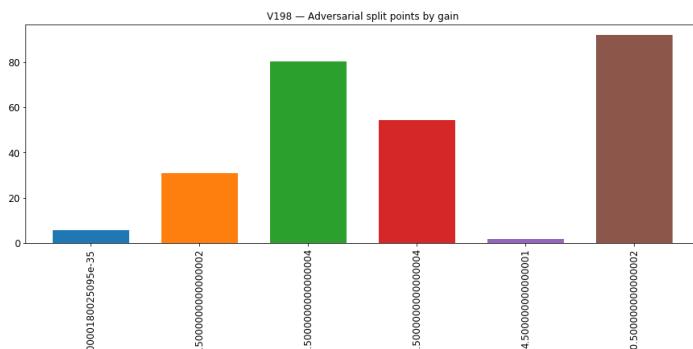
4 split point values used. Most prevalent is 1.5000000000000002 with gain of 62.72569155693054.



V198

Used 20 times, total gain is 265.3735502958298.

6 split point values used. Most repetitive is 10.500000000000002 with gain of 92.07731628417969.

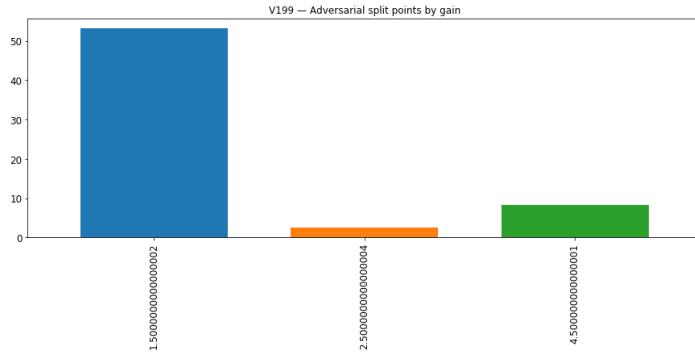


1.0000
1
2
3
1

V199

Used 8 times, total gain is 63.88098669052124.

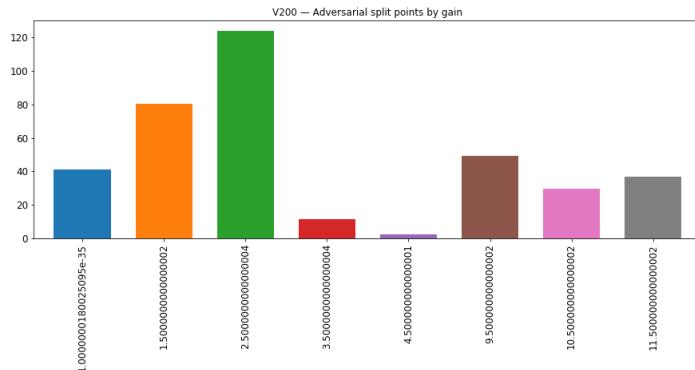
3 split point values used. Most common is 1.5000000000000002 with gain of 53.1188360452652.



V200

Used 53 times, total gain is 375.32913088798523.

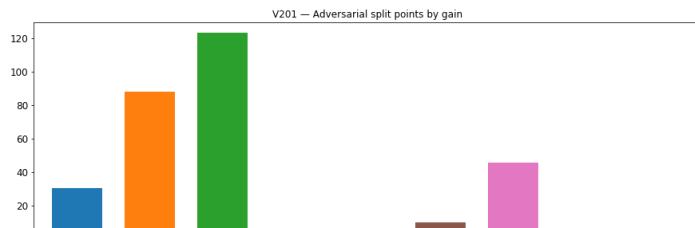
8 split point values used. Most abundant is 2.5000000000000004 with gain of 123.90473699569702.

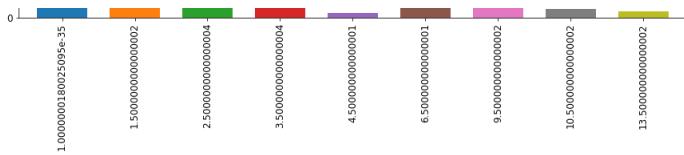


V201

Used 48 times, total gain is 315.21461153030396.

9 split point values used. Most recurrent is 2.5000000000000004 with gain of 123.21807289123535.

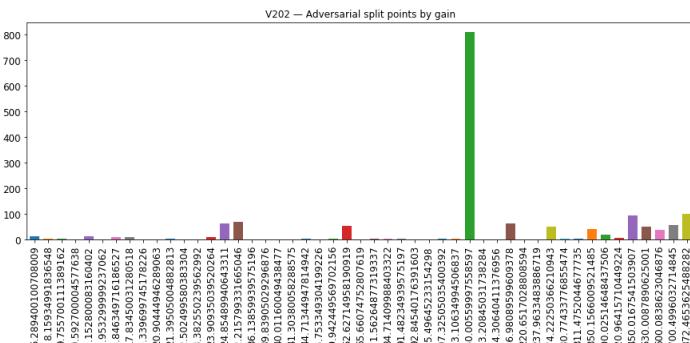




V202

Used 56 times, total gain is 1656.3217313885689.

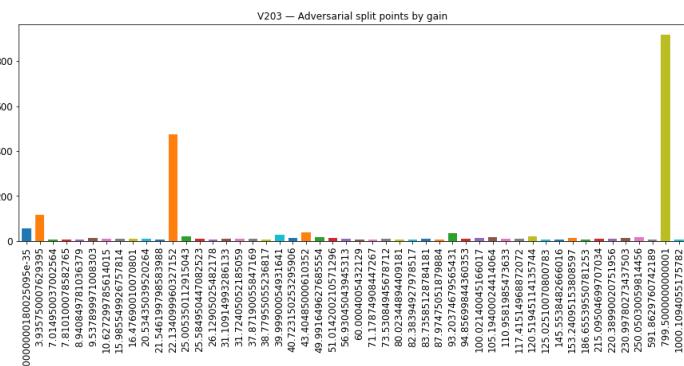
49 split point values used. Most frequent is 150.00559997558597 with gain of 809.2953491210938.



V203

Used 146 times, total gain is 2239.6167542934418.

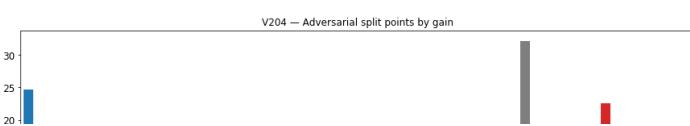
96 split point values used. Most rampant is 799.5000000000001 with gain of 917.49951171875.

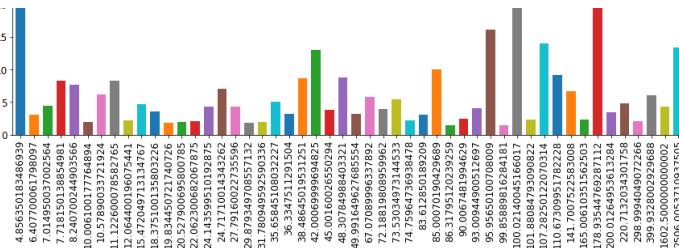


V204

Used 63 times, total gain is 332.47151350975037.

57 split point values used. Most rampant is 100.02140045166017 with gain of 32.17401885986328.

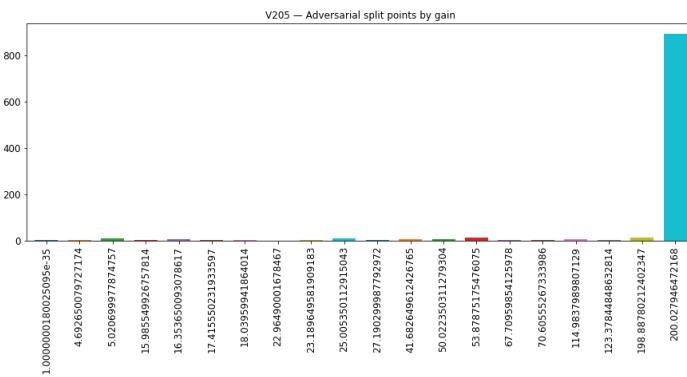




V205

Used 25 times, total gain is 999.9517687559128.

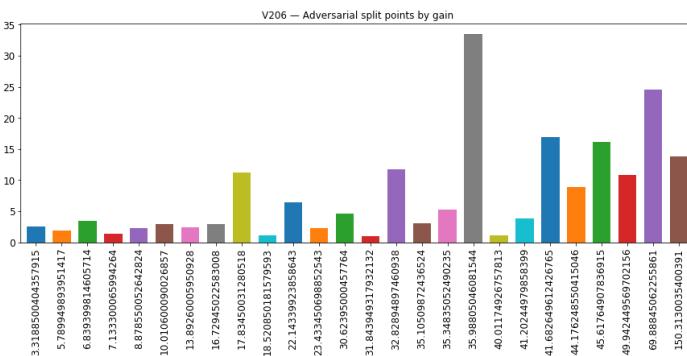
20 split point values used. Most legendary is 200.027946472168 with gain of 891.660888671875.



V206

Used 31 times, total gain is 195.91588628292084.

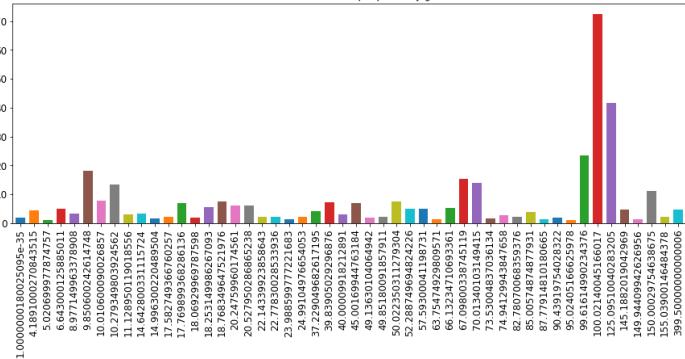
26 split point values used. Most legendary is 35.98805046081544 with gain of 33.53403925895691.



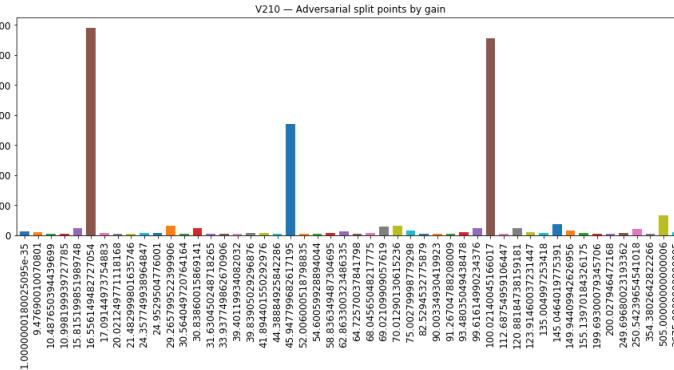
V207

Used 64 times, total gain is 364.2288204431534.

51 split point values used. Most ubiquitous is 100.02140045166017 with gain of 72.42742919921875.



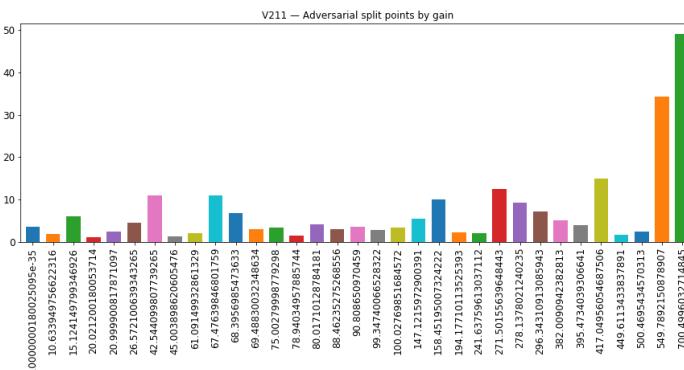
OU split point values used. Most recurrent is 10.0000180025095e-35 with gain of 690.421630859375.



V211

Used 36 times, total gain is 236.40697288513184.

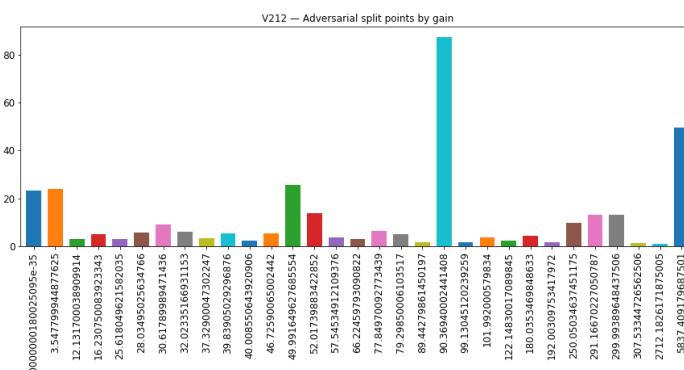
33 split point values used. Most ubiquitous is 700.4996032714845 with gain of 49.03105926513672.



V212

Used 39 times, total gain is 342.7492751479149.

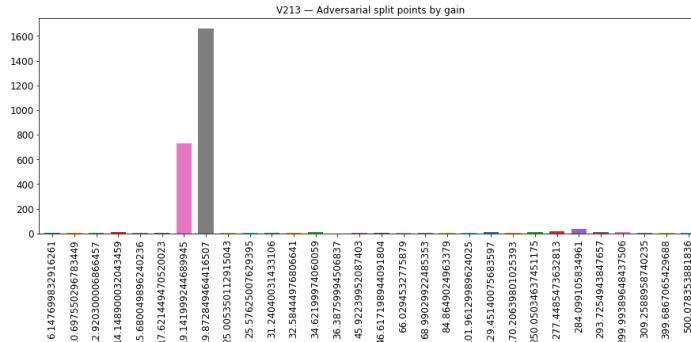
31 split point values used. Most prevalent is 90.36940002441408 with gain of 87.24172973632812.



V213

Used 33 times, total gain is 2578.2293944358826.

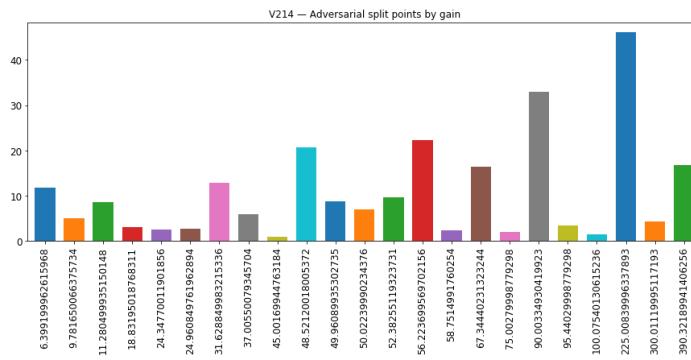
30 split point values used. Most prevalent is 19.872849464416507 with gain of 1662.0621337890625.



V214

Used 25 times, total gain is 247.65209048986435.

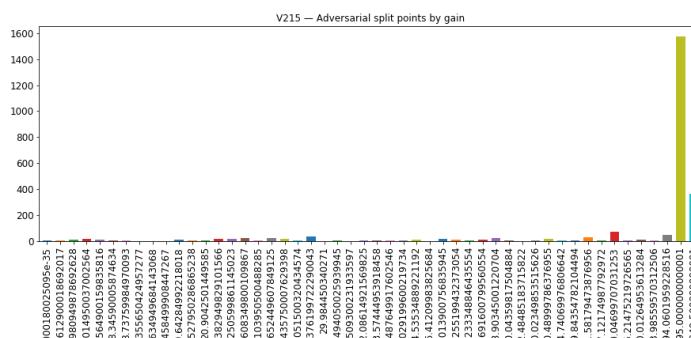
23 split point values used. Most abundant is 225.00839996337893 with gain of 46.0252685546875.



V215

Used 77 times, total gain is 2523.8563010692596.

56 split point values used. Most prevalent is 995.0000000000001 with gain of 1573.5157470703125.

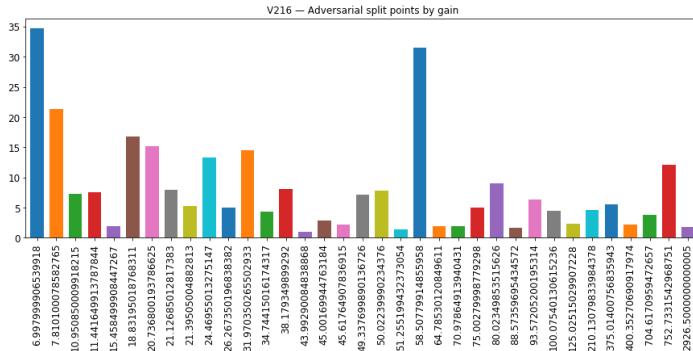


1.0000C
2.
4.
6.
6.
6.
1.
1.
10.
10.
15.
15.
19.
19.

V216

Used 43 times, total gain is 279.88188219070435.

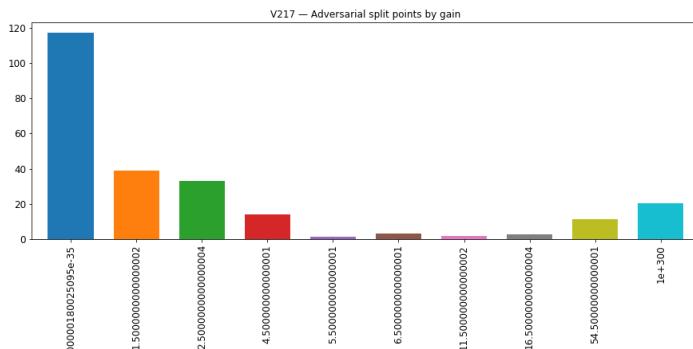
35 split point values used. Most fashionable is 6.997999906539918 with gain of 34.645750522613525.



V217

Used 34 times, total gain is 243.64506340026855.

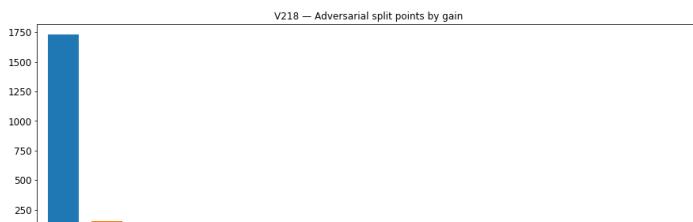
10 split point values used. Most repetitive is 1.0000000180025095e-35 with gain of 117.2049994468689.

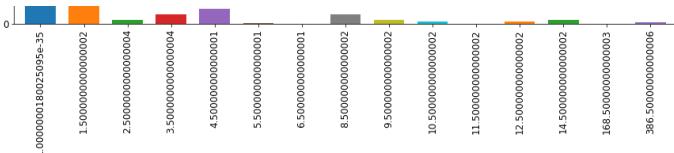


V218

Used 101 times, total gain is 2330.415140271187.

15 split point values used. Most widespread is 1.0000000180025095e-35 with gain of 1732.115311384201.

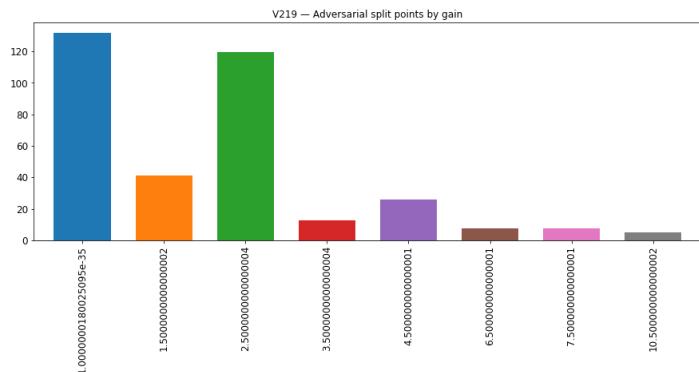




V219

Used 46 times, total gain is 350.7508074045181.

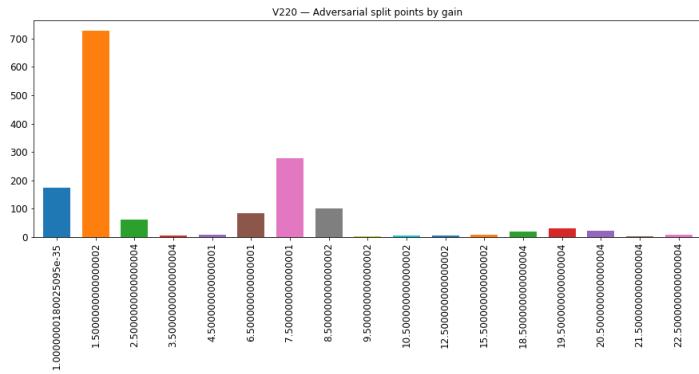
8 split point values used. Most omnipresent is 1.000000180025095e-35 with gain of 131.7498733997345.



V220

Used 78 times, total gain is 1541.457898736.

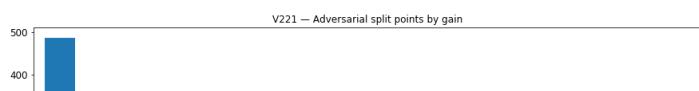
17 split point values used. Most rife is 1.5000000000000002 with gain of 727.2252616882324.

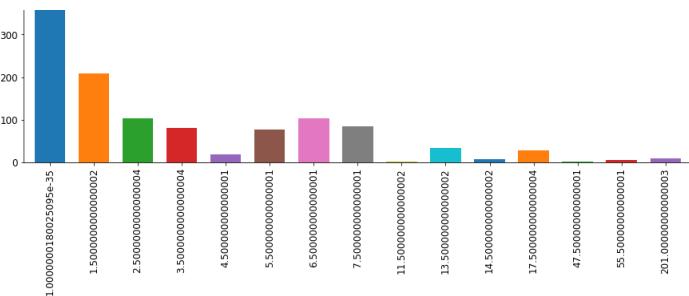


V221

Used 199 times, total gain is 1249.537996351719.

15 split point values used. Most widespread is 1.000000180025095e-35 with gain of 487.05511832237244.

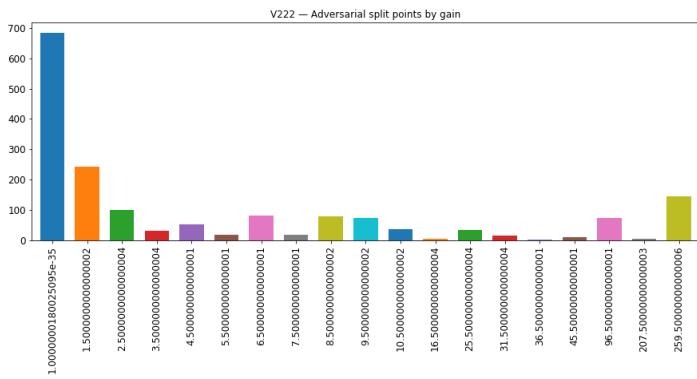




V222

Used 213 times, total gain is 1704.4495626091957.

