```
[1]: # pip install xgboost
                                                                                                                                                                                                                                                                               长向个↓去早■
[3]: # # Lift Booster Notebook: Improving Rare Event Detection
             import of
           import os
import glob
import joblib
import plobib
import nummy as np
import nummy as np
from sklearn.metrics import average_precision_score
from sklearn.model_selection import train_test_split
             champion_stack_folder = "champion_stacks"
data_folder = "market_shock_synthetic_dat
            data_folder = "market_shock_synthetic_datasets"
base_model_folder = "champion_packages"
xgb_output_folder = "xgboost_stacks"
             # * Create output folder for xgboost models os.makedirs(xgb_output_folder, exist_ok=True)
            # * Load Champion Logistic Stack Models
mode\[ paths = sorted(glob.globics.psh.join(champion_stack_folder, "*.pkl")))
models = (os.path.basename().replace("_stacked.pkl", ""): jobilo.load(p) for p in model_paths)
             # 📈 Load All Datasets
            # W Load At Databets
csv_paths = Sorted(glob.glob(os.path.join(data_folder, "*.csv")))
datasets = {os.path.basename(p).replace(".csv", ""): pd.read_csv(p) for p in csv_paths}
                   iults = []
r name im models:
   if name in datasets:
        df = datasets[name]
        X = df.drop("rare_event", axis=1)
        y = df["rare_event"]
                               # Rebuild meta features from base champions
                              # Newstanding | Mark | 
                                       model = joblib.loadlwase_puss.,
try:
    meta_features.append(model.predict_proba(X)[:, 1])
                                       except AttributeError:

meta_features.append(model.decision_function(X))
                              meta_X = np.vstack(meta_features).T
X_train, X_test, y_train, y_test = train_test_split(meta_X, y, stratify=y, test_size=0.3, random_state=42)
                              xgb = XGBClassifier(use_label_encoder=False, eval_metric='logloss')
xgb.fit(X_train, y_train)
                              # M Save XGBoost stacker joblib.dump(xgb, os.path.join(xgb_output_folder, f"{name}_xgb_stacked.pkl"))
                              preds = xgb.predict_proba(X_test)[:, 1]
pr_auc = average_precision_score(y_test, preds)
baseline = y.mean()
                              results.append({
                                      ults.append({
"Dataset": name,
"Model": "XGBoost Stacker",
"PR AUC": round(pr_auc, 3),
"Baseline": round(baseline, 3),
"Liftorf": "∱" if pr_auc >= 0.6 else "⊕"
                             3.)
             # # Save Results
results_df = pd.DataFrame(results)
            results_df.to_csv("xgboost_lift_results.csv", index=False)
print(results_df)
             /Users/sophiaboettcher/anaconda3/lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:17] WARNING: /Users/runner/work/xgboost/xgc/learner.cc:738: Parameters: ("use_label_encoder") are not used.
             bst.update(dtrain, iteration=i, fobj=obj)
/Users/sophiaboettcher/anaconda3/lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:17] WARNING: /Users/runner/work/xg
             boost/xgboost/src/learner.cc:738:
Parameters: { "use_label_encoder" } are not used.
             bst.update(dtrain, iteration=i, fobj=obj)
//Josers/sophiaboettcher/anaconda3/lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:18] WARNING: /Users/runner/work/xg
             boost/xgboost/src/learner.cc:738:
Parameters: { "use_label_encoder" } are not used.
                bst.update(dtrain, iteration=i, fobj=obj)
Users/sophiaboettcher/anaconda3/lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:18] WARNING: /Users/runner/work/xg
             boost/xgboost/src/learner.cc:738:
Parameters: { "use_label_encoder" } are not used.
                bst.update(dtrain, iteration=i, fobj=obj)
Users/sophiaboettcher/anaconda3/lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:19] WARNING: /Users/runner/work/xg
             Users/sophiaboettcher/anaconda3/lib/python3.11/s
boost/xgboost/src/learner.cc:738:
Parameters: { "use_label_encoder" } are not used.
             bst.update(dtrain, iteration=i, fobj=obj)
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boost/xgboost/syclearer.cc738:
Parameters: { "use_label_encoder" } are not used.
             bst.update(dtrain, iteration=i, fobj=obj)
//Users/sophiaboettcher/anaconda3/lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:19] WARNING: /Users/runner/work/xg
boost/xgboost/syclearer.cc/738:
Parameters: { "use_label_encoder" } are not used.
            bst.update(dtrain, iteration=i, fobj=obj)
//Users/sophiaboettcher/anaconda3/Lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [81:18:20] WARNING: /Users/runner/work/xg
boost/xgboost/syclearner.cc:738:
Parameters: { "use_label_encoder" } are not used.
             bst.update(dtrain, iteration=i, fobj=obj)
//Users/sophiaboettcher/anaconda3/Lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:20] WARNING: /Users/runner/work/xg
boost/xgboost/src/learner.cc:738:
Parameters: { "use_label_encoder" } are not used.
             bst.update(dtrain, iteration=i, fobj=obj)
//Users/sophiaboettcher/anaconda3/lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:20] MARNING: /Users/runner/work/xg
boost/xgboost/xfyclaerner.cc738:
Parameters: { "use_label_encoder" } are not used.