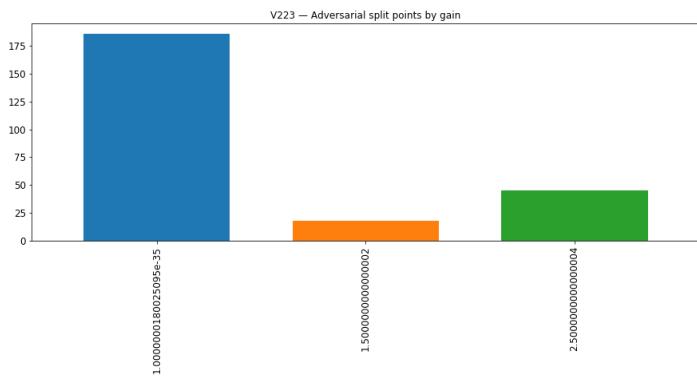
19 split point values used. Most prevalent is 1.000000180025095e-35 with gain of 683.2814173698425.



V223

Used 20 times, total gain is 249.10256958007812.

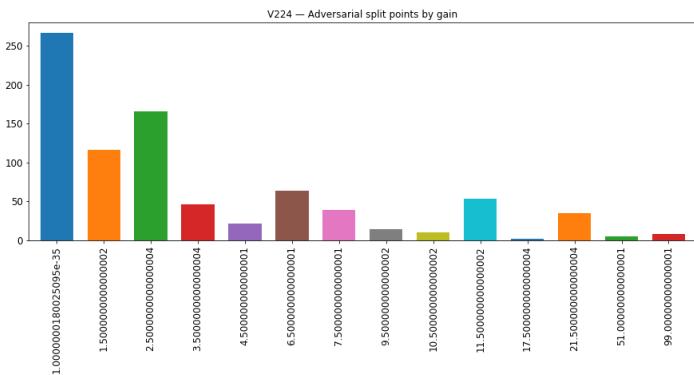
3 split point values used. Most ubiquitous is 1.000000180025095e-35 with gain of 185.74476027488708.



V224

Used 118 times, total gain is 845.4222990870476.

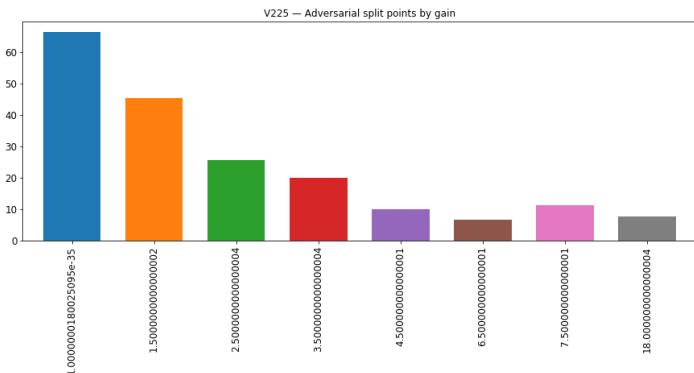
14 split point values used. Most recurrent is 1.000000180025095e-35 with gain of 266.56667882204056.



V225

Used 32 times, total gain is 193.43680095672607.

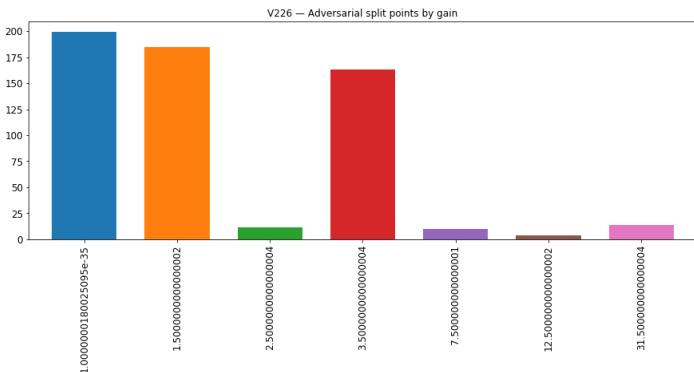
8 split point values used. Most ubiquitous is 1.0000000180025095e-35 with gain of 66.4852864742279.



V226

Used 35 times, total gain is 586.260537981987.

7 split point values used. Most repetitious is 1.0000000180025095e-35 with gain of 199.26505494117737.

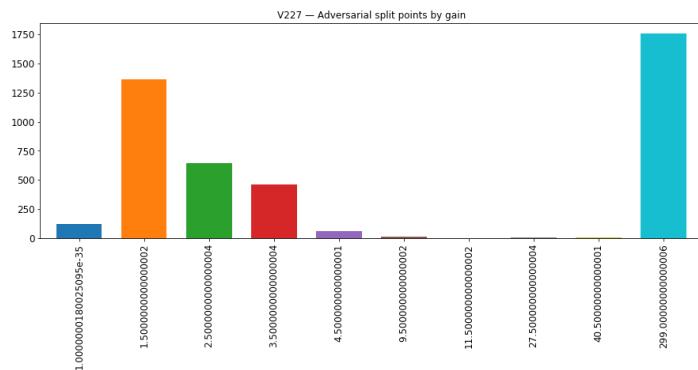


V227

Used 407 times, total gain is 4420.5100400076002

Used 107 times, total gain is 4459.51901900/000.

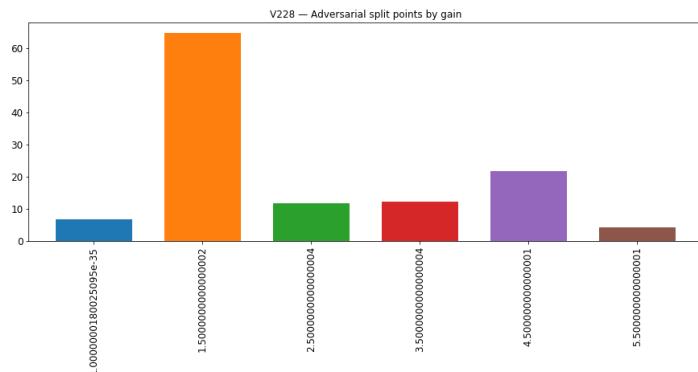
10 split point values used. Most useful is 299.00000000000006 with gain of 1757.61288356781.



V228

Used 33 times, total gain is 121.23718822002411.

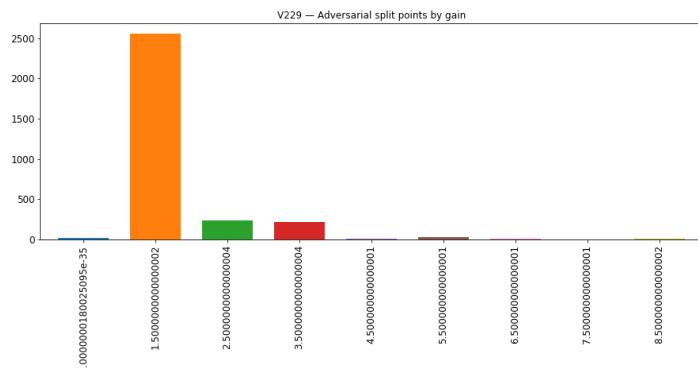
6 split point values used. Most repetitious is 1.5000000000000002 with gain of 64.63042986392975.



V229

Used 91 times, total gain is 3086.048131465912.

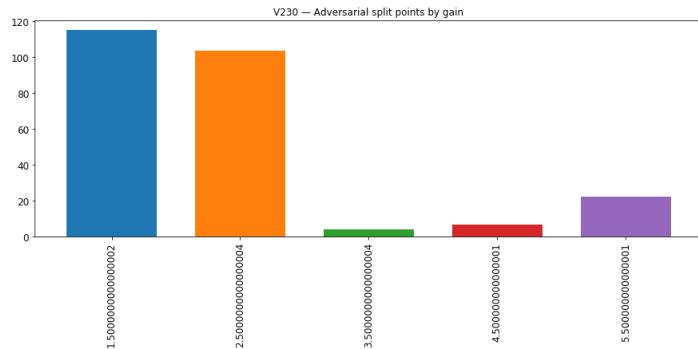
9 split point values used. Most common is 1.5000000000000002 with gain of 2556.1180136203766.



V230

Used 42 times, total gain is 251.20437049865723.

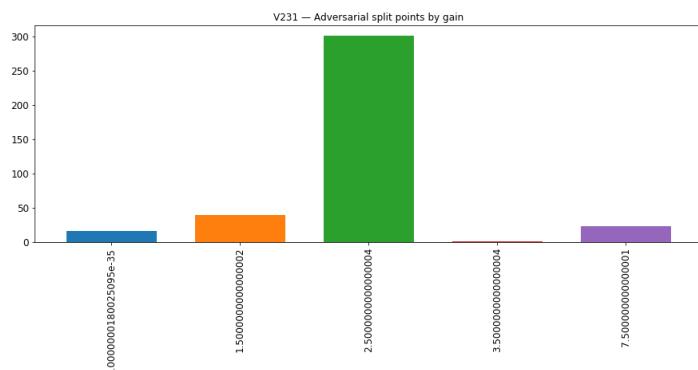
5 split point values used. Most prevalent is 1.5000000000000002 with gain of 114.95959830284119.



V231

Used 9 times, total gain is 380.97548604011536.

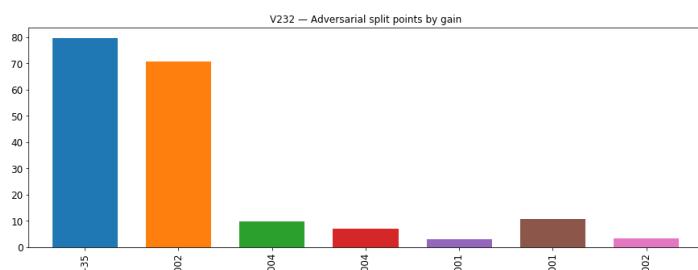
5 split point values used. Most ubiquitous is 2.5000000000000004 with gain of 301.1233215332031.



V232

Used 40 times, total gain is 184.59865885972977.

7 split point values used. Most recurrent is 1.000000180025095e-35 with gain of 79.65231680870056.

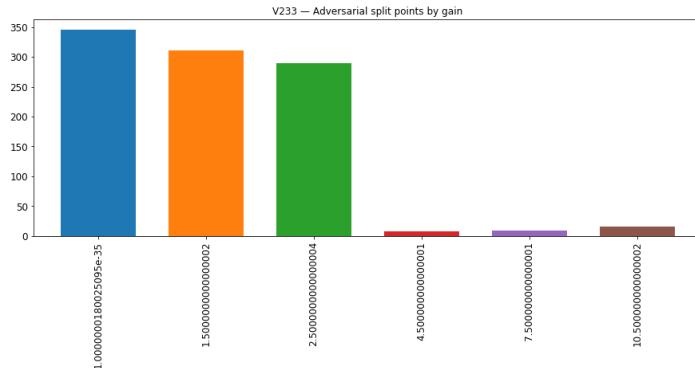




V233

Used 20 times, total gain is 978.605208158493.

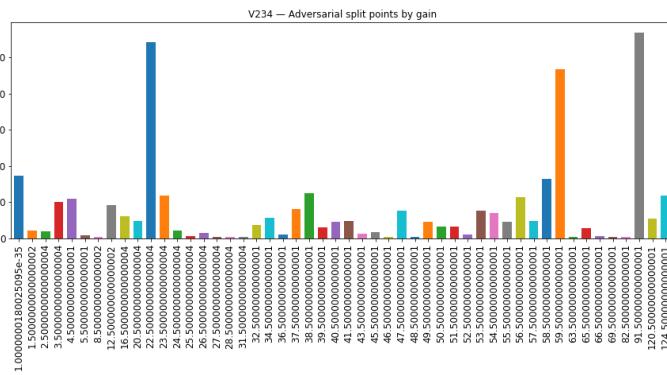
6 split point values used. Most legendary is $1.0000000180025095e-35$ with gain of 345.36762857437134.



V234

Used 1271 times, total gain is 19208.212720155716.

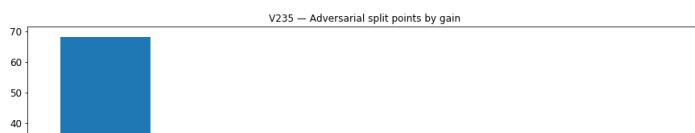
76 split point values used. Most omnipresent is 91.50000000000001 with gain of 2842.250535428524.

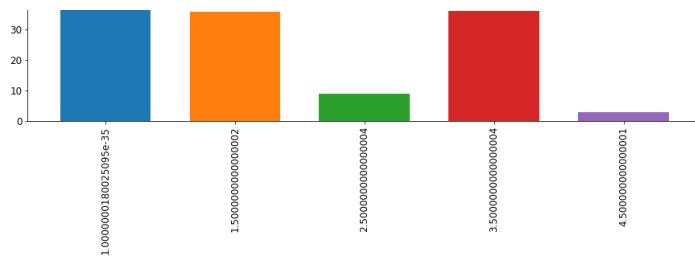


V235

Used 23 times, total gain is 151.77856731414795.

5 split point values used. Most abundant is $1.0000000180025095e-35$ with gain of 68.2442102432251.

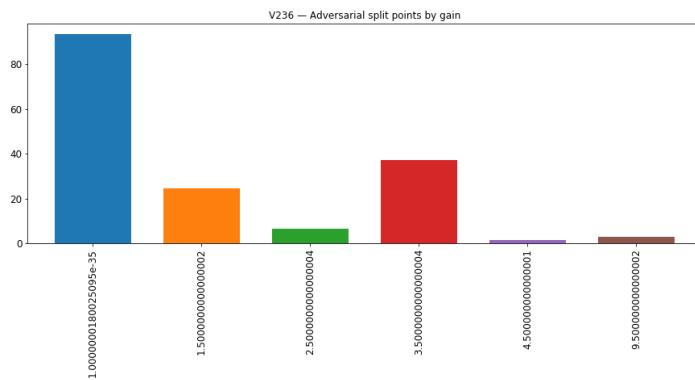




V236

Used 29 times, total gain is 166.43080627918243.

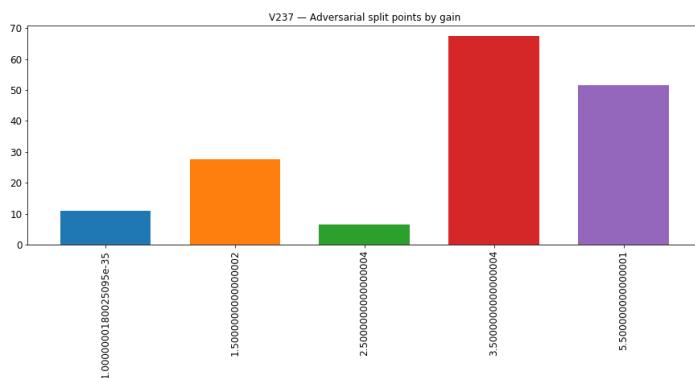
6 split point values used. Most omnipresent is 1.000000180025095e-35 with gain of 93.47057247161865.



V237

Used 21 times, total gain is 163.9425751566887.

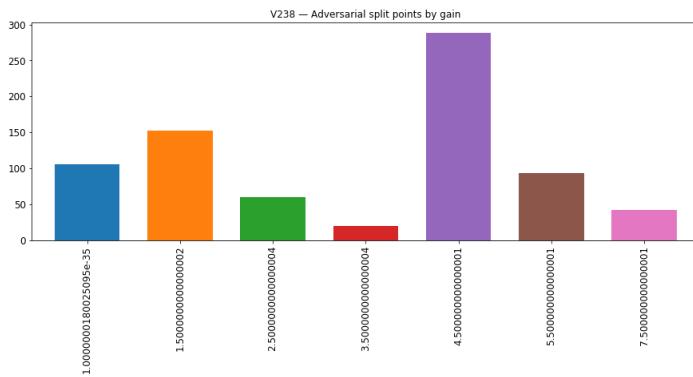
5 split point values used. Most abundant is 3.5000000000000004 with gain of 67.44308650493622.



V238

Used 61 times, total gain is 763.9812121391296.

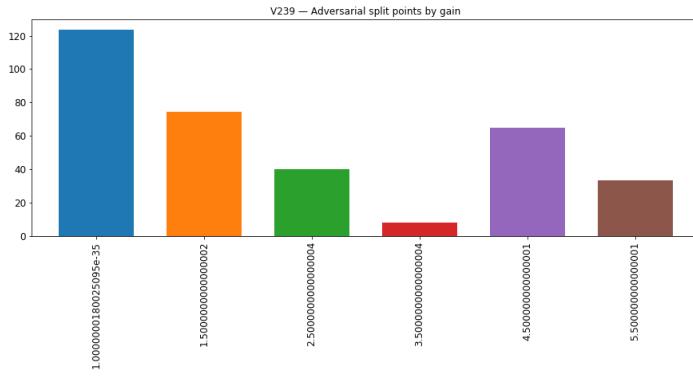
7 split point values used. Most useful is 4.5000000000000001 with gain of 288.3364644050598.



V239

Used 54 times, total gain is 344.66674530506134.

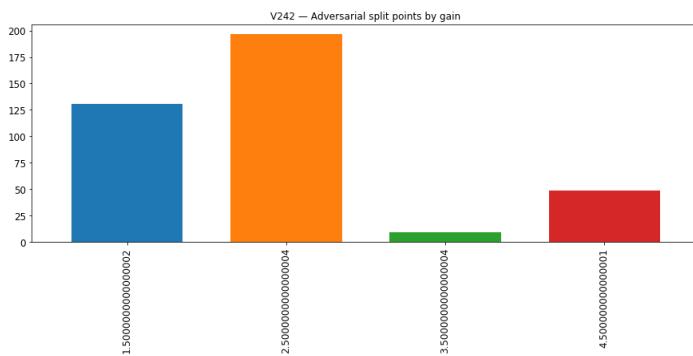
6 split point values used. Most prevalent is 1.000000180025095e-35 with gain of 123.55844616889954.



V242

Used 28 times, total gain is 385.051390171051.

4 split point values used. Most recurrent is 2.500000000000004 with gain of 196.30014038085938.

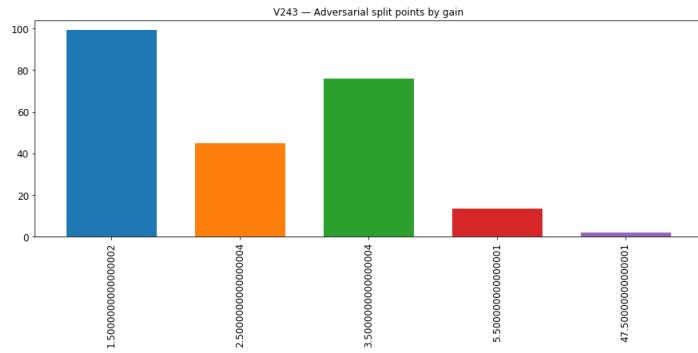


V243

Used 30 times, total gain is 235.21576857566833.

5 split point values used. Most prevalent is 1.50000000000002 with gain of

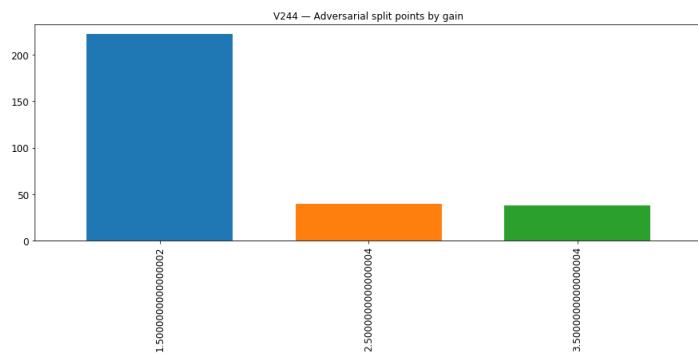
3 split point values used. Most prevalent is 1.5000000000000002 with gain of 99.07203435897827.



V244

Used 37 times, total gain is 299.9084572196007.

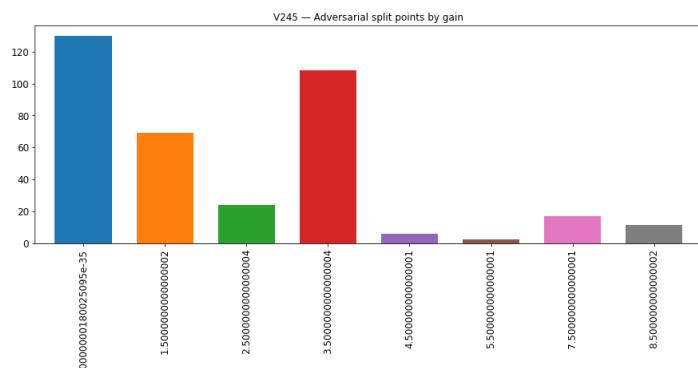
3 split point values used. Most widespread is 1.5000000000000002 with gain of 221.91846722364426.



V245

Used 72 times, total gain is 368.61701023578644.

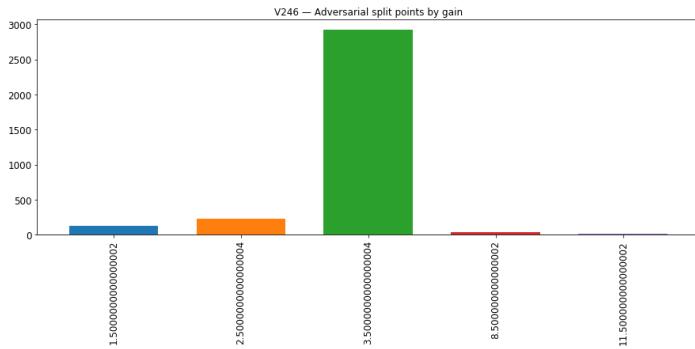
8 split point values used. Most pernicious is 1.000000180025095e-35 with gain of 129.8953479528427.



V246

Used 38 times, total gain is 3314.0201287269592.

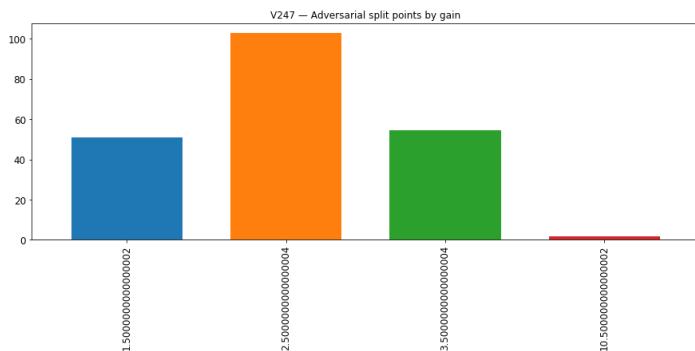
5 split point values used. Most ubiquitous is 3.5000000000000004 with gain of 2920.4660662412643.



V247

Used 14 times, total gain is 209.99003863334656.

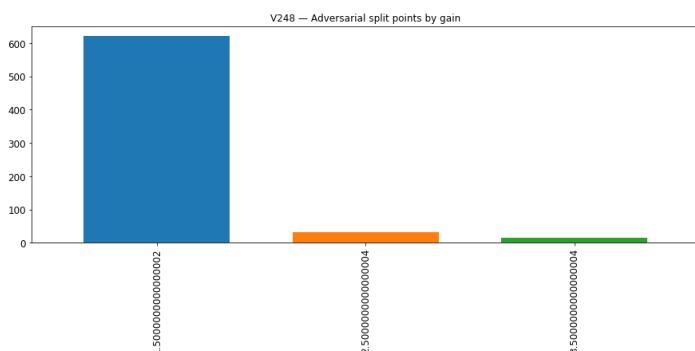
4 split point values used. Most repetitive is 2.5000000000000004 with gain of 102.72485542297363.



V248

Used 69 times, total gain is 666.3470293283463.

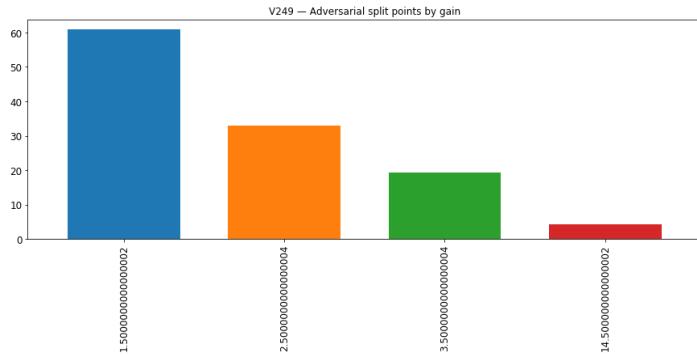
3 split point values used. Most abundant is 1.5000000000000002 with gain of 620.1237550973892.



V249

Used 17 times, total gain is 117.46266603469849.

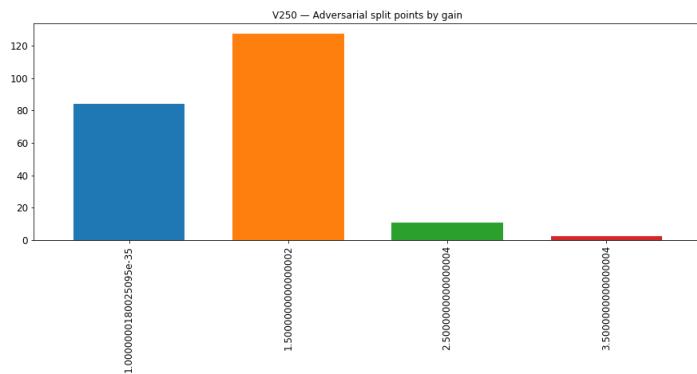
4 split point values used. Most recurrent is 1.5000000000000002 with gain of 60.82166039943695.



V250

Used 50 times, total gain is 224.4799401164055.

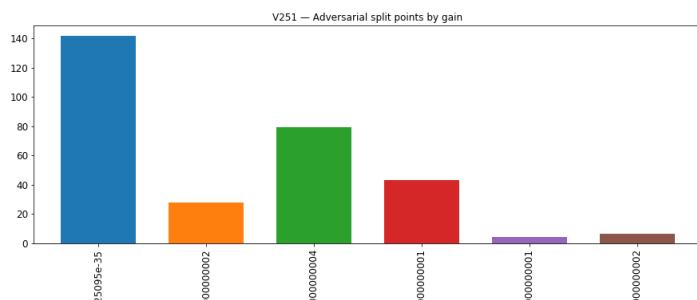
4 split point values used. Most frequent is 1.5000000000000002 with gain of 127.30518478155136.



V251

Used 57 times, total gain is 303.53964507579803.

6 split point values used. Most marked is 1.0000000180025095e-35 with gain of 141.68064403533936.

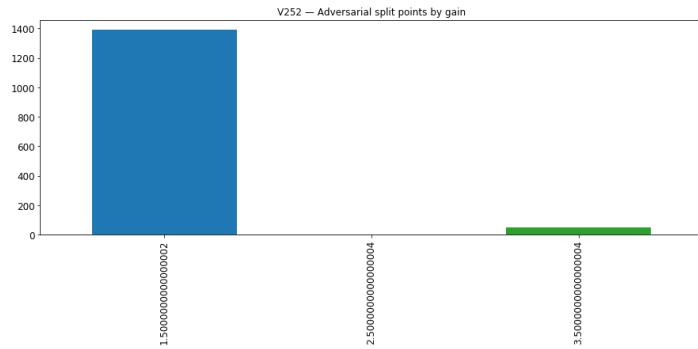




V252

Used 13 times, total gain is 1442.935184955597.

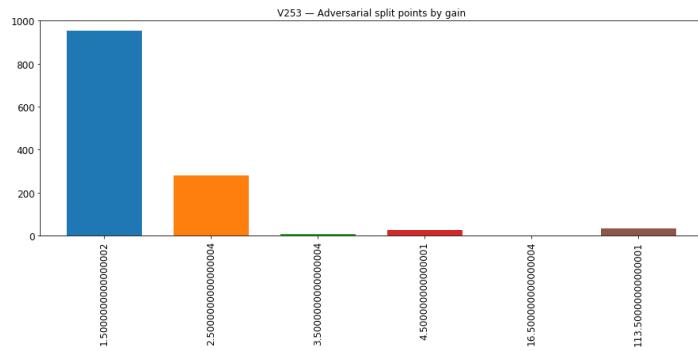
3 split point values used. Most prevalent is 1.5000000000000002 with gain of 1388.0626039505005.



V253

Used 50 times, total gain is 1299.506036221981.

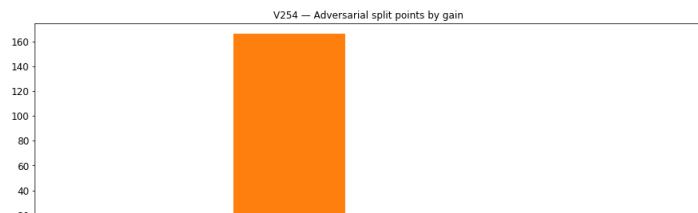
6 split point values used. Most prevalent is 1.5000000000000002 with gain of 952.9373073577881.

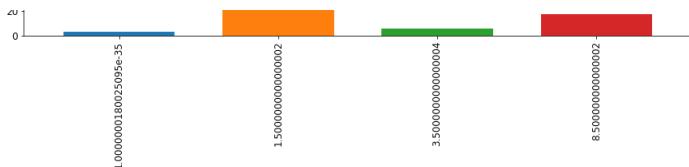


V254

Used 17 times, total gain is 192.8038039803505.

4 split point values used. Most useful is 1.5000000000000002 with gain of 166.15566664934158.

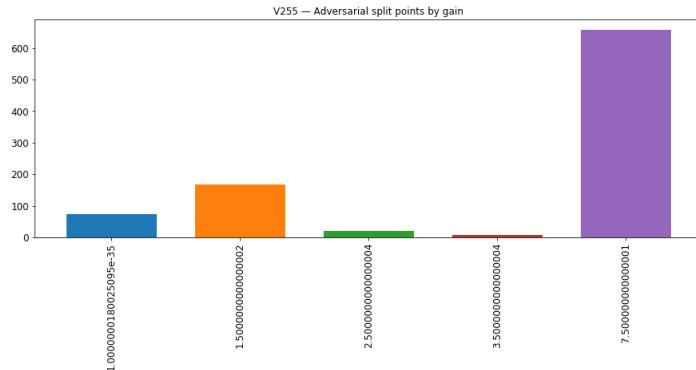




V255

Used 46 times, total gain is 927.7507830858231.

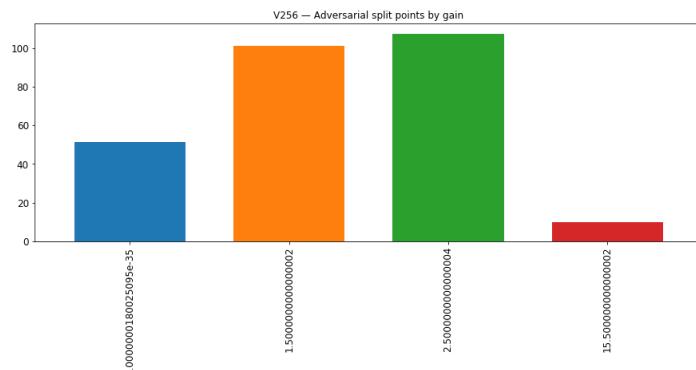
5 split point values used. Most rife is 7.500000000000001 with gain of 657.5947265625.



V256

Used 43 times, total gain is 269.6709637641907.

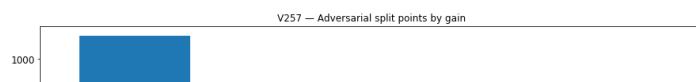
4 split point values used. Most rife is 2.500000000000004 with gain of 107.3578313589096.

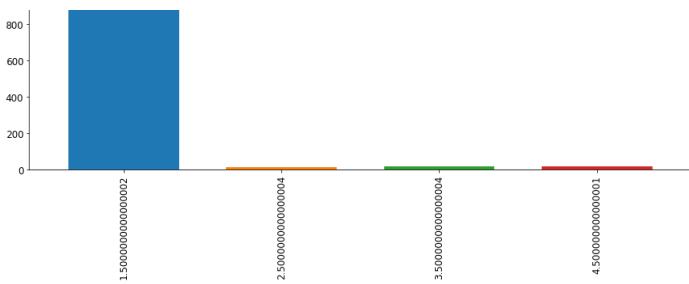


V257

Used 25 times, total gain is 1176.8490458726883.

4 split point values used. Most usual is 1.500000000000002 with gain of 1123.3885946273804.

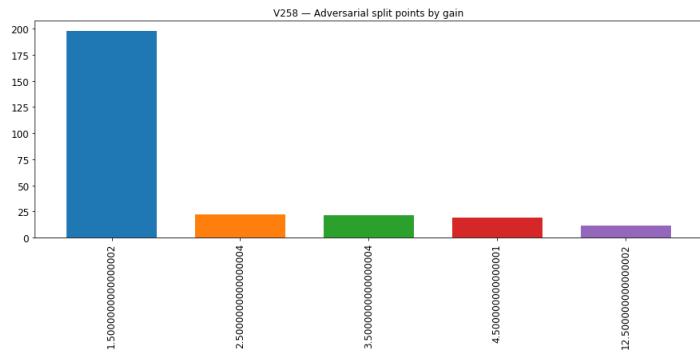




V258

Used 43 times, total gain is 271.4210138320923.

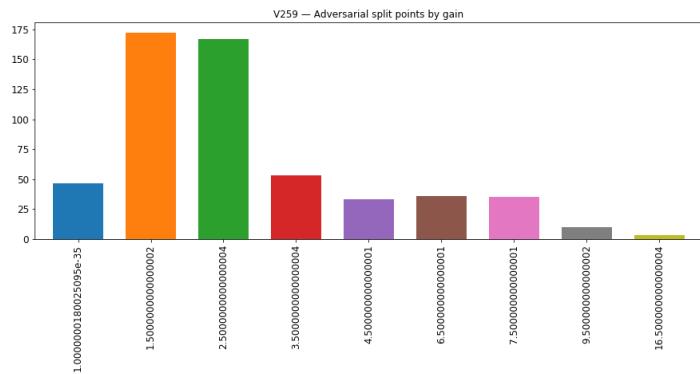
5 split point values used. Most marked is 1.50000000000002 with gain of 197.61230945587158.



V259

Used 74 times, total gain is 556.335613489151.

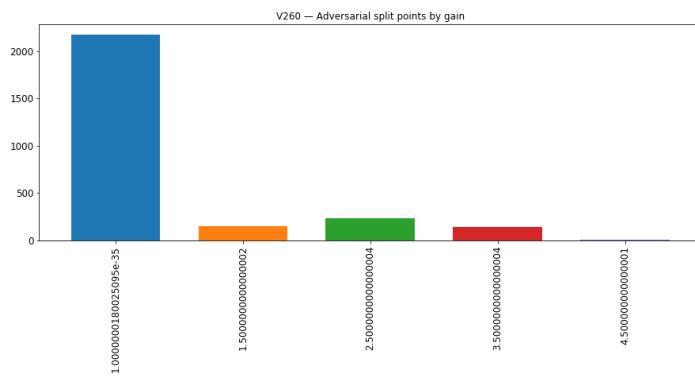
9 split point values used. Most prevalent is 1.50000000000002 with gain of 172.12758886814117.



V260

Used 160 times, total gain is 2710.656824707985.

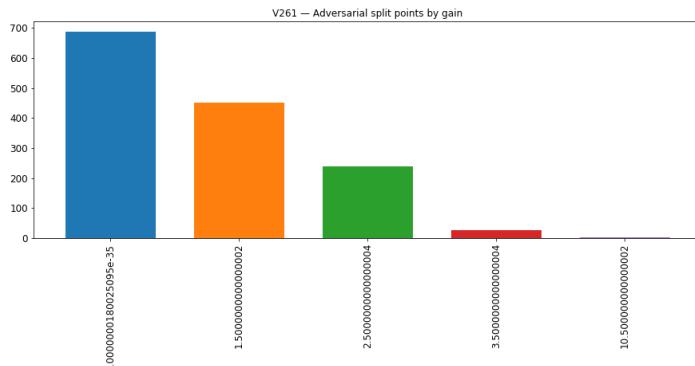
5 split point values used. Most widespread is 1.00000000000000e-35 with gain of 2174.9579874277115.



V261

Used 235 times, total gain is 1402.3152475357056.

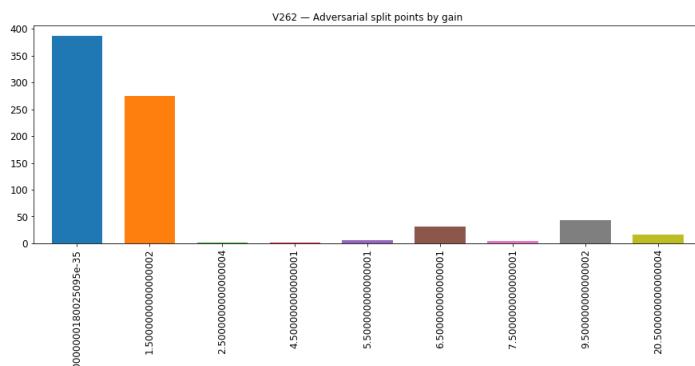
5 split point values used. Most common is 1.000000180025095e-35 with gain of 687.0394126176834.



V262

Used 132 times, total gain is 768.1347635984421.

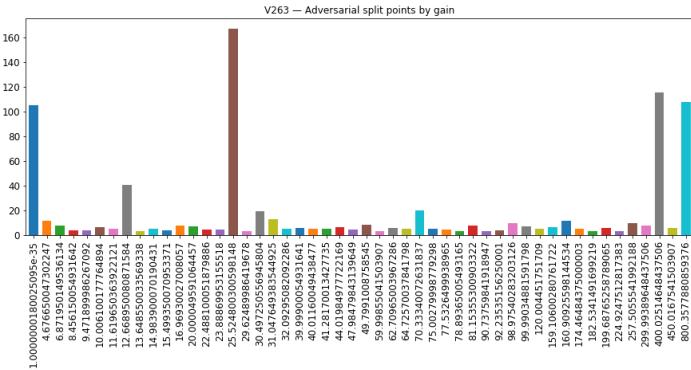
9 split point values used. Most prevalent is 1.000000180025095e-35 with gain of 386.9786262512207.



V263

Used 103 times, total gain is 885.3986214399338.

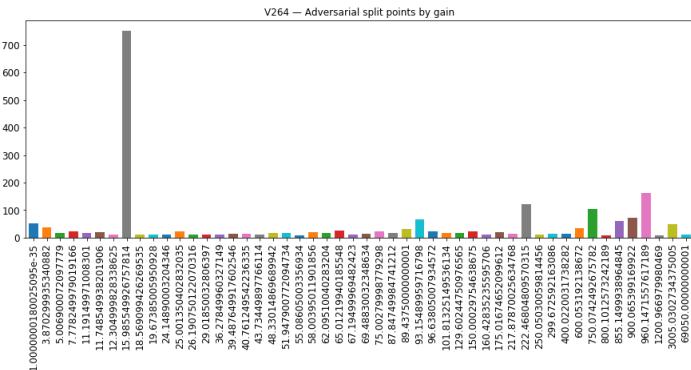
79 split point values used. Most abundant is 25.524800300598148 with gain of 167.239013671875.



V264

Used 274 times, total gain is 2543.1447424292564.

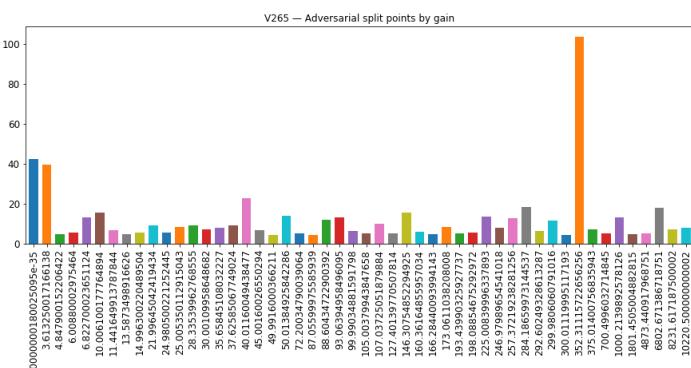
149 split point values used. Most predominant is 15.985549926757814 with gain of 751.8790262937546.



V265

Used 137 times, total gain is 706.5609750747681.

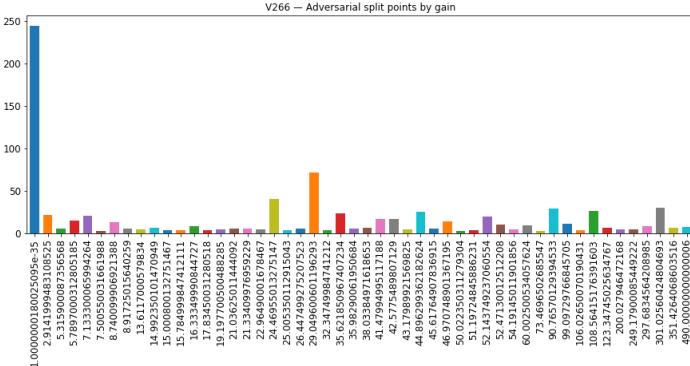
97 split point values used. Most abundant is 352.31115722656256 with gain of 103.59080505371094.



V266

Used 89 times, total gain is 842.1489448547363.

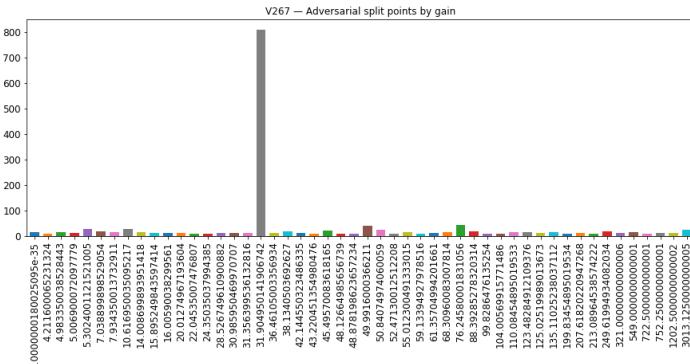
64 split point values used. Most rampant is 1.0000000180025095e-35 with gain of 244.3613622188568.



V267

Used 237 times, total gain is 1887.3263893127441.

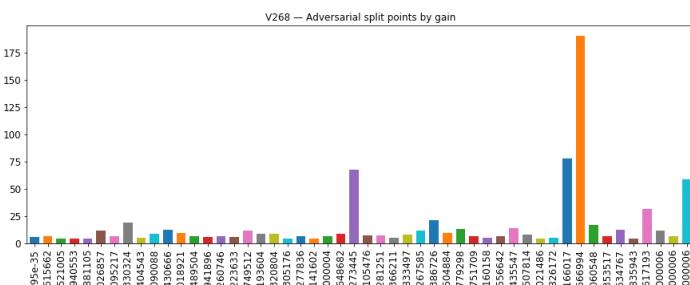
141 split point values used. Most recurrent is 31.904950141906742 with gain of 807.9415128231049.



V268

Used 123 times, total gain is 881.5309429764748.

86 split point values used. Most marked is 103.63090133666994 with gain of 190.0003662109375.

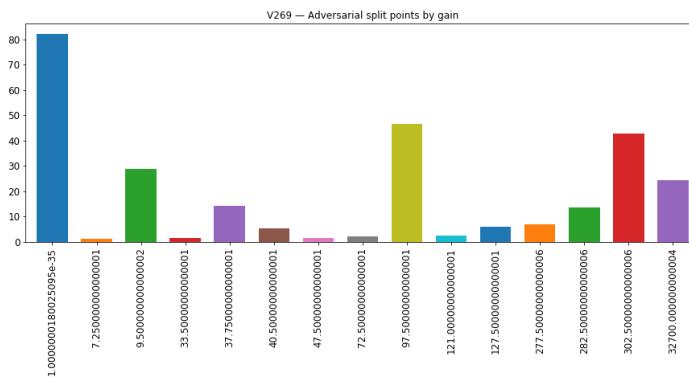




V269

Used 22 times, total gain is 280.74461221694946.

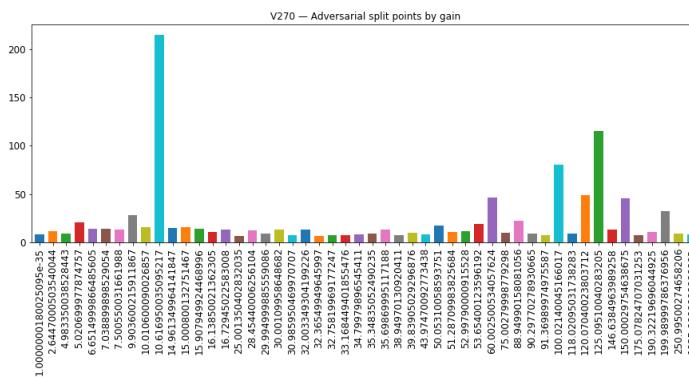
15 split point values used. Most omnipresent is 1.0000000180025095e-35 with gain of 82.17482328414917.



V270

Used 211 times, total gain is 1346.2408066391945.