             bst.update(dtrain, iteration=i, fobj=obj)
//Users/sophiaboettcher/anaconda3/lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:21] WARNING: /Users/runner/work/xg
boost/xgboost/src/learner.cc:738:
Parameters: { "use_label_encoder" } are not used.
             bst.update(dtrain, iteration=i, fobj=obj)
//Users/sophiaboettcher/anaconda3/Lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:21] WARNING: /Users/runner/work/xg
boost/xgboost/src/learner.cc:738:
Parameters: ("use_label_encoder") are not used.
             bst.update(dtrain, iteration=i, fobj=obj)
/Users/sophiaboettcher/anacondu3/lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:21] MARNING: /Users/runner/work/xg
             boost/xgboost/src/learner.cc:738:
Parameters: { "use_label_encoder" } are not used.
               bst.update(dtrain, iteration=i, fobj=obj)
/Users/sophiaboettcher/anaconda3/lib/python3.11/site-packages/xgboost/training.py:183: UserWarning: [01:18:22] MARNING: /Users/runner/work/xg
             /Users/sophiaboettcher/anaconuas/ciu/pychons.ii,
boost/xgboost/src/learner.cc:738:
Parameters: { "use_label_encoder" } are not used.
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1 marketshock_nesy_s1 XGBoost Stacker 0.581 0.141 0.440 0 2 marketshock_nesy_s2 XGBoost Stacker 0.659 0.136 0.524 3 marketshock_nesy_s3 XGBoost Stacker 0.695 0.133 0.562 4 marketshock_nesy_s3 XGBoost Stacker 0.695 0.133 0.562 5 marketshock_nextreme_s2 XGBoost Stacker 0.258 0.255 0.013 0 6 marketshock_nextreme_s2 XGBoost Stacker 0.268 0.255 0.013 0 7 marketshock_nextreme_s3 XGBoost Stacker 0.185 0.177 0.008 0 8 marketshock_hard_s1 XGBoost Stacker 0.185 0.177 0.008 0 9 marketshock_hard_s3 XGBoost Stacker 0.185 0.177 0.008 0 9 marketshock_hard_s3 XGBoost Stacker 0.155 0.164 0.007 0 9 marketshock_meduim_s1 XGBoost Stacker 0.156 0.144 0.155 0.011 0 10 marketshock_meduim_s2 XGBoost Stacker 0.275 0.141 0.136 0 11 marketshock_meduim_s2 XGBoost Stacker 0.275 0.140 0.112 0.140 0.070 0		Dataset		PR AUC			Liftoff	
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4 marketshock_extreme_s1 XGBoost Stacker 0.258 0.251 -0.083 ○ 5 marketshock_extreme_s2 XGBoost Stacker 0.268 0.255 0.013 ○ 6 marketshock_extreme_s3 XGBoost Stacker 0.281 0.264 0.018 ○ 7 marketshock_hard_s1 XGBoost Stacker 0.185 0.177 0.008 ○ 8 marketshock_hard_s2 XGBoost Stacker 0.156 0.164 -0.007 ○ 9 marketshock_hard_s3 XGBoost Stacker 0.156 0.164 0.155 -0.011 ○ 10 marketshock_medium_s1 XGBoost Stacker 0.277 0.141 0.155 0.111 ○ 11 marketshock_medium_s2 XGBoost Stacker 0.276 0.144 0.112 ○ 12 marketshock_medium_s3 XGBoost Stacker 0.276 0.144 0.112 ○ 12 marketshock_medium_s3 XGBoost Stacker 0.210 0.140 0.140 0.070 ○	2	marketshock_easy_s2	XGBoost Stacker	0.659	0.136	0.524		
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7 marketshock, hard_s1 X68oost Stacker 0.185 0.177 0.008 9 marketshock, hard_s2 X68oost Stacker 0.156 0.164 -0.007 9 marketshock, madium_s1 X68oost Stacker 0.144 0.155 -0.011 10 marketshock, madium_s1 X68oost Stacker 0.277 0.141 0.156 11 marketshock, madium_s2 X68oost Stacker 0.256 0.144 0.112 12 marketshock, madium_s3 X68oost Stacker 0.256 0.144 0.112 12 marketshock, madium_s3 X68oost Stacker 0.210 0.140 0.070	5	marketshock_extreme_s2	XGBoost Stacker	0.268	0.255	0.013		٥
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10 marketshock_medium_s1 XGBoost Stacker 0.277 0.141 0.136	8	marketshock_hard_s2	XGBoost Stacker	0.156	0.164	-0.007		
11 marketshock_medium_s2	9	marketshock_hard_s3	XGBoost Stacker	0.144	0.155	-0.011		
12 marketshock_medium_s3 XGBoost Stacker 0.210 0.140 0.070 🖨	10	marketshock_medium_s1	XGBoost Stacker	0.277	0.141	0.136		
	11	marketshock_medium_s2	XGBoost Stacker	0.256	0.144	0.112		٥
13 stock_prediction_clean XGBoost Stacker 0.921 0.502 0.418 🚀	12	marketshock_medium_s3	XGBoost Stacker	0.210	0.140	0.070		٥
	13	stock_prediction_clean	XGBoost Stacker	0.921	0.502	0.418	39	9