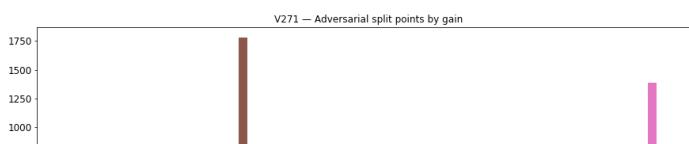
125 split point values used. Most ubiquitous is 10.616950035095217 with gain of 214.6073760986328.

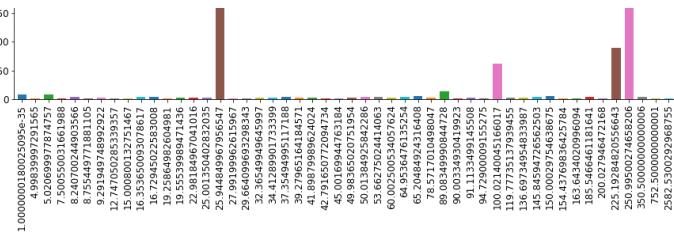


V271

Used 214 times, total gain is 4921.934344172478.

126 split point values used. Most repetitive is 25.944849967956547 with gain of 1778.7820672988892.

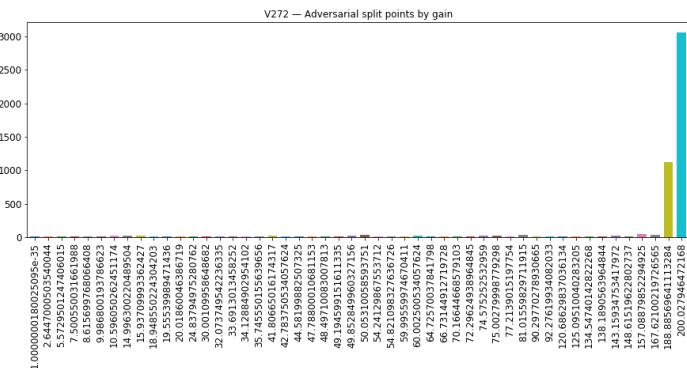




V272

Used 172 times, total gain is 5047.736066699028.

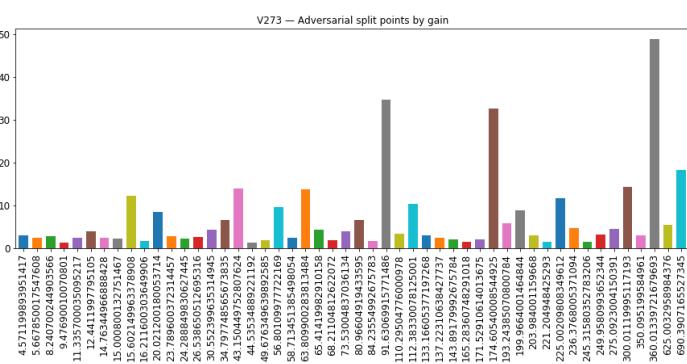
114 split point values used. Most repetitive is 200.027946472168 with gain of 3058.18701171875.



V273

Used 61 times, total gain is 351.31655925512314.

54 split point values used. Most frequent is 360.01339721679693 with gain of 48.90920066833496.

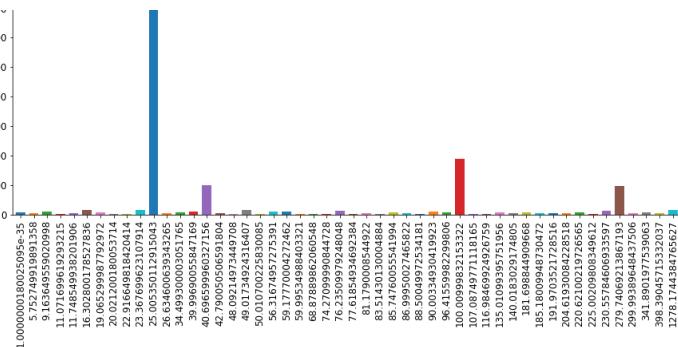


V274

Used 87 times, total gain is 1434.224886417389.

72 split point values used. Most useful is 25.005350112915043 with gain of 701.1462607383728.

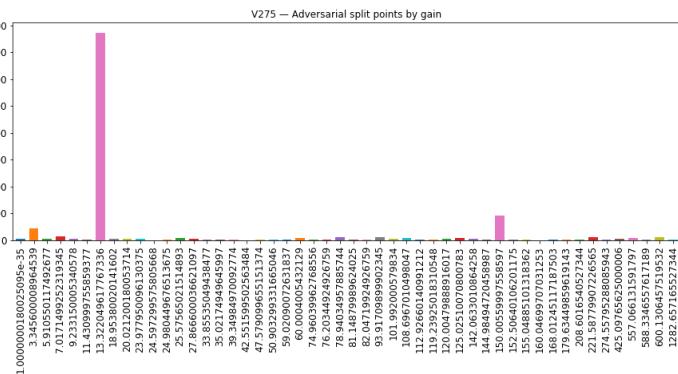




V275

Used 64 times, total gain is 1144.364446759224.

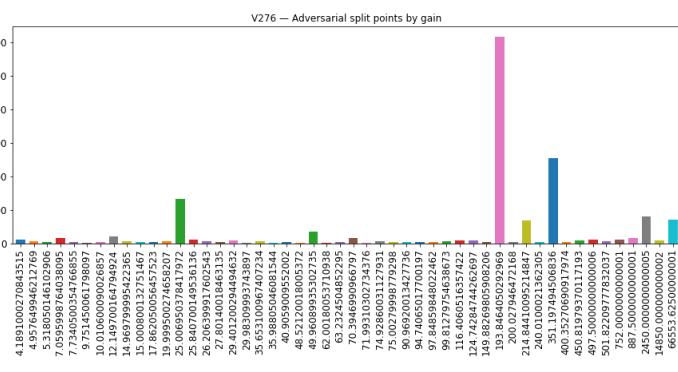
52 split point values used. Most prevalent is 13.322049617767336 with gain of 771.8099975585938.



V276

Used 81 times, total gain is 1536.873187303543.

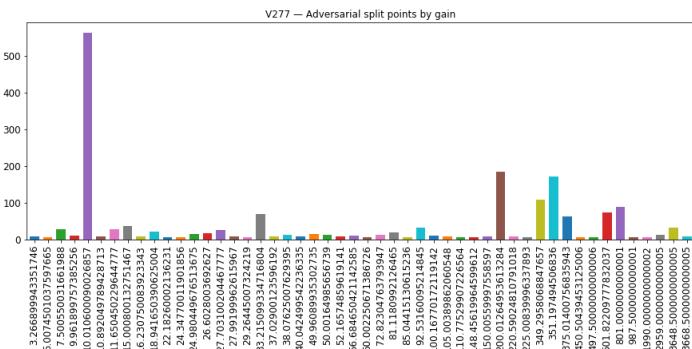
57 split point values used. Most rife is 193.8464050292969 with gain of 617.1064460277557.



V277

Used 145 times, total gain is 1912.1979776024818.

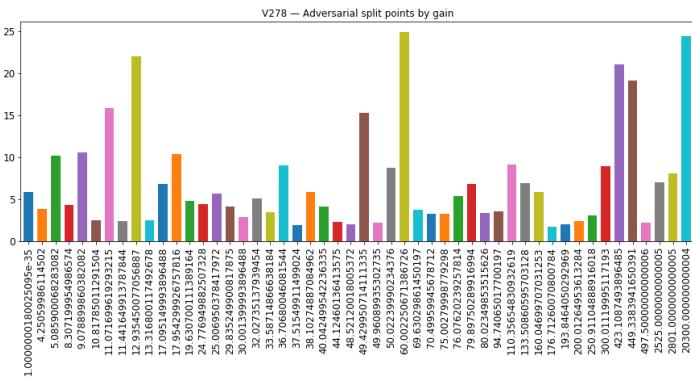
87 split point values used. Most ubiquitous is 10.010600090026857 with gain of 563.8812866210938.



V278

Used 74 times, total gain is 365.4111576080322.

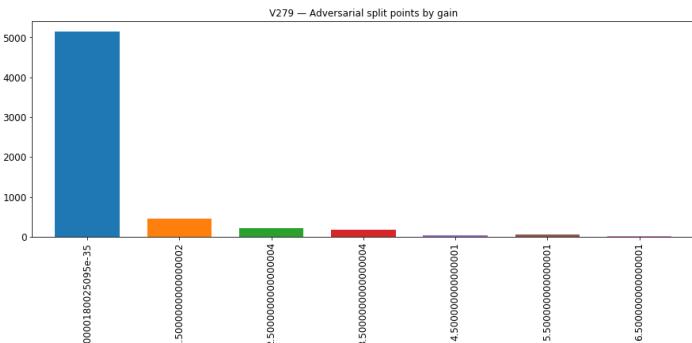
57 split point values used. Most legendary is 60.002250671386726 with gain of 24.927054405212402.



V279

Used 301 times, total gain is 6130.185734987259.

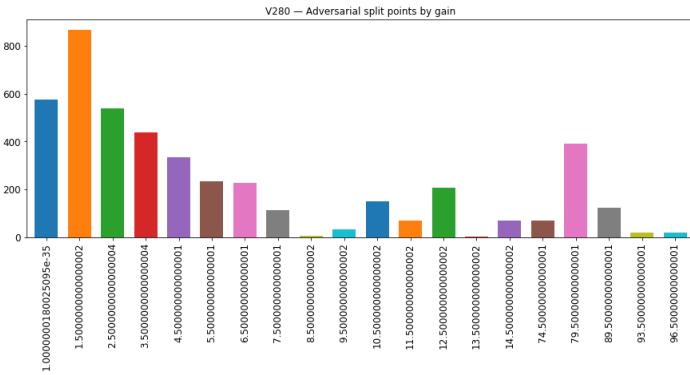
7 split point values used. Most rampant is 1.000000180025095e-35 with gain of 5147.679567456245.



v280

Used 543 times, total gain is 4484.2203342318535.

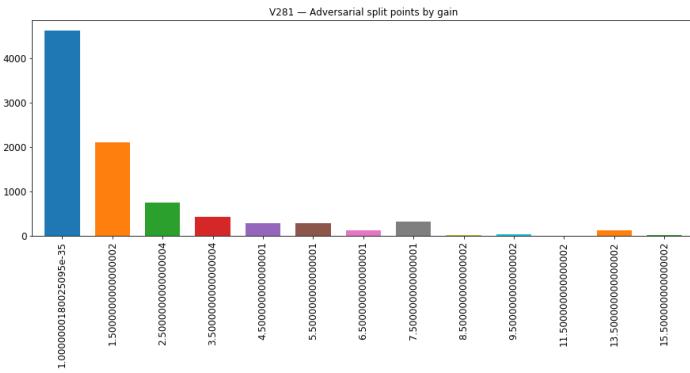
20 split point values used. Most repetitive is 1.5000000000000002 with gain of 866.5105647444725.



V281

Used 928 times, total gain is 9112.199250459671.

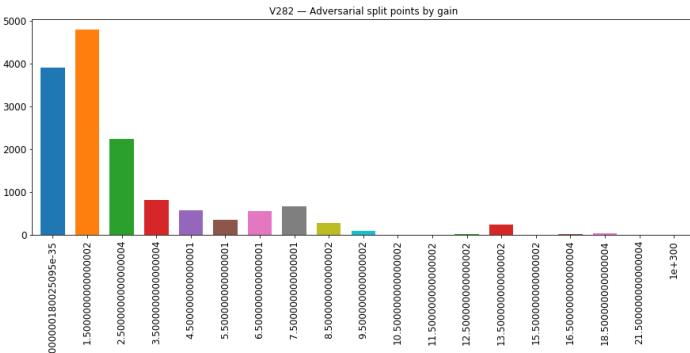
13 split point values used. Most useful is 1.000000180025095e-35 with gain of 4631.339902997017.



V282

Used 1698 times, total gain is 14596.00525522232.

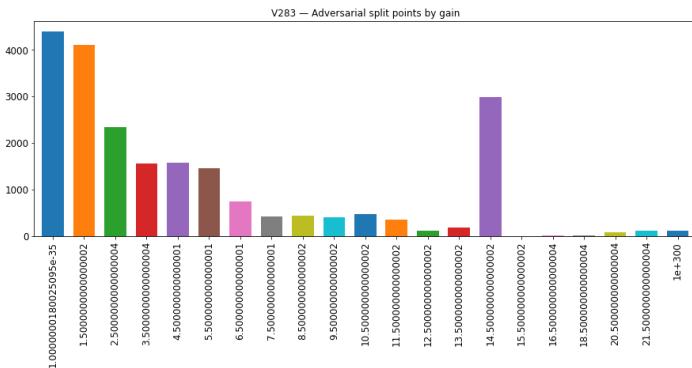
19 split point values used. Most prevalent is 1.5000000000000002 with gain of 4792.055278599262.



V283

Used 1975 times, total gain is 21926.671445965767.

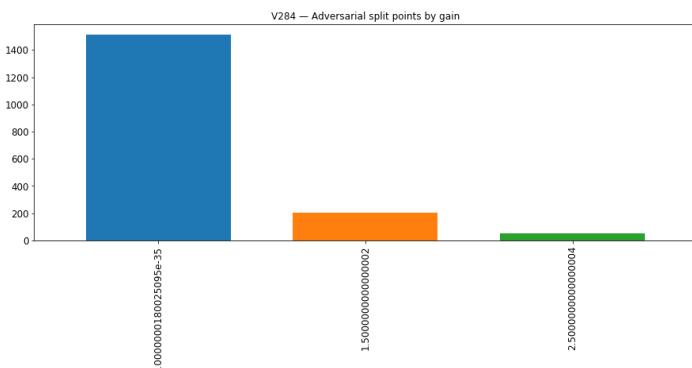
21 split point values used. Most ubiquitous is $1.0000000180025095e-35$ with gain of 4397.629321098328.



V284

Used 190 times, total gain is 1769.3668669462204.

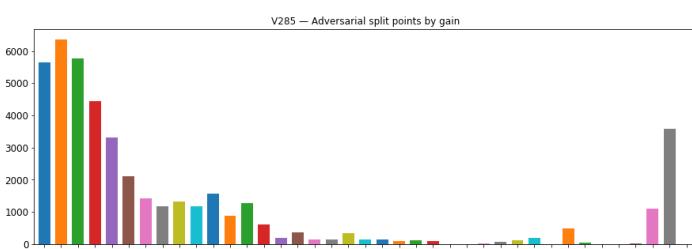
3 split point values used. Most abundant is $1.0000000180025095e-35$ with gain of 1513.0992245674133.



V285

Used 3115 times, total gain is 44562.98772442341.

39 split point values used. Most prevalent is 1.5000000000000002 with gain of 6354.341720819473.

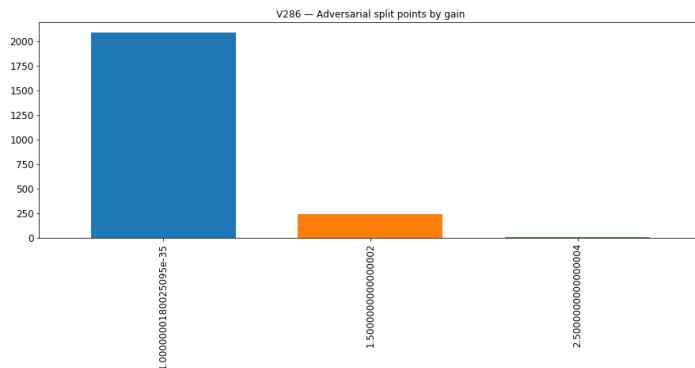


1.0000000180025095e-35
 1.5000000000000002
 2.5000000000000004
 3.5000000000000001
 5.5000000000000001
 6.5000000000000001
 7.5000000000000001
 8.5000000000000002
 9.5000000000000002
 10.5000000000000002
 11.5000000000000002
 12.5000000000000002
 13.5000000000000002
 14.5000000000000002
 15.5000000000000002
 16.5000000000000004
 17.5000000000000004
 19.5000000000000004
 20.5000000000000004
 21.5000000000000004
 22.5000000000000004
 23.5000000000000004
 24.5000000000000004
 25.5000000000000004
 27.5000000000000004
 29.5000000000000004
 30.5000000000000004
 31.5000000000000004
 34.5000000000000001
 35.5000000000000001
 36.5000000000000001
 43.5000000000000001
 45.5000000000000001
 47.5000000000000001
 49.5000000000000001
 52.5000000000000001
 53.5000000000000001
 54.5000000000000001

V286

Used 229 times, total gain is 2341.7574603557587.

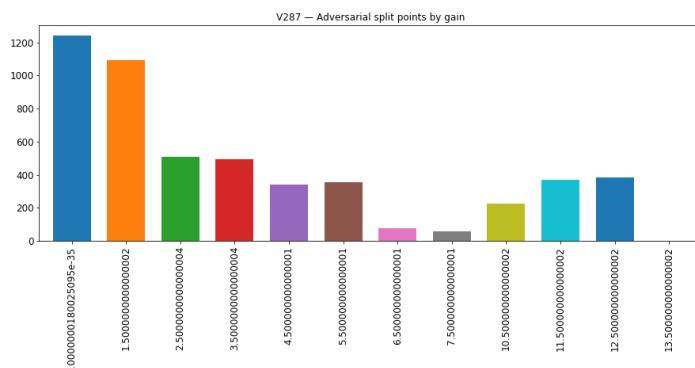
3 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 2088.3731048107147.



V287

Used 549 times, total gain is 5140.534682035446.

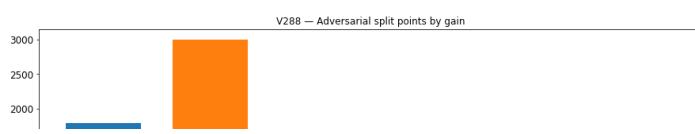
12 split point values used. Most abundant is 1.0000000180025095e-35 with gain of 1241.2073937654495.

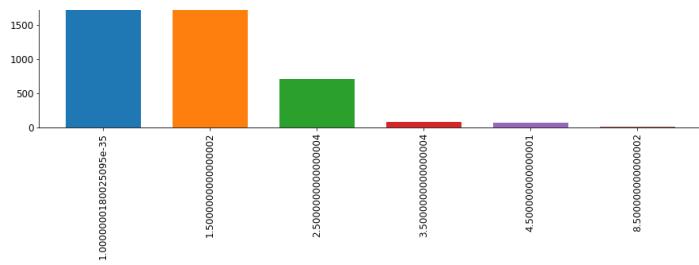


V288

Used 651 times, total gain is 5654.438668847084.

6 split point values used. Most ubiquitous is 1.5000000000000002 with gain of 3003.4149029254913.

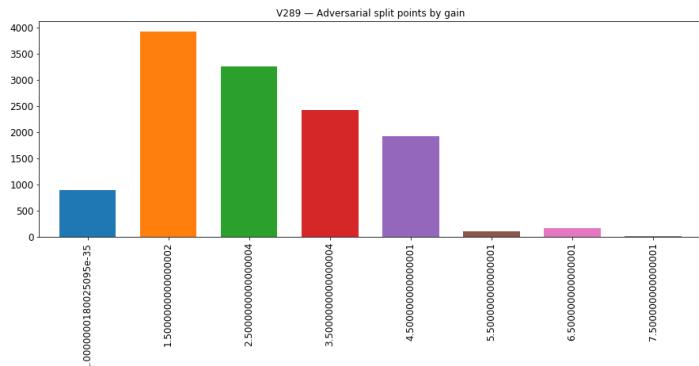




V289

Used 1118 times, total gain is 12691.115834891796.

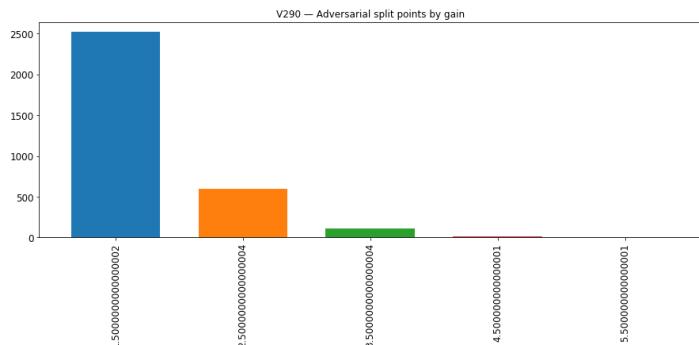
8 split point values used. Most repetitious is 1.5000000000000002 with gain of 3926.602230966091.



V290

Used 400 times, total gain is 3247.8263553380966.

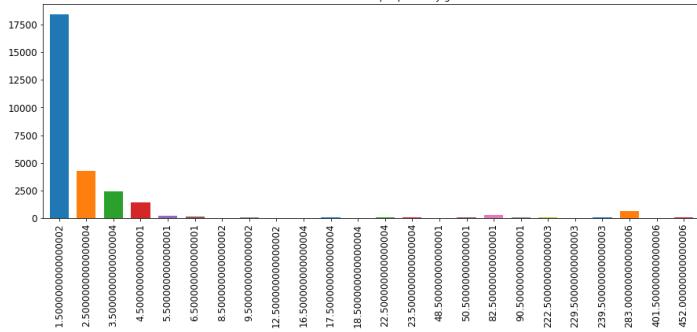
5 split point values used. Most popular is 1.5000000000000002 with gain of 2518.9892548322678.



V291

Used 2071 times, total gain is 28308.130717515945.

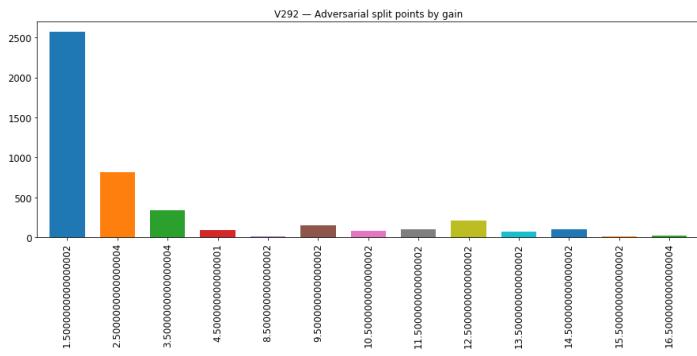
24 split point values used. Most prevalent is 1.5000000000000002 with gain of 18429.965735793114.



V292

Used 607 times, total gain is 4566.770212233067.

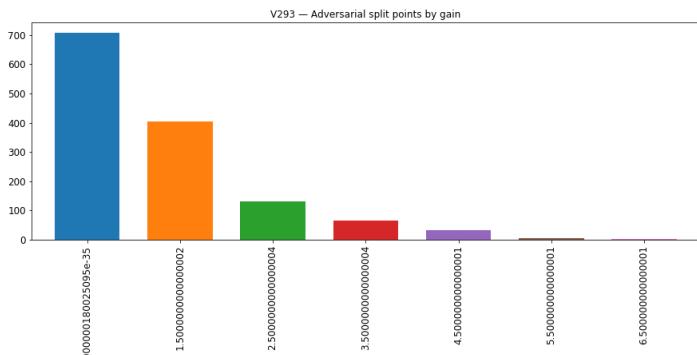
13 split point values used. Most ubiquitous is 1.5000000000000002 with gain of 2568.948297381401.



V293

Used 203 times, total gain is 1350.7194956541061.

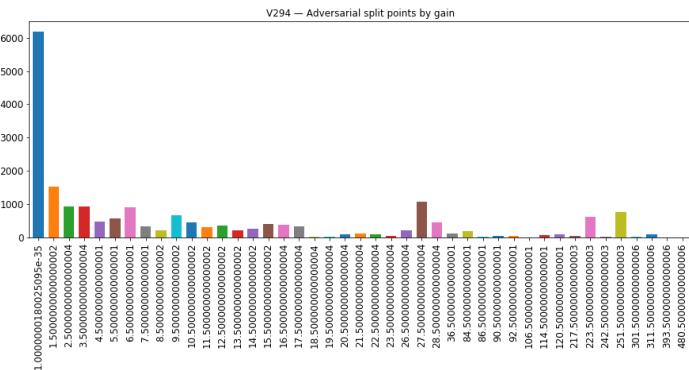
7 split point values used. Most widespread is 1.0000000180025095e-35 with gain of 707.4789499044418.



V294

Used 1137 times, total gain is 19657.6598123312.

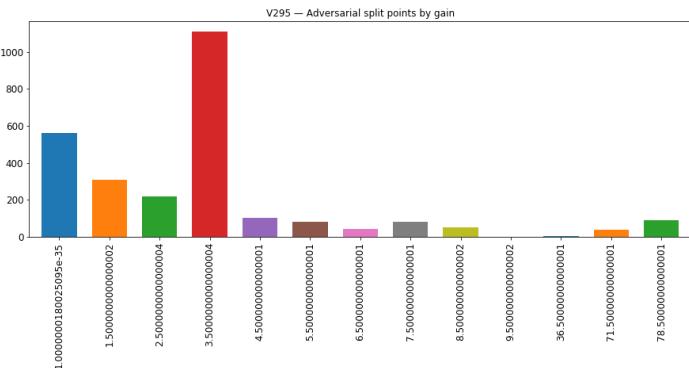
43 split point values used. Most useful is 1.0000000180025095e-35 with gain of 6180.600731253624.



V295

Used 255 times, total gain is 2685.741781294346.

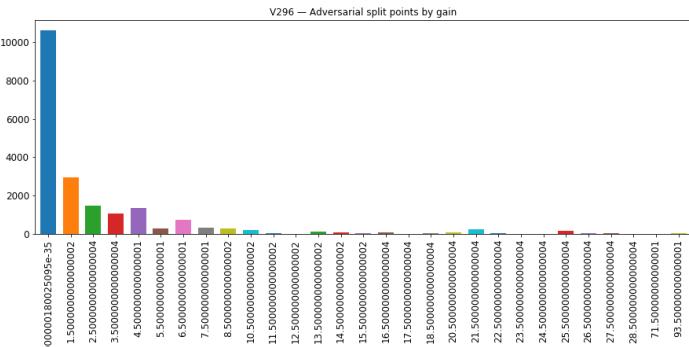
13 split point values used. Most repetitious is 3.5000000000000004 with gain of 1109.8401029109955.



V296

Used 1474 times, total gain is 20328.237850546837.

29 split point values used. Most predominant is 1.0000000180025095e-35 with gain of 10615.309496939182.

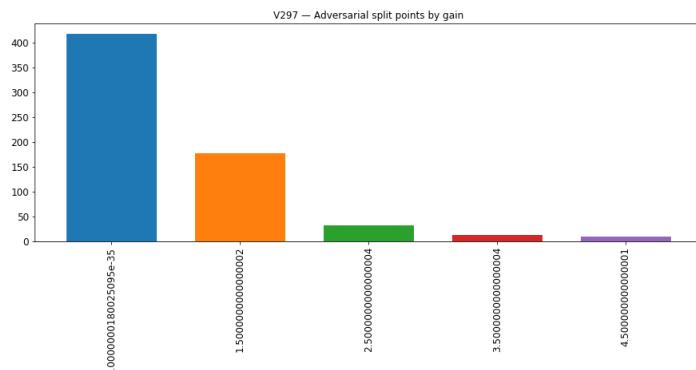


V297

Used 1474 times, total gain is 649.80856004050700.

Used 150 times, total gain is 840.0999999999999 / 09.

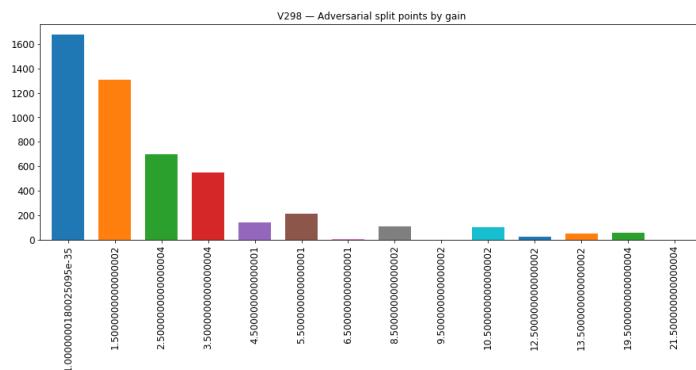
5 split point values used. Most prevalent is 1.0000000180025095e-35 with gain of 417.20712077617645.



V298

Used 516 times, total gain is 4961.299727261066.

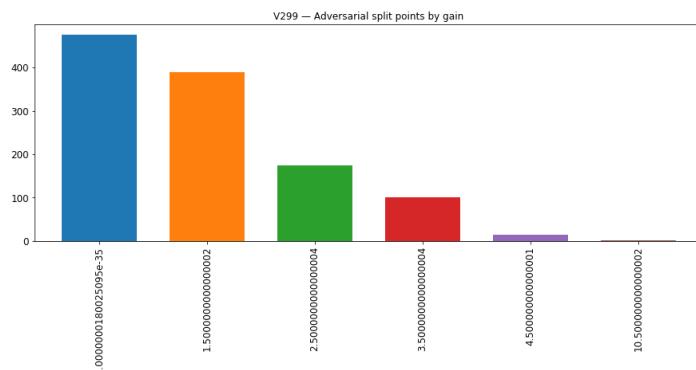
14 split point values used. Most common is 1.0000000180025095e-35 with gain of 1675.624459207058.



V299

Used 177 times, total gain is 1158.8780201673508.

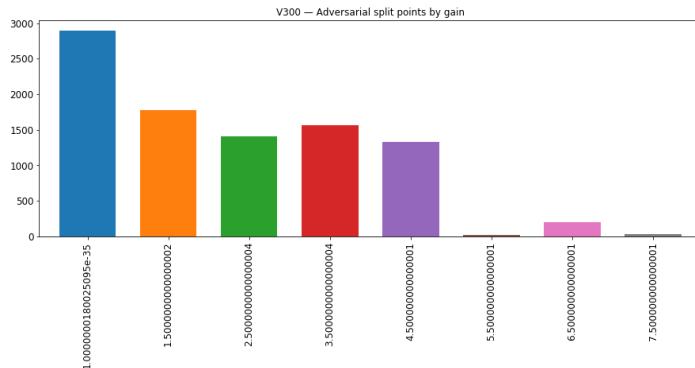
6 split point values used. Most popular is 1.0000000180025095e-35 with gain of 475.27940833568573.



V300

Used 626 times, total gain is 9231.81604540348.

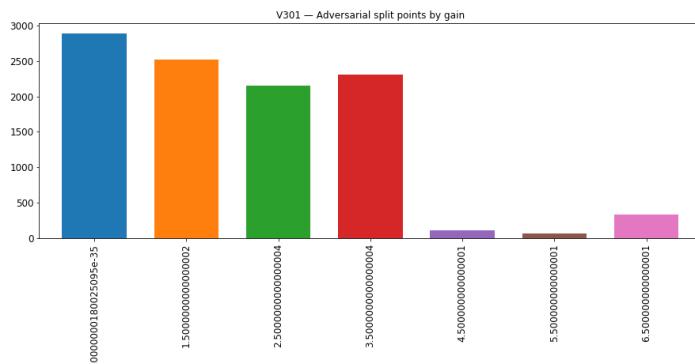
8 split point values used. Most common is $1.0000000180025095e-35$ with gain of 2893.196469068527.



V301

Used 643 times, total gain is 10365.644233107567.

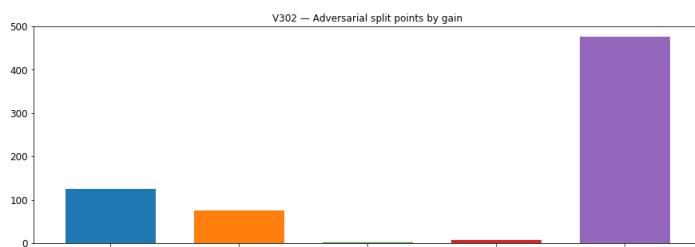
7 split point values used. Most repetitive is $1.0000000180025095e-35$ with gain of 2886.0194239616394.



V302

Used 45 times, total gain is 685.8159379959106.

5 split point values used. Most widespread is 7.5000000000000001 with gain of 476.199462890625.

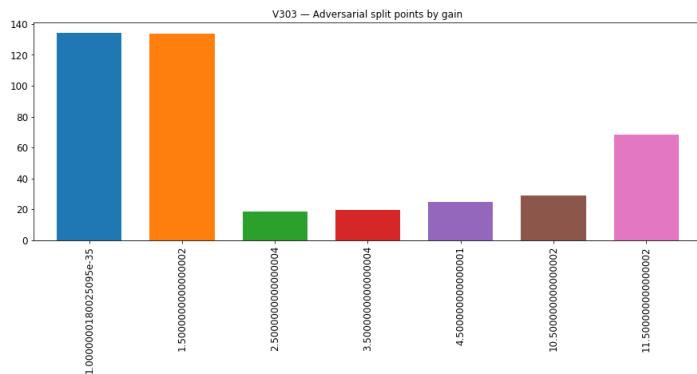




V303

Used 86 times, total gain is 428.95585864782333.

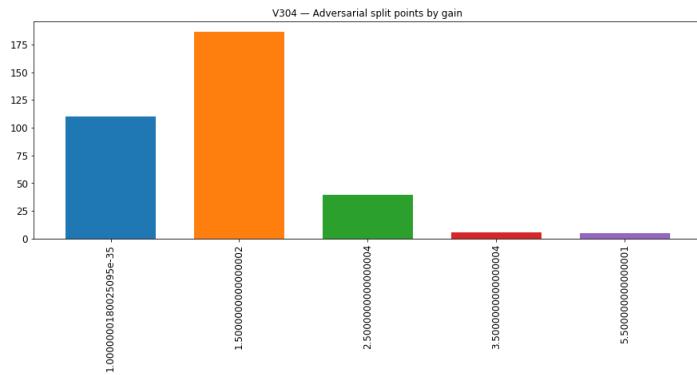
7 split point values used. Most abundant is $1.000000180025095e-35$ with gain of 134.19616478681564.



V304

Used 93 times, total gain is 346.0821198821068.

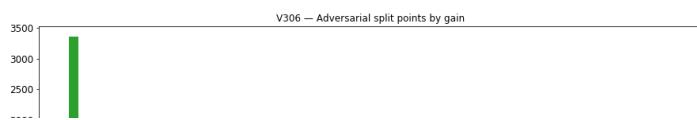
5 split point values used. Most legendary is 1.500000000000002 with gain of 186.32200253009796.

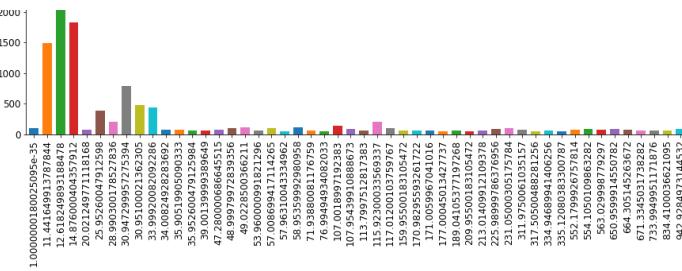


V306

Used 1861 times, total gain is 18256.289864242077.

249 split point values used. Most fashionable is 12.618249893188478 with gain of 3356.742374897003.

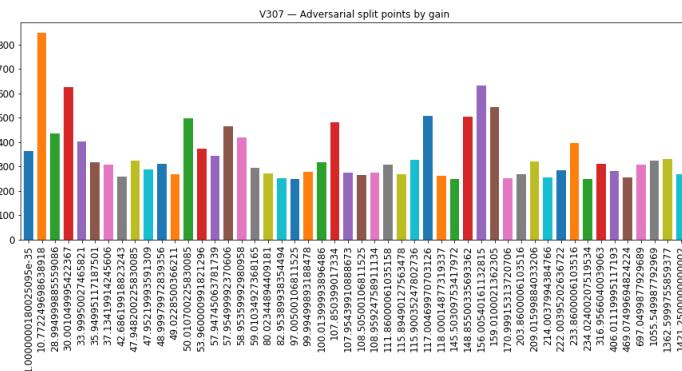




V307

Used 7001 times, total gain is 49369.14197969437.

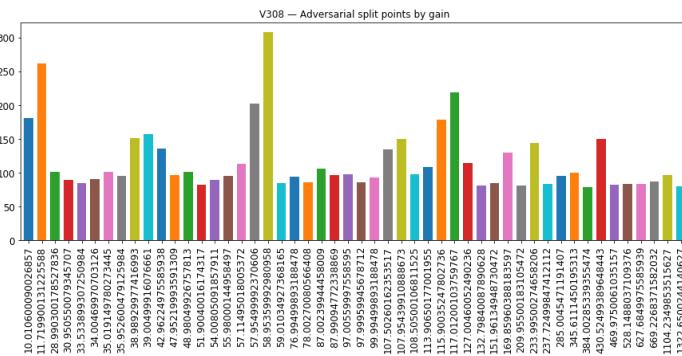
253 split point values used. Most prevalent is 10.772249698638918 with gain of 848.1524317264557.



V308

Used 2656 times, total gain is 15231.37759655714.

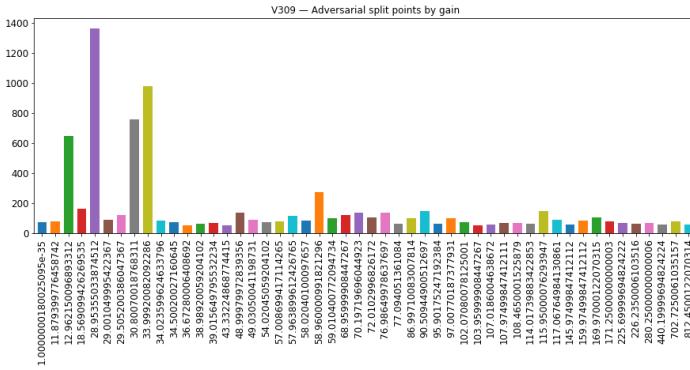
252 split point values used. Most recurrent is 58.95359992980958 with gain of 307.32314133644104.



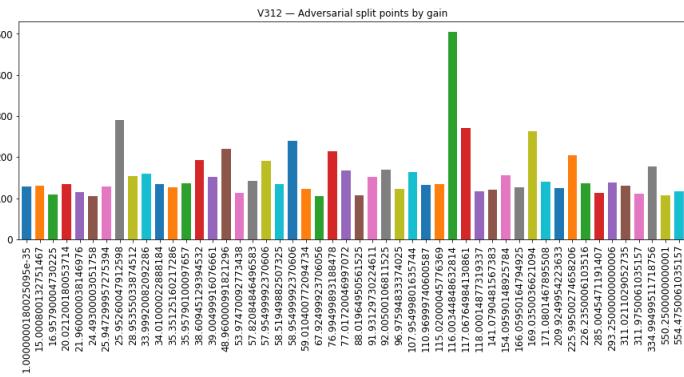
V309

Used 1421 times, total gain is 12230.360779821873.

240 split point values used. Most pernicious is 28.95355033874512 with gain of 1361.9797842502594.



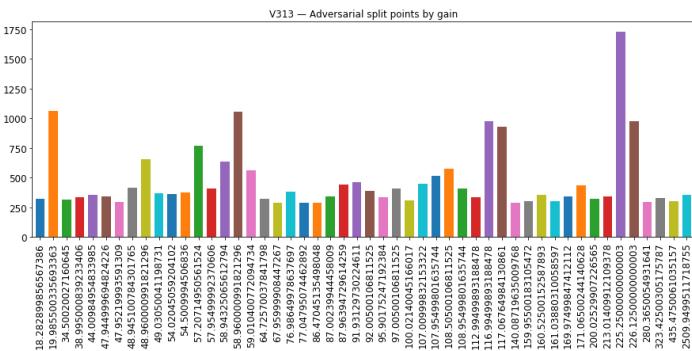
gain of 504.6466860771179.



V313

Used 7018 times, total gain is 53177.30558025837.

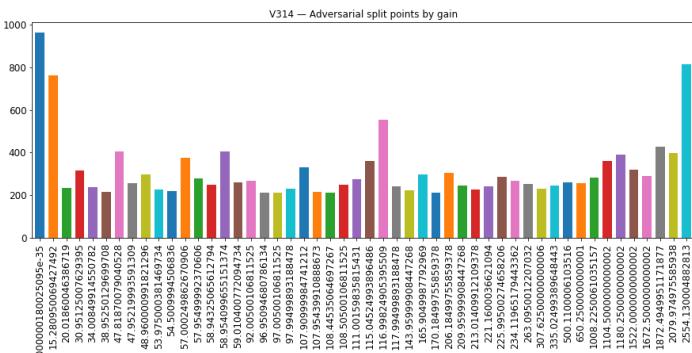
253 split point values used. Most usual is 225.25000000000003 with gain of 1727.223098397255.



V314

Used 5649 times, total gain is 42383.858743071556.

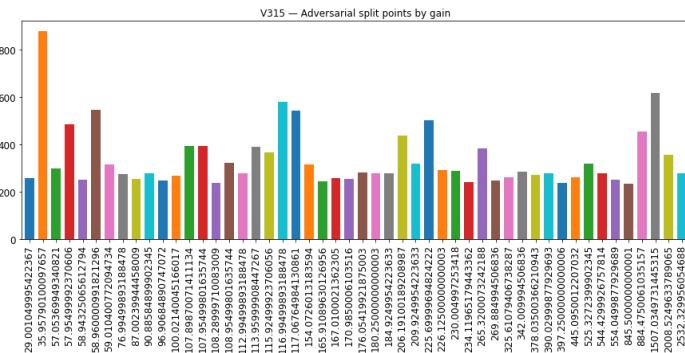
253 split point values used. Most permeant is 1.000000180025095e-35 with gain of 962.7018370628357.



v315

Used 5714 times, total gain is 43870.39150553942.

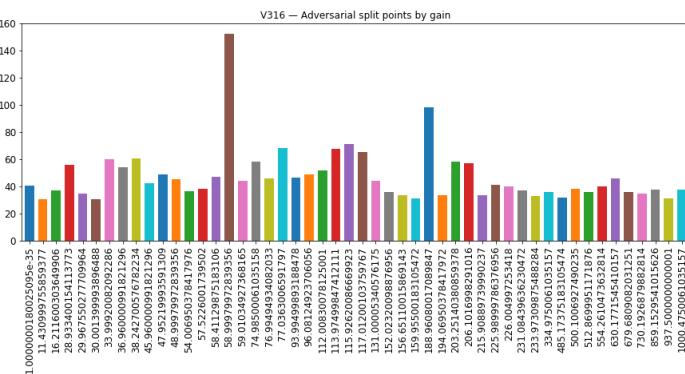
253 split point values used. Most omnipresent is 35.95790100097657 with gain of 877.0706310272217.



V316

Used 944 times, total gain is 5178.846964895725.

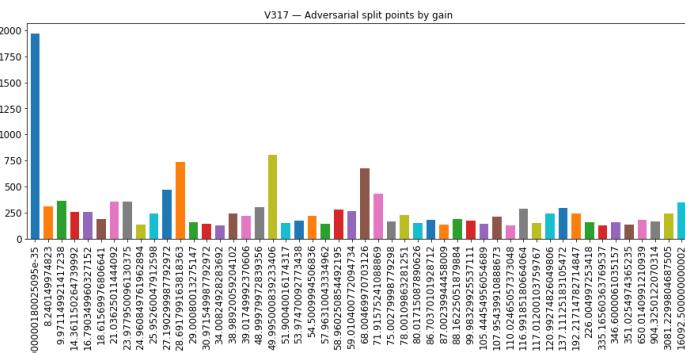
234 split point values used. Most usual is 58.99979972839356 with gain of 152.5239930152893.



V317

Used 2428 times, total gain is 25765.974639177322.

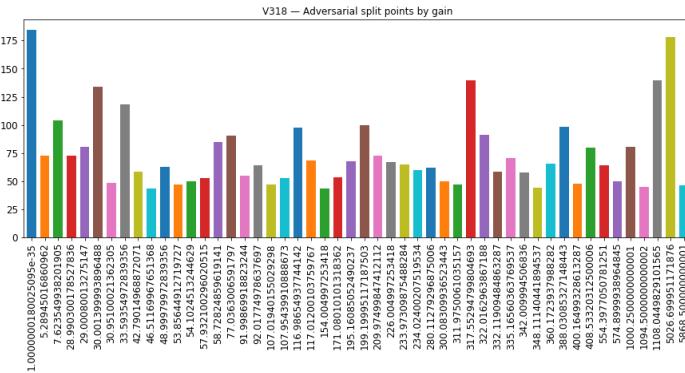
247 split point values used. Most prevalent is 1.000000180025095e-35 with gain of 1967.0798605680466.



V318

Used 1042 times, total gain is 7363.9597136974335.

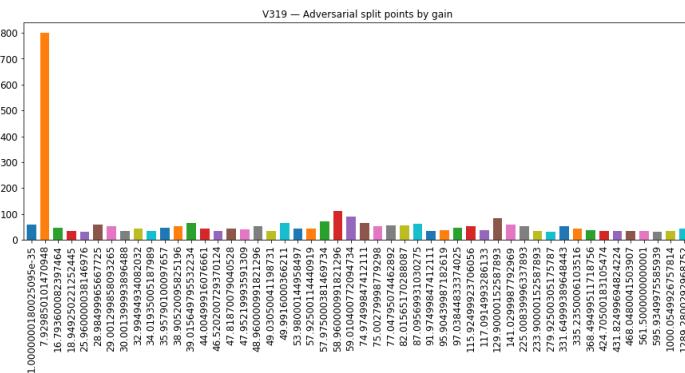
245 split point values used. Most abundant is 1.0000000180025095e-35 with gain of 184.5055547952652.



V319

Used 931 times, total gain is 5893.055078268051.

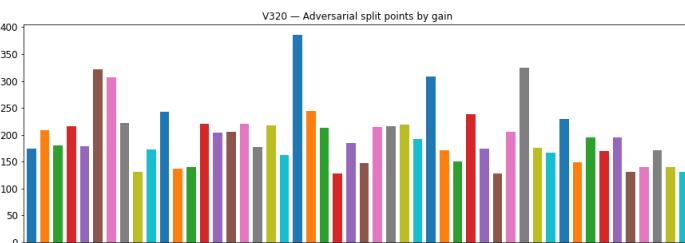
244 split point values used. Most widespread is 7.929850101470948 with gain of 800.1903200149536.



V320

Used 2533 times, total gain is 22087.31248730421.

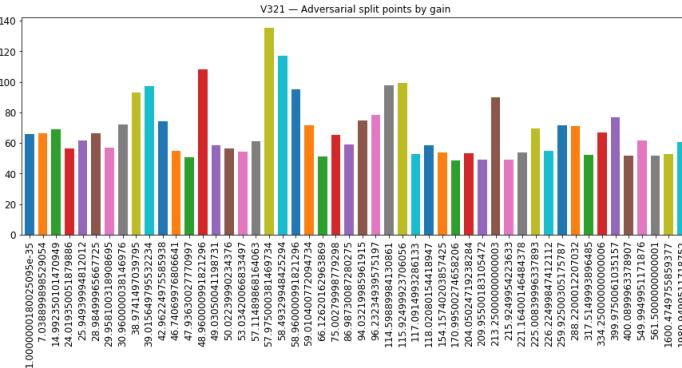
249 split point values used. Most useful is 58.960000991821296 with gain of 385.61540257930756.



V321

Used 1132 times, total gain is 7254.646207392216.

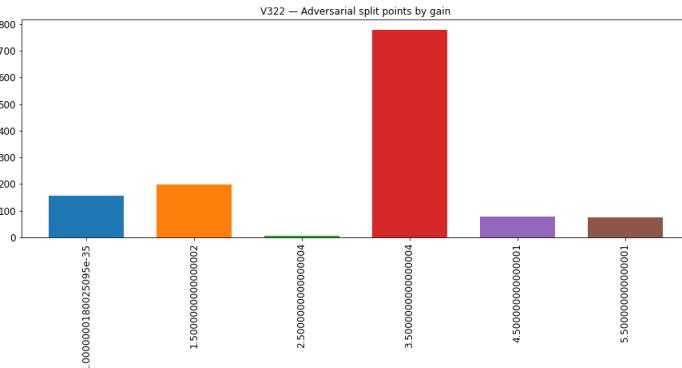
246 split point values used. Most recurrent is 57.975000381469734 with gain of 135.36361598968506.



V322

Used 34 times, total gain is 1291.261734843254.

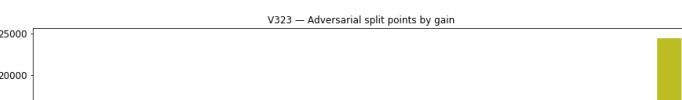
6 split point values used. Most useful is 3.5000000000000004 with gain of 777.9752807617188.

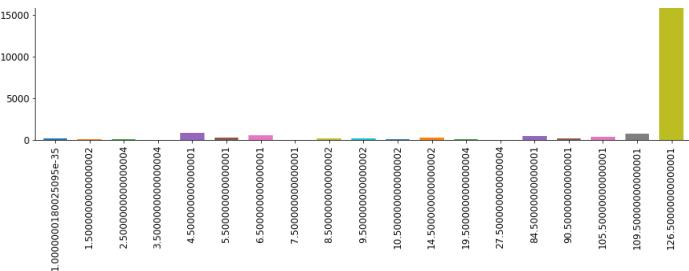


V323

Used 84 times, total gain is 28962.085960030556.

19 split point values used. Most frequent is 126.5000000000001 with gain of 24397.861839294434.

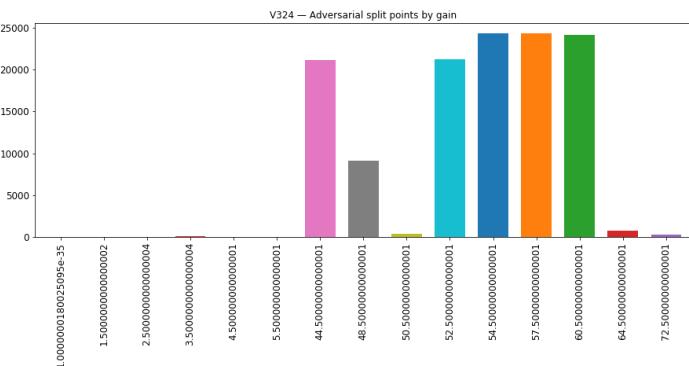




V324

Used 30 times, total gain is 125866.50064575672.

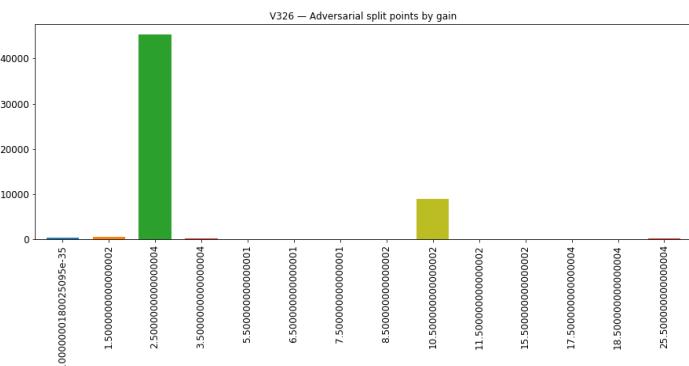
15 split point values used. Most marked is 54.50000000000001 with gain of 24339.2734375.



V326

Used 56 times, total gain is 55553.640429496765.

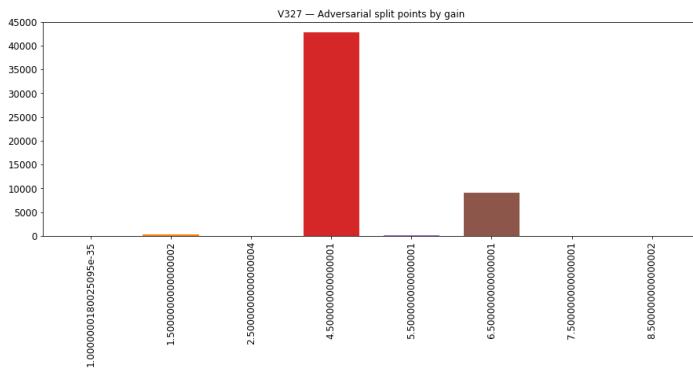
14 split point values used. Most predominant is 2.500000000000004 with gain of 45302.7952580452.



V327

Used 29 times, total gain is 52358.865605831146.

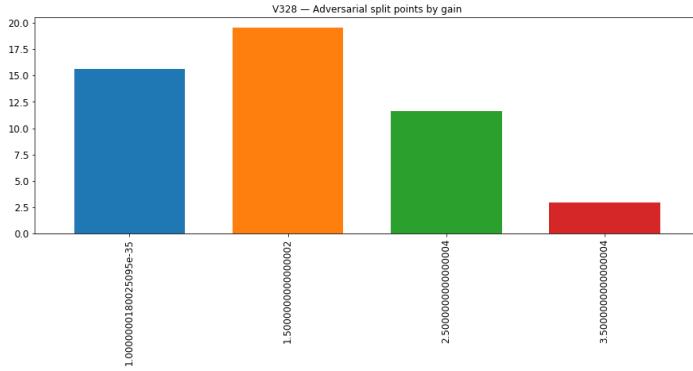
8 split point values used. Most common is 4.500000000000001 with gain of 42793.81855392456.



V328

Used 14 times, total gain is 49.74156588315964.

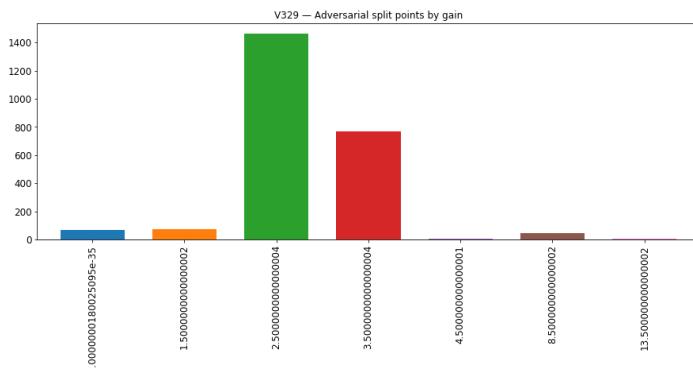
4 split point values used. Most common is 1.5000000000000002 with gain of 19.559332132339478.



V329

Used 40 times, total gain is 2423.5239197015762.

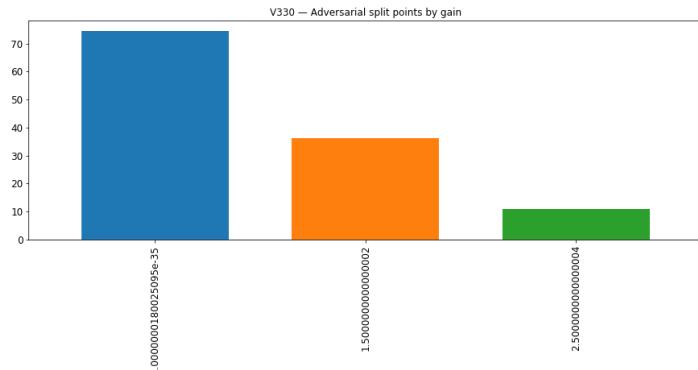
7 split point values used. Most prevalent is 2.5000000000000004 with gain of 1463.93177652359.



V330

Used 15 times, total gain is 121.48838460445404.

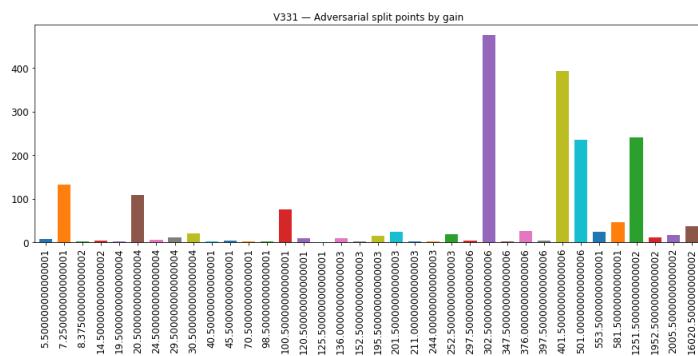
3 split point values used. Most marked is 1.0000000180025095e-35 with gain of 74.46215975284576.



V331

Used 59 times, total gain is 1974.1816260814667.

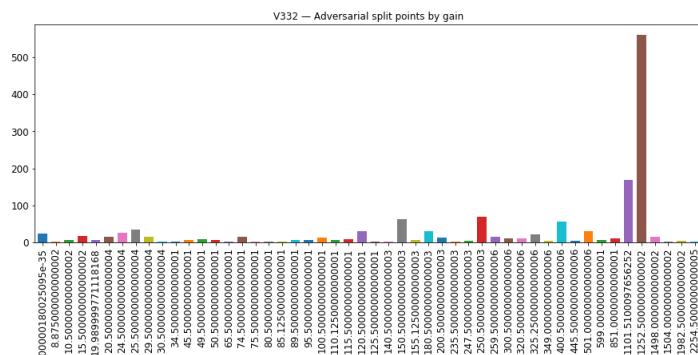
36 split point values used. Most prevalent is 302.50000000000006 with gain of 474.85772705078125.



V332

Used 126 times, total gain is 1384.266849577427.

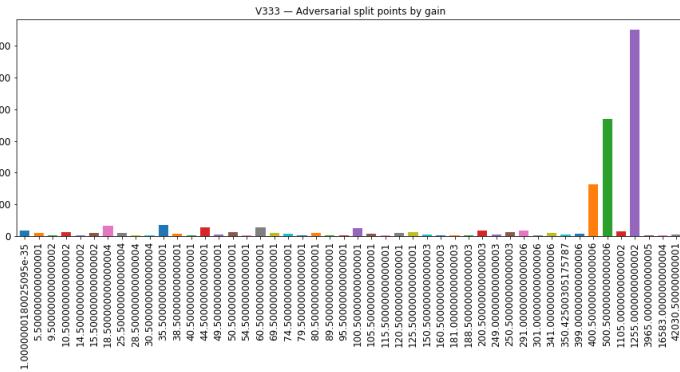
52 split point values used. Most prevalent is 1252.5000000000002 with gain of 561.0044536590576.



V333

Used 100 times, total gain is 1605.0610920190811.

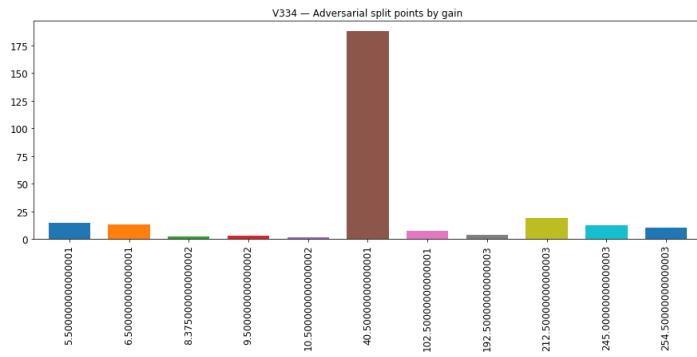
48 split point values used. Most repetitive is 1255.0000000000002 with gain of 651.1607208251953.



V334

Used 13 times, total gain is 274.30608332157135.

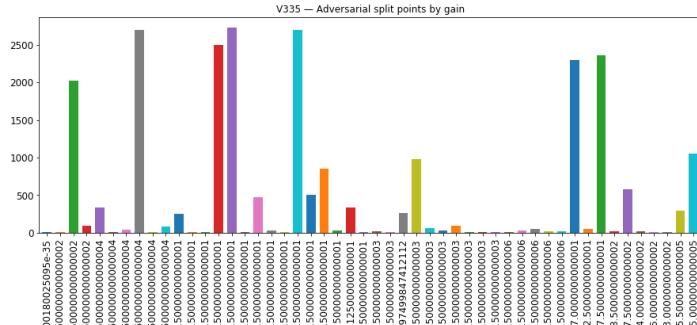
11 split point values used. Most prevalent is 40.50000000000001 with gain of 187.6360092163086.



V335

Used 137 times, total gain is 24117.347853958607.

68 split point values used. Most popular is 58.50000000000001 with gain of 2728.591649353504.

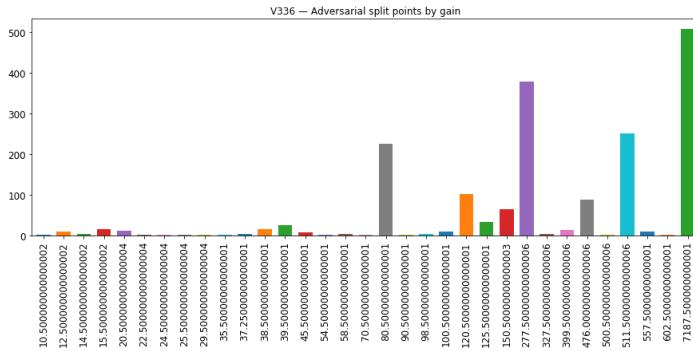


1.0000000000000002 9.
 10.500000000000002 10.
 12.500000000000002 14.
 14.500000000000002 14.
 15.500000000000002 19.
 20.500000000000004 20.
 22.500000000000004 24.
 24.500000000000004 25.
 26.500000000000004 29.
 28.500000000000004 30.
 30.500000000000004 34.
 32.500000000000004
 34.500000000000004
 36.500000000000001
 37.500000000000001
 38.500000000000001
 39.500000000000001
 40.500000000000001
 42.500000000000001
 45.500000000000001
 54.500000000000001
 58.500000000000001
 70.500000000000001
 80.500000000000001
 90.500000000000001
 98.500000000000001
 100.500000000000001
 120.500000000000001
 125.500000000000001
 150.500000000000003
 27.500000000000006
 27.500000000000006
 32.500000000000006
 39.500000000000006
 47.600000000000006
 50.500000000000006
 51.500000000000006
 56.500000000000001
 60.500000000000001
 71.875000000000001

V336

Used 44 times, total gain is 1813.0199944972992.

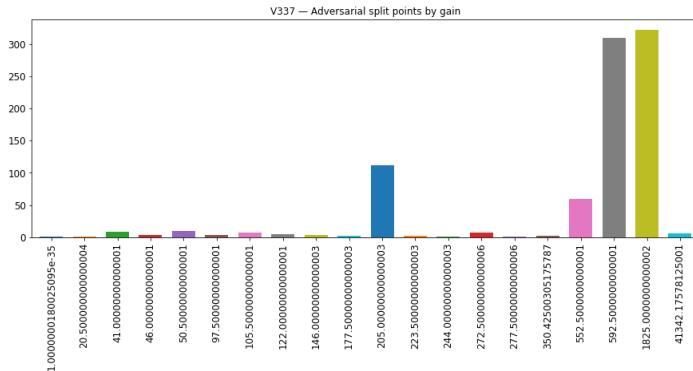
33 split point values used. Most rife is 7187.500000000001 with gain of 507.73150634765625.



V337

Used 31 times, total gain is 870.2654116153717.

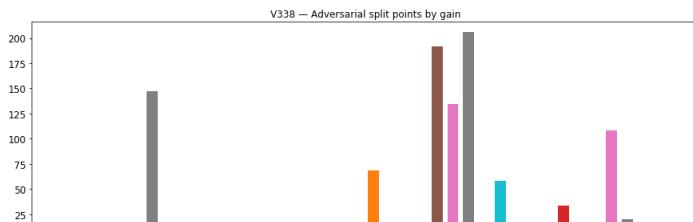
20 split point values used. Most predominant is 1825.000000000002 with gain of 321.7283821105957.

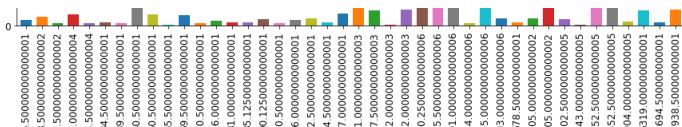


V338

Used 62 times, total gain is 1172.9286560416222.

42 split point values used. Most prevalent is 401.0000000000006 with gain of 205.8491497039795.

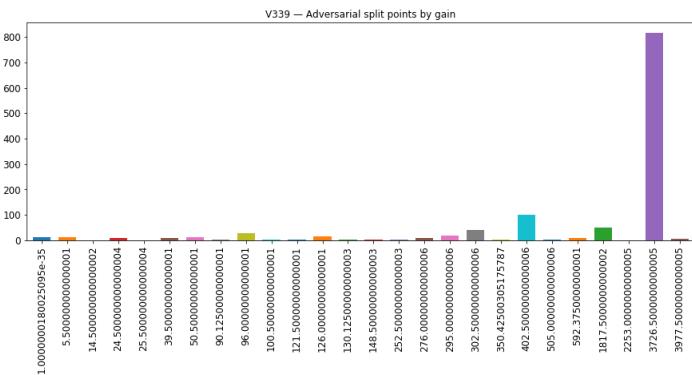




V339

Used 35 times, total gain is 1173.540998160839.

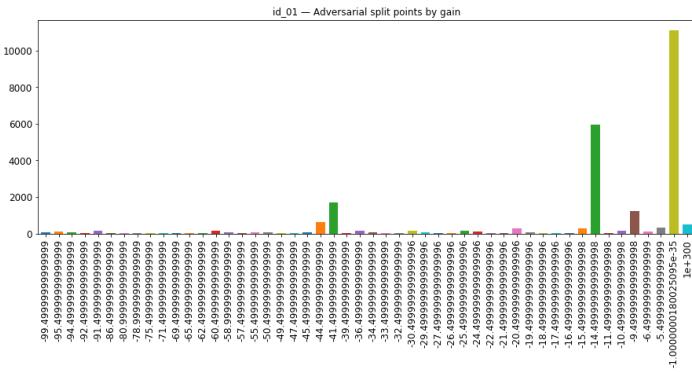
26 split point values used. Most fashionable is 3726.5000000000005 with gain of 815.7216796875.



id_01

Used 1036 times, total gain is 24345.591632664204.

58 split point values used. Most rampant is -1.0000000180025095e-35 with gain of 11109.443493247032.

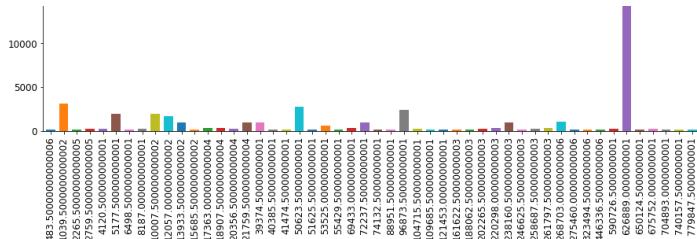


id_02

Used 3291 times, total gain is 58206.47148376703.

252 split point values used. Most abundant is 626889.0000000001 with gain of 23216.806400716305.

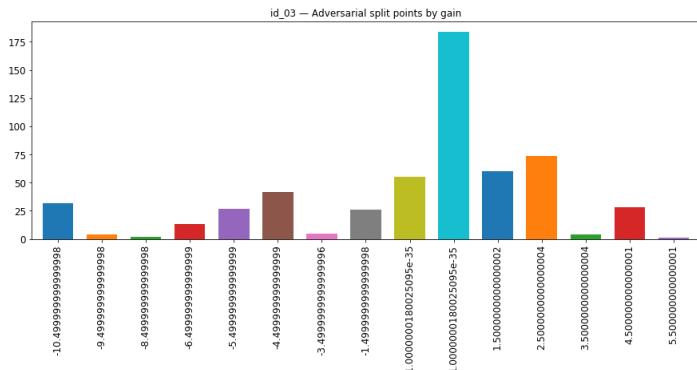




id_03

Used 129 times, total gain is 554.6489773988724.

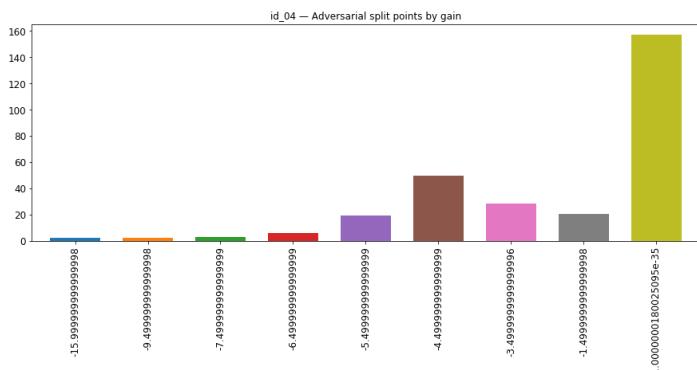
15 split point values used. Most widespread is 1.000000180025095e-35 with gain of 184.05403995513916.



id_04

Used 54 times, total gain is 287.8205716609955.

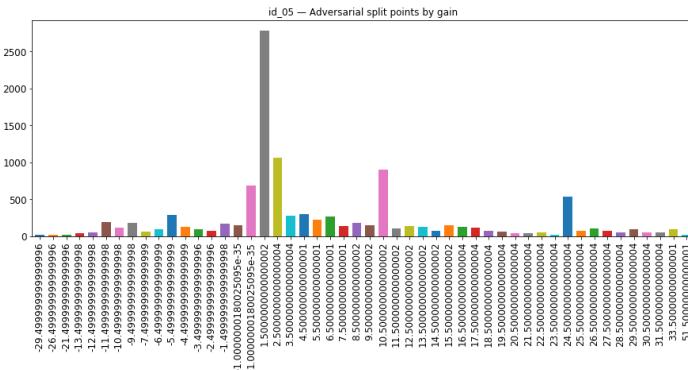
9 split point values used. Most prevalent is -1.000000180025095e-35 with gain of 157.39475905895233.



id_05

Used 1495 times, total gain is 10888.95545232296.

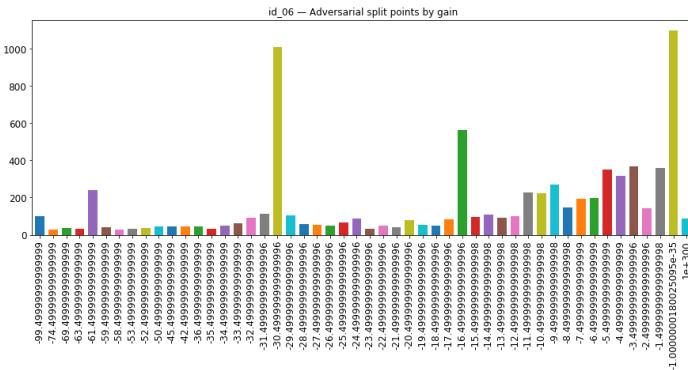
66 split point values used. Most frequent is 1.5000000000000002 with gain of 2786.731270134449.



id_06

Used 1503 times, total gain is 8328.05035752058.

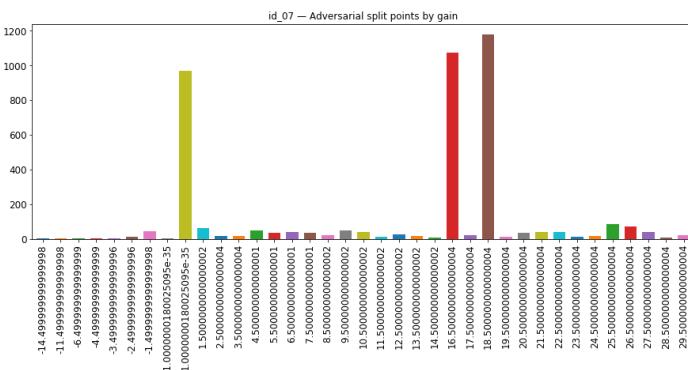
96 split point values used. Most frequent is -1.000000180025095e-35 with gain of 1099.4173001646996.



id 07

Used 201 times, total gain is 4104.8222463727.

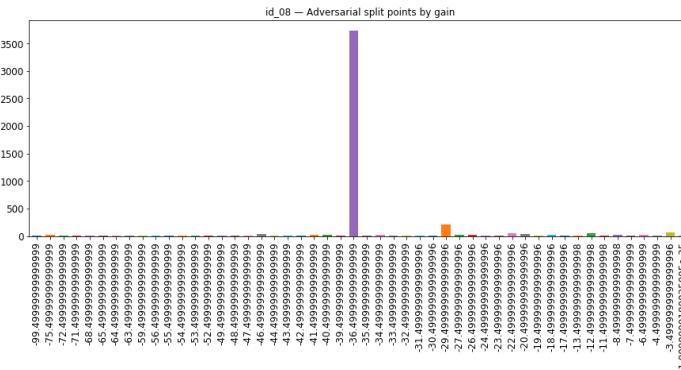
37 split point values used. Most rampant is 18.500000000000004 with gain of 1179.8165014982224.



id_08

Used 164 times, total gain is 4592.930215001106.

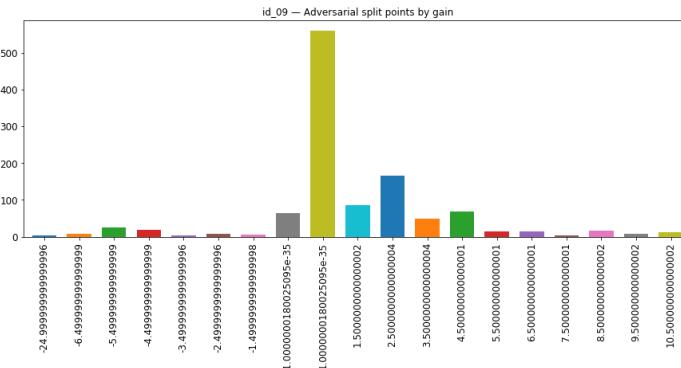
60 split point values used. Most permeant is -36.49999999999999 with gain of 3737.473470568657.



id_09

Used 212 times, total gain is 1131.240520298481.

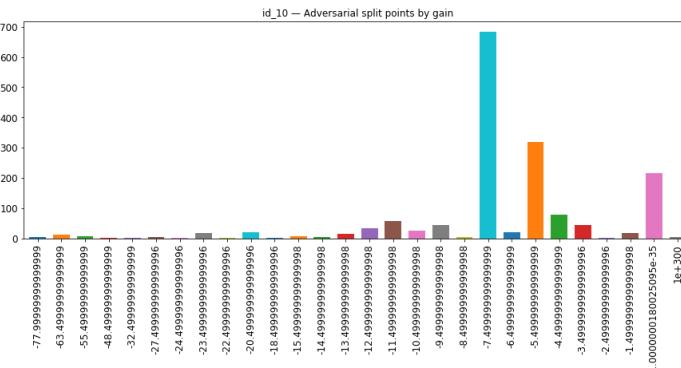
19 split point values used. Most omnipresent is 1.0000000180025095e-35 with gain of 560.636191546917.



id_10

Used 172 times, total gain is 1639.84019947052.

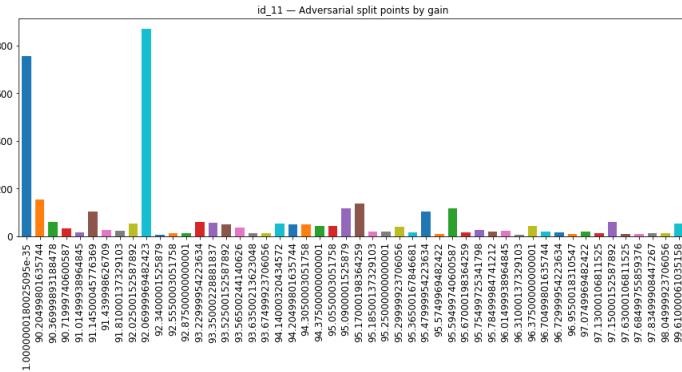
28 split point values used. Most rife is -7.49999999999999 with gain of 684.0889768600464.



id_11

Used 354 times, total gain is 3704.9790838956833.

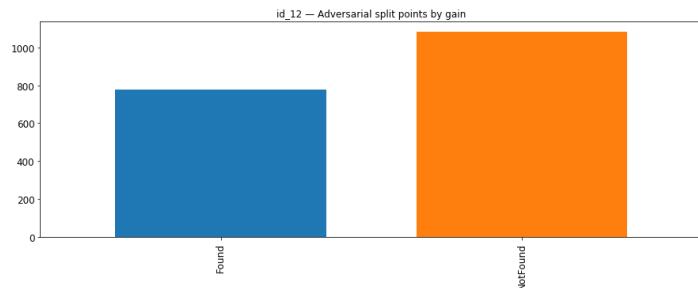
93 split point values used. Most usual is 92.06999969482423 with gain of 870.4707570075989.



id_12

Used 218 times, total gain is 1857.3063566088676.

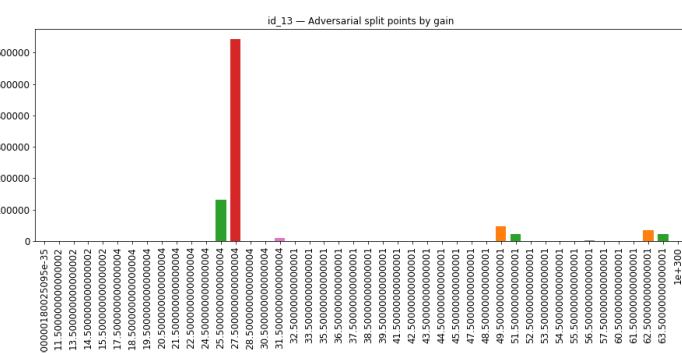
2 split point values used. Most prevalent is NotFound with gain of 1081.5203631520271.



id_13

Used 2425 times, total gain is 917236.3420783877.

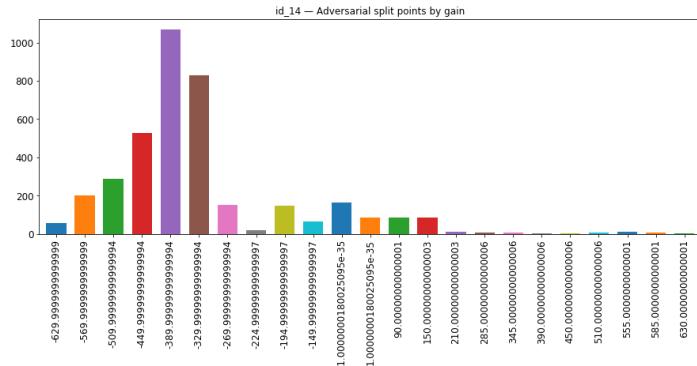
44 split point values used. Most predominant is 27.500000000000004 with gain of 642915.1966816783.



id_14

Used 663 times, total gain is 3816.3260444402695.

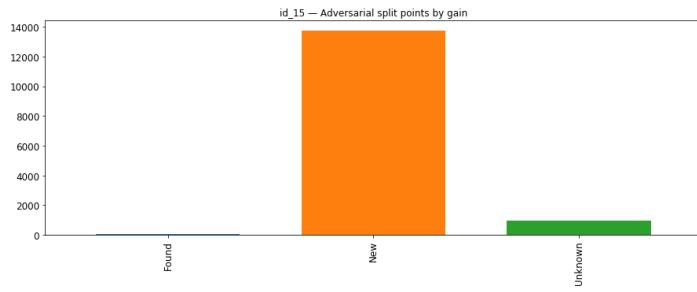
23 split point values used. Most ubiquitous is -389.9999999999994 with gain of 1069.883467555046.



id_15

Used 143 times, total gain is 14730.673908352852.

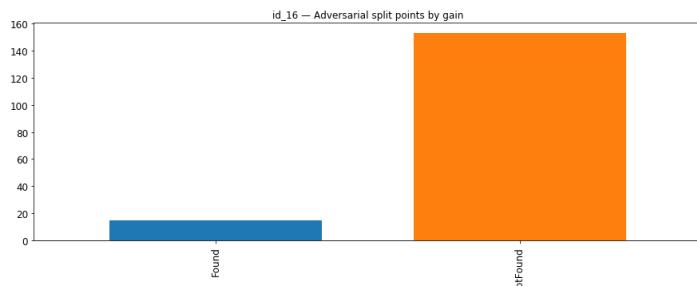
3 split point values used. Most widespread is New with gain of 13720.974215745926.



id_16

Used 48 times, total gain is 167.81230783462524.

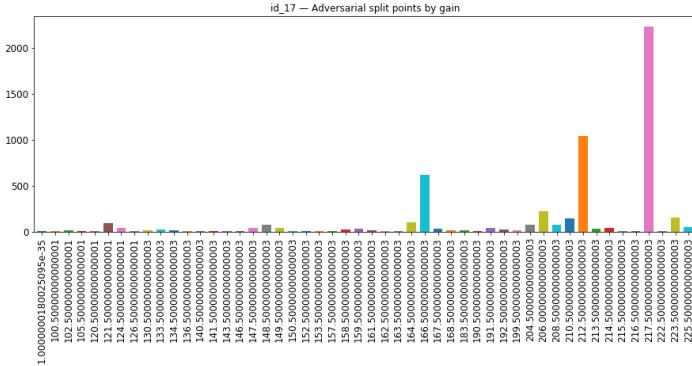
2 split point values used. Most prevalent is NotFound with gain of 152.89183819293976.



id 17

Used 308 times, total gain is 5632.402988791466.

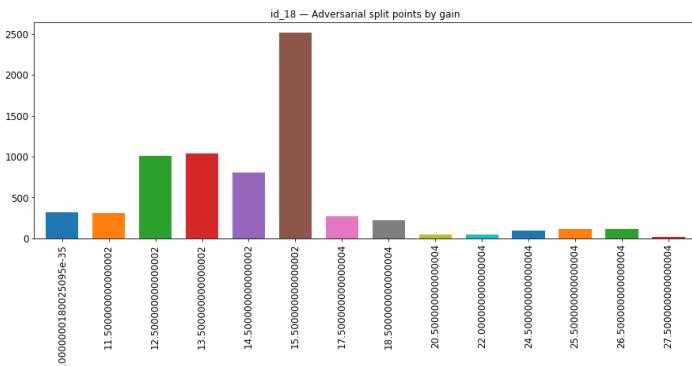
70 split point values used. Most recurrent is 217.50000000000003 with gain of 2235.3298873901367.



id _18

Used 1007 times, total gain is 6938.504720449448.

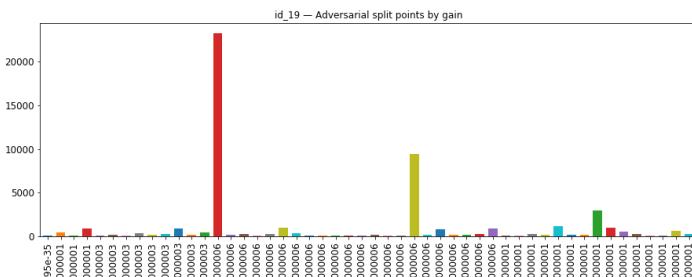
14 split point values used. Most usual is 15.500000000000002 with gain of 2515.916172981262.



id 19

Used 2616 times, total gain is 54525.51056498289.

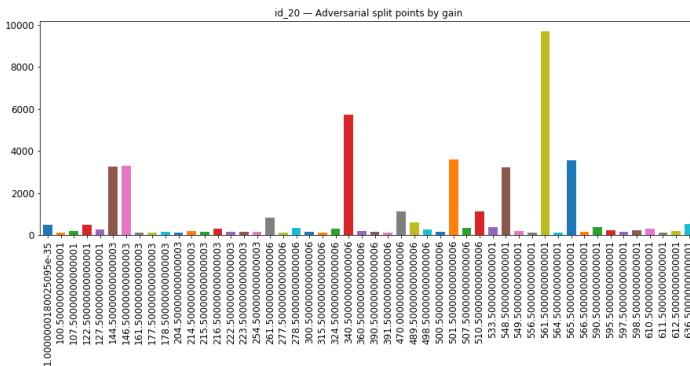
197 split point values used. Most repetitious is 261.50000000000006 with gain of 23254.40835094452.



id 20

Used 2754 times, total gain is 48417.171837449074.

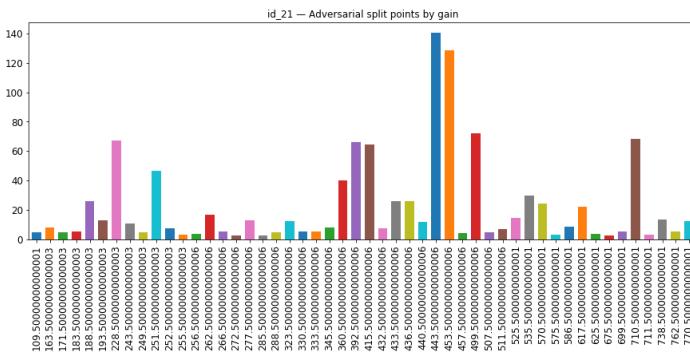
152 split point values used. Most popular is 561.5000000000001 with gain of 9697.31749767065.



id_21

Used 133 times, total gain is 1128.1840364933014.

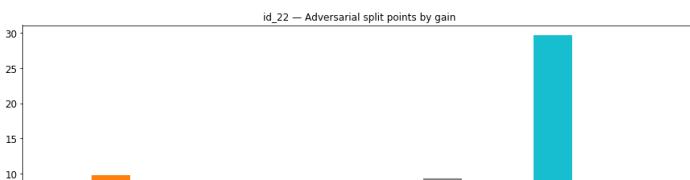
69 split point values used. Most marked is 443.5000000000006 with gain of 140.54919934272766.

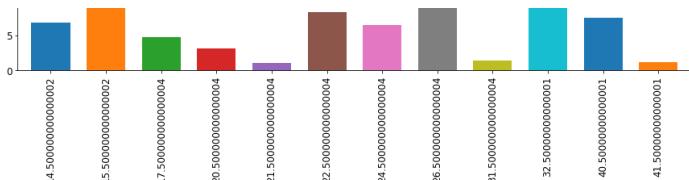


id 22

Used 26 times, total gain is 89.32718908786774.

12 split point values used. Most repetitive is 32.50000000000001 with gain of 29.64807093143463.

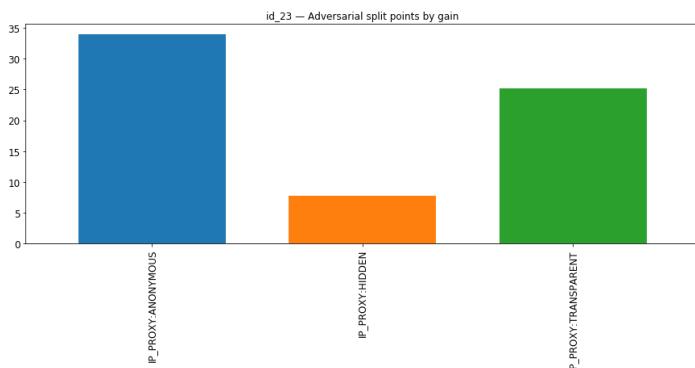




id_23

Used 13 times, total gain is 66.88894474506378.

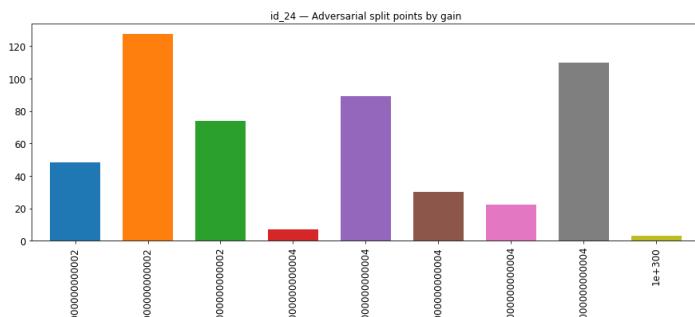
3 split point values used. Most marked is IP_PROXY:ANONYMOUS with gain of 33.93153095245361.



id_24

Used 93 times, total gain is 511.08997094631195.

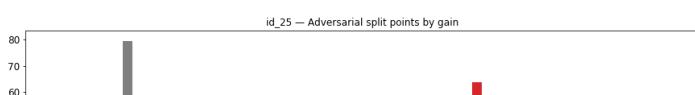
9 split point values used. Most rampant is 12.500000000000002 with gain of 127.34073853492737.

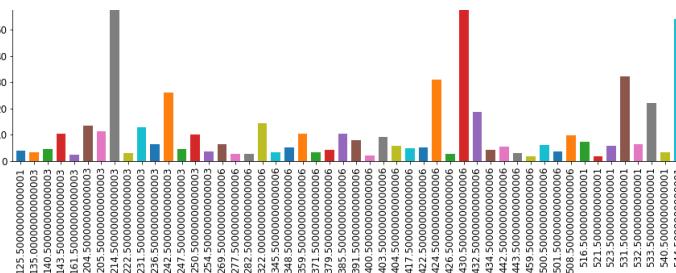


id_25

Used 101 times, total gain is 592.7726156115532.

61 split point values used. Most prevalent is 214.5000000000003 with gain of 79.43505728244781.

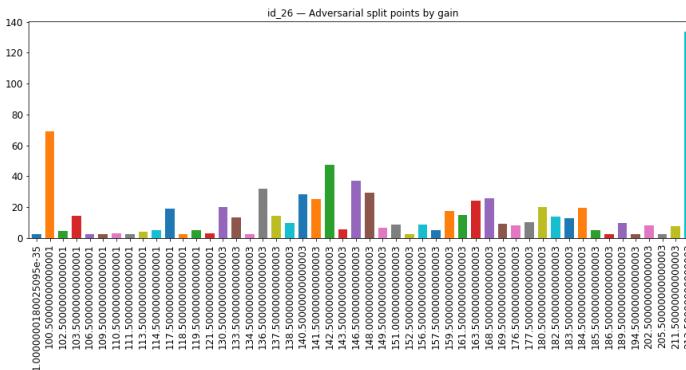




id 26

Used 169 times, total gain is 801.0125380754471.

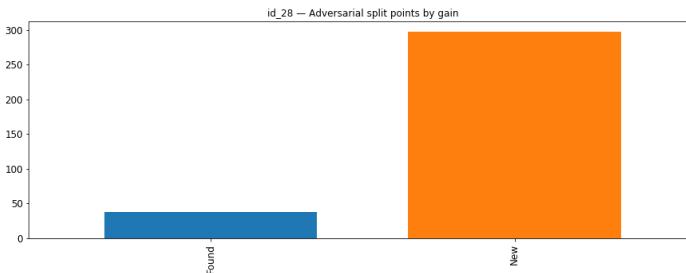
58 split point values used. Most legendary is 213.50000000000003 with gain of 133.5489078760147.



id 28

Used 67 times, total gain is 335.23129963874817.

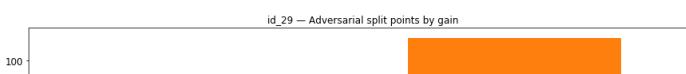
2 split point values used. Most frequent is New with gain of 297.2439993619919.

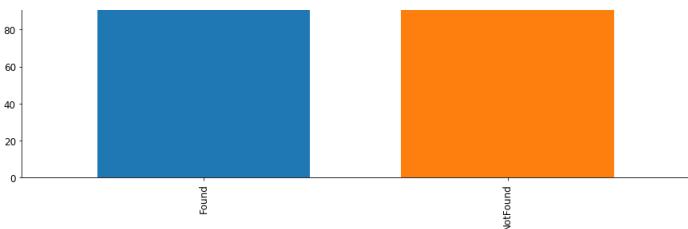


id 29

Used 24 times, total gain is 204.94686686992645.

2 split point values used. Most prevalent is NotFound with gain of 112.13874793052673.

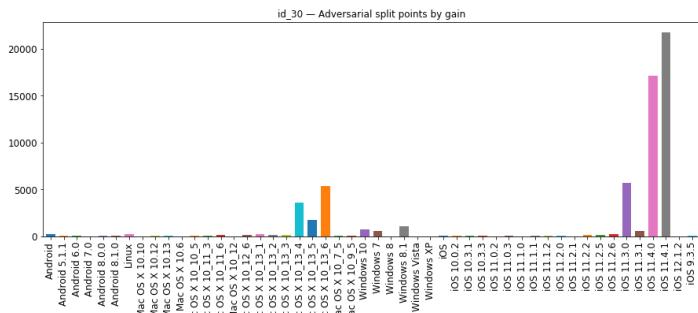




id 30

Used 2096 times, total gain is 61652.427128732204.

61 split point values used. Most abundant is iOS 11.4.1 with gain of 21770.914392530918.

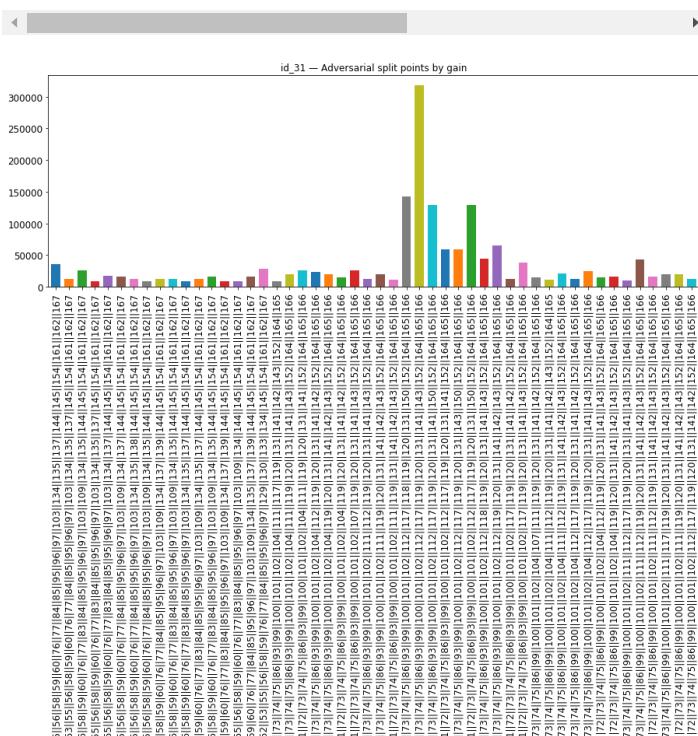


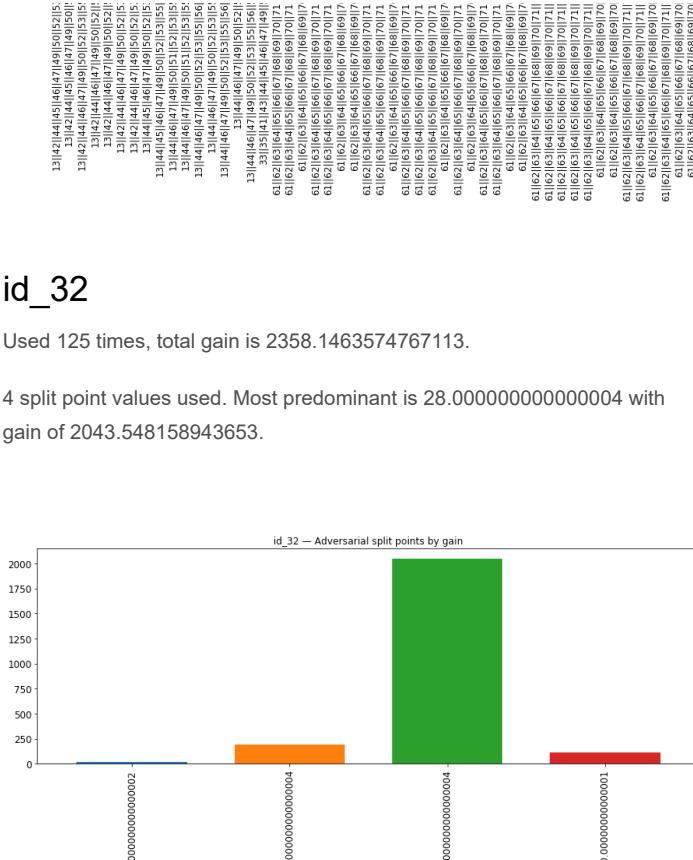
id_31

Used 4867 times, total gain is 2246253.060251951.

4727 split point values used. Most abundant is

61||62||63||64||65||66||67||68||69||70||71||72||73||74||75||86||93||99||100||101||1
with gain of 317753.326171875.



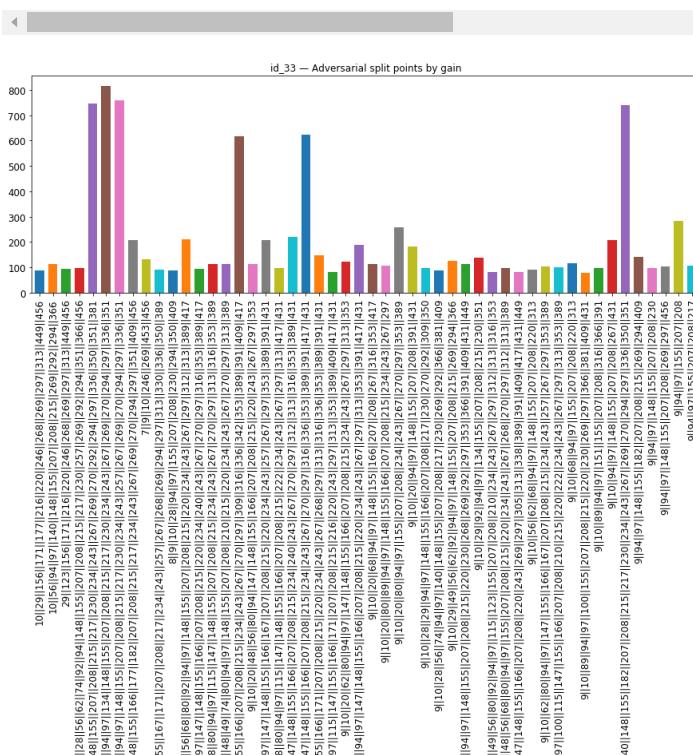


id 33

Used 1899 times, total gain is 24999.733945548534.

1897 split point values used. Most common is

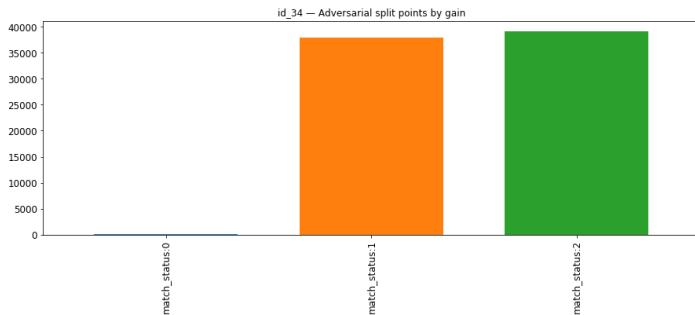
7||8||9||20||28||56||74||80||92||94||97||134||148||155||207||208||215||217||230||241
with gain of 814.582275390625.



id 34

Used 474 times, total gain is 77115.56831949949.

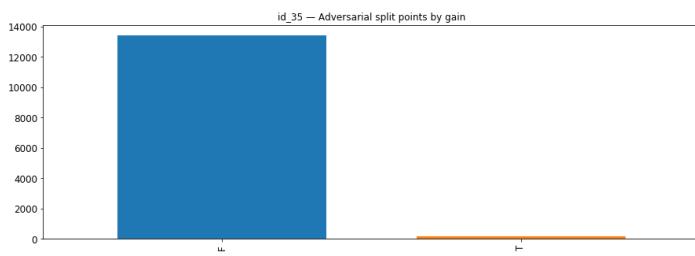
3 split point values used. Most prevalent is match_status:2 with gain of 39159.302365124226.



id 35

Used 76 times, total gain is 13597.362829566002.

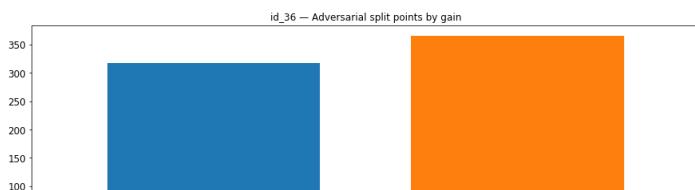
2 split point values used. Most recurrent is F with gain of 13436.36002099514.



id 36

Used 155 times, total gain is 682.8623881936073.

2 split point values used. Most widespread is T with gain of 365.9016085267067.

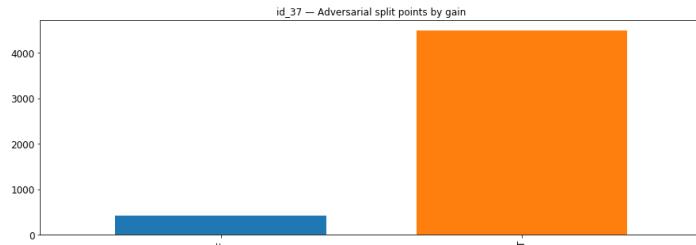




id_37

Used 234 times, total gain is 4909.747916519642.

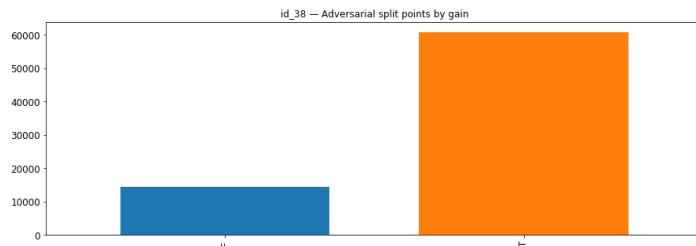
2 split point values used. Most usual is T with gain of 4493.197110533714.



id_38

Used 430 times, total gain is 75328.45362842083.

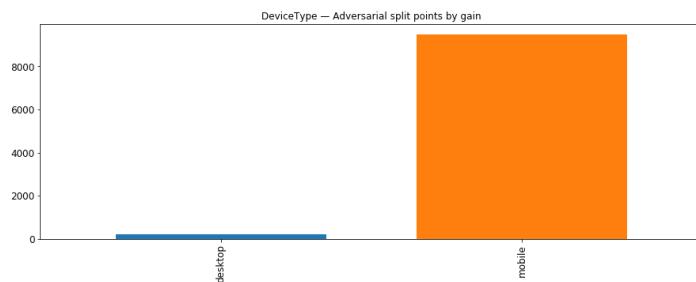
2 split point values used. Most prevalent is T with gain of 60808.62016057968.



DeviceType

Used 193 times, total gain is 9699.08280068636.

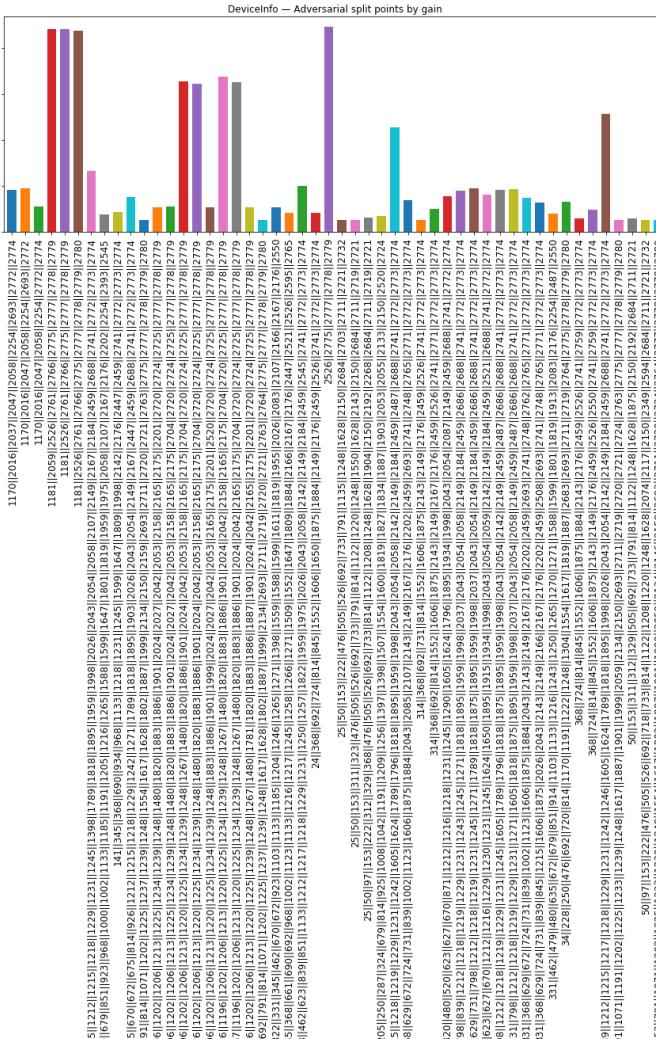
2 split point values used. Most abundant is mobile with gain of 9482.779277980328.



DeviceInfo

Used 3447 times, total gain is 101961.21466469765.

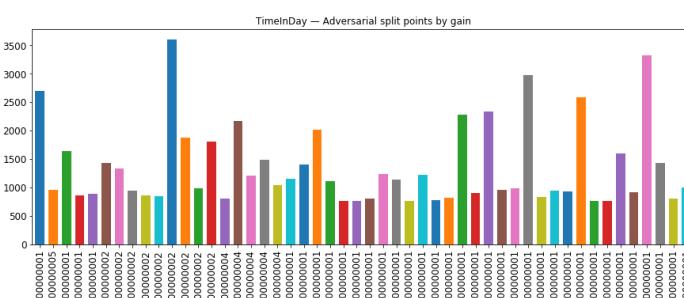
3445 split point values used. Most recurrent is 2526||2775||2777||2778||2779 with gain of 4455.5107421875.



TimeInDay

Used 26147 times, total gain is 172928.78871881962.

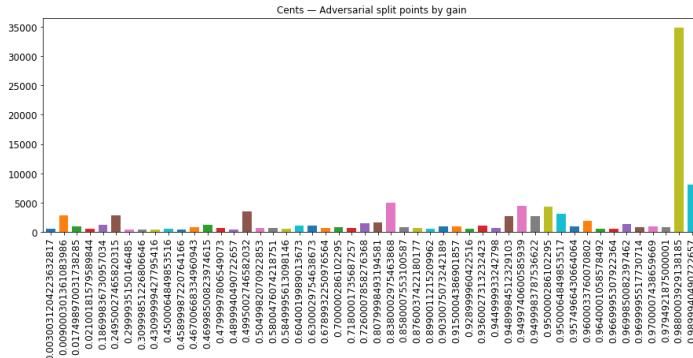
254 split point values used. Most permeant is 13684.500000000002 with gain of 3604.266279757023



Cents

Used 10063 times, total gain is 139167.5504116416.

251 split point values used. Most rampant is 0.9880003929138185 with gain of 34780.441195487976.



Conclusions

Now we can inspect trained models to see **which points** in the feature space matter for train/test distinctions...

An interesting next step might be to use this information to build an *auto-relaxing* function that buckets the data for us in a way that makes the train and test sets more similar, without any tedious manual inspection of plots :)

A note to any n00bs reading: the original features used here are only a starting point, used just to demonstrate. If (say) DeviceInfo of hi6210sft Build/MRA58K comes along in the training set and makes a fast burst of transactions (all marked fraud), then appears in the test set but spread out and on many separate days, it does not make sense to predict a high fraud likelihood, simply because of that one feature. Features that capture *event timing & behaviour* are needed :)

For inspiration you should check out an [extensive index of winning](#) and high ranking Kaggle solutions here (<https://www.kaggle.com/jtrotman/high-ranking-solution-posts>) (and upvote if this helps you find something useful — I guarantee there are useful links there :)

This kernel has been released under the [Apache 2.0](#) open source license.

Did you find this Kernel useful?
Show your appreciation with an upvote

8



Data

Data Sources

IEEE-CIS Fraud Detection

sample_submission.csv	507k x 2
test_identity.csv	142k x 41
test_transaction.csv	507k x 393
train_identity.csv	144k x 41
train_transaction.csv	591k x 394



IEEE-CIS Fraud Detection

Can you detect fraud from customer transactions?
Last Updated: 2 months ago

About this Competition

In this competition you are predicting the probability that an online transaction is fraudulent, as denoted by the binary target `isFraud`.

The data is broken into two files `identity` and `transaction`, which are joined by `TransactionID`. Not all transactions have corresponding identity information.

Categorical Features - Transaction

- ProductCD
- card1 - card6
- addr1, addr2
- P_emaildomain
- R_emaildomain
- M1 - M9

Categorical Features - Identity

- DeviceType
- DeviceInfo
- id_12 - id_38

The `TransactionDT` feature is a `timedelta` from a given reference datetime (not an actual timestamp).

Output Files

[New Dataset](#)
[New Notebook](#)
[Download All](#)


Output Files

- ☰ ieee_fraud_adversarial_lgb_auc_logs.csv
- ☰ ieee_fraud_adversarial_lgb_importances.csv
- 📄 ieee_fraud_adversarial_lgb_model_0.txt
- 📄 ieee_fraud_adversarial_lgb_model_1.txt
- 📄 ieee_fraud_adversarial_lgb_model_2.txt
- 📄 ieee_fraud_adversarial_lgb_model_3.txt
- 📄 ieee_fraud_adversarial_lgb_oof.npy
- ☰ ieee_fraud_adversarial_split_points.xlsx

About this file

This file was created from a Kernel, it does not have a description.

☰ ieee_fraud_adversarial_lgb_auc_logs.csv



1	Round	train_0	train_1	train_2	train_3	valid_0	valid_1	valid_2	valid_3
2	0	0.79864340 64513619	0.80020880 23233842	0.79857433 70587667	0.79786974 52368742	0.79639526 04646755	0.79968986 86063837	0.79890510 02758246	0.79724027 38838309
3	1	0.85061641 44158546	0.85064107 02618814	0.85087849 96797097	0.85102134 6565489	0.84864740 55824058	0.84997436 52544611	0.85144196 02721448	0.85087696 48009086
4	2	0.87521606 35564636	0.87517441 79807978	0.87490963 12930608	0.87505213 20902878	0.87313180 74982398	0.87504554 58199727	0.87551043 08969015	0.87490634 68320549
5	3	0.87888684 22888557	0.87869357 35717727	0.87859897 36626179	0.87855682 05762216	0.87672342 73141158	0.87847967 73636998	0.87916866 28402655	0.87848494 49084176
6	4	0.88010592 25317546	0.88018061 8738766	0.88007311 40796672	0.87985261 21593532	0.87803752 03644458	0.87996595 43815284	0.88031330 6733935	0.87987038 90583334
7	5	0.88680163 83133149	0.88644293 85702095	0.88632754 25308874	0.88669448 07312543	0.88490445 18974627	0.88620162 96577805	0.88673830 00792669	0.88651448 22452288
8	6	0.88890406 23226421	0.88885171 65679696	0.88872696 18886848	0.88910036 62317722	0.88696909 51280138	0.88859597 7473963	0.88920909 23451811	0.88883023 14396305
9	7	0.88855431 28256366	0.88867207 78858513	0.88853873 8350231	0.88892965 69437909	0.88670960 3093363	0.88834699 56793978	0.88901466 60432732	0.88873790 37749806
10	8	0.88896460 38691492	0.88896691 68365566	0.88891080 61870666	0.88935977 40114638	0.88712693 45578313	0.88855575 30625328	0.88943499 18364275	0.88910267 41928405
11	9	0.88941219 85199908	0.88942810 33860272	0.88940135 37146183	0.88976438 75711165	0.88756887 55348977	0.88907919 19616197	0.88973562 79078306	0.88963196 34797892
12	10	0.89072376 59776247	0.89048347 97860668	0.89054275 51836852	0.89101238 89647691	0.88877275 25059597	0.89020850 22765779	0.89084165 27316202	0.89083905 00416168
13	11	0.89214467 60238527	0.89194386 65474723	0.89199058 25959353	0.89227227 99172581	0.89017098 68836939	0.89173180 28557787	0.89231616 16653068	0.89201316 01996752
14	12	0.89229743 57213782	0.89225161 45048373	0.89210781 64483299	0.89249025 22670153	0.89017800 25908814	0.89204339 35427052	0.89248018 26687043	0.89225921 61467165
15	13	0.89358415 72089949	0.89348967 35128756	0.89336187 67945908	0.89373033 40002241	0.89152670 67324595	0.89325970 07634232	0.89369064 83279621	0.89341946 22174194
16	14	0.89453362 33771314	0.89431243 85075825	0.89417672 61723643	0.89451593 33096163	0.89251119 23813654	0.89411993 15559599	0.89448483 99910991	0.89414822 97860788
17	15	0.89523480 50390818	0.89488010 00820921	0.89492943 73194484	0.89513280 77380455	0.89320281 23161491	0.89464963 35794611	0.89521939 43652585	0.89471986 08109668
18	16	0.89611605 72228694	0.89577475 27456017	0.89577529 90471812	0.89605690 61334501	0.89416245 1562128	0.89555383 20385139	0.89609191 57257099	0.89553268 17900082
19	17	0.89699520 85344838	0.89666524 48646368	0.89670946 66571529	0.89699920 93885628	0.89510499 91481703	0.89649456 57152787	0.89693272 33519601	0.89642572 88189068

Comments (1)

Sort by

All Comments

Hotness



Click here to comment...



Fredrik Jonsson • Posted on Latest Version • a day ago • Options • Reply

^ 1



Wonderful job.

Similar Kernels



[Private Kernel]



[Private Kernel]



© 2019 Kaggle Inc

[Our Team](#) [Terms](#) [Privacy](#) [Contact/Support](#)

