When to Buy, Sell, and Hold

A multi-classification model with stock data.

What publicly traded stocks are currently....

Overbought

Overbought defines a period of time where there has been a **significant and consistent upward move** in price over a period of time **without much pullback**.

Oversold

The term oversold illustrates a period where there has been a **significant and consistent downward move** in price over a specified period of time **without much pullbac**k.

Neither

The premise is simple, **overbought** markets could lead to a downward move in price.

Oversold markets could lead to an upward move in price.

So neither, is Neither...

Our Methodology: OSEMN

Obtain / Scrub → Explore / Model → Interpret / Results

APIs & Web Scraping

Source: **Yahoo Finance**

Time to Scrape: ~**24hrs**

Companies Searched: **~5,000 companies**

Companies in final dataset: **~2,000 tickers**

EDA & Modeling

Features: **29**

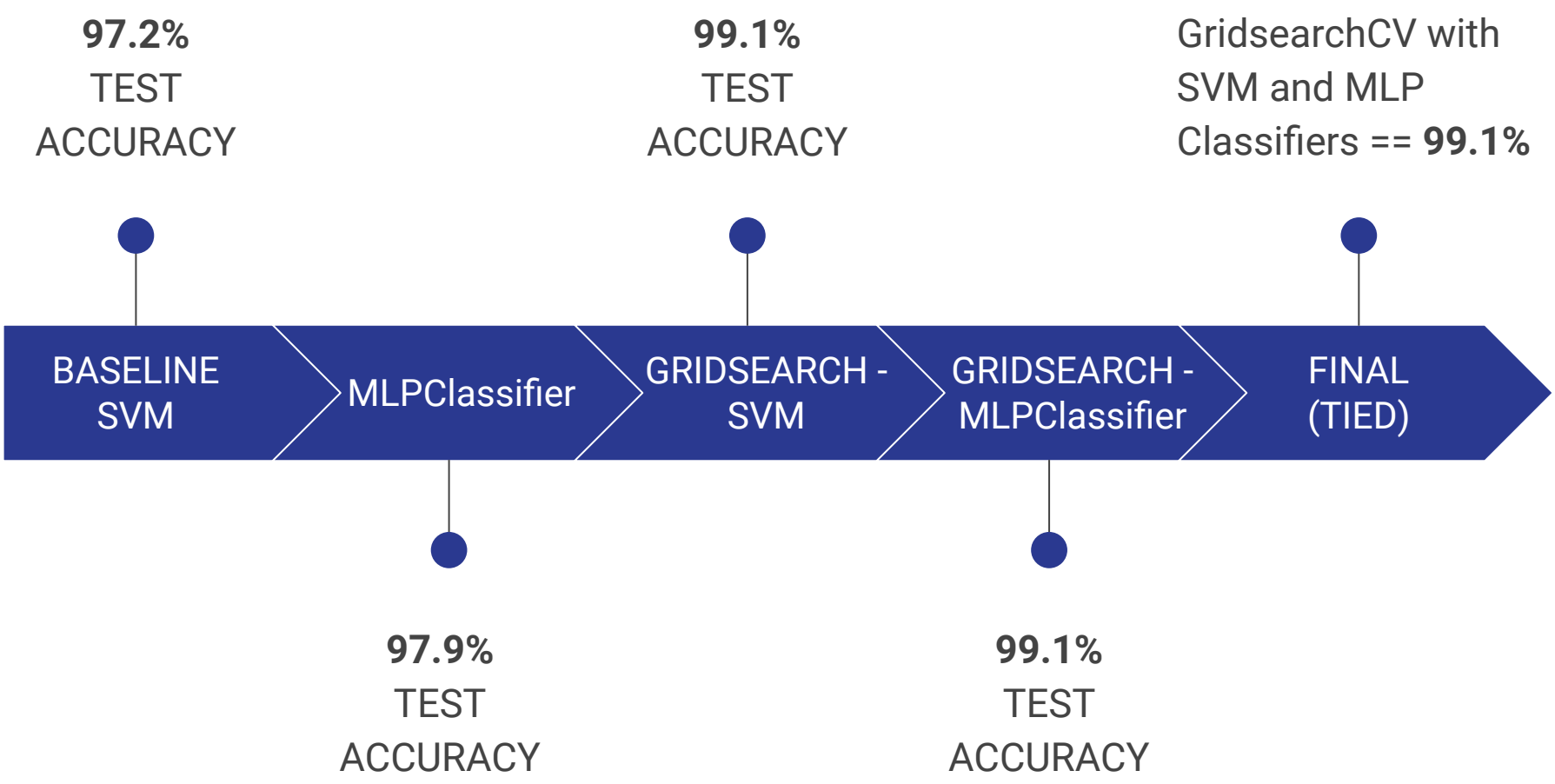
Machine Learning Models: **7 models**

Models Tuned with Grid Search: **2 models**

Baseline to Final accuracy score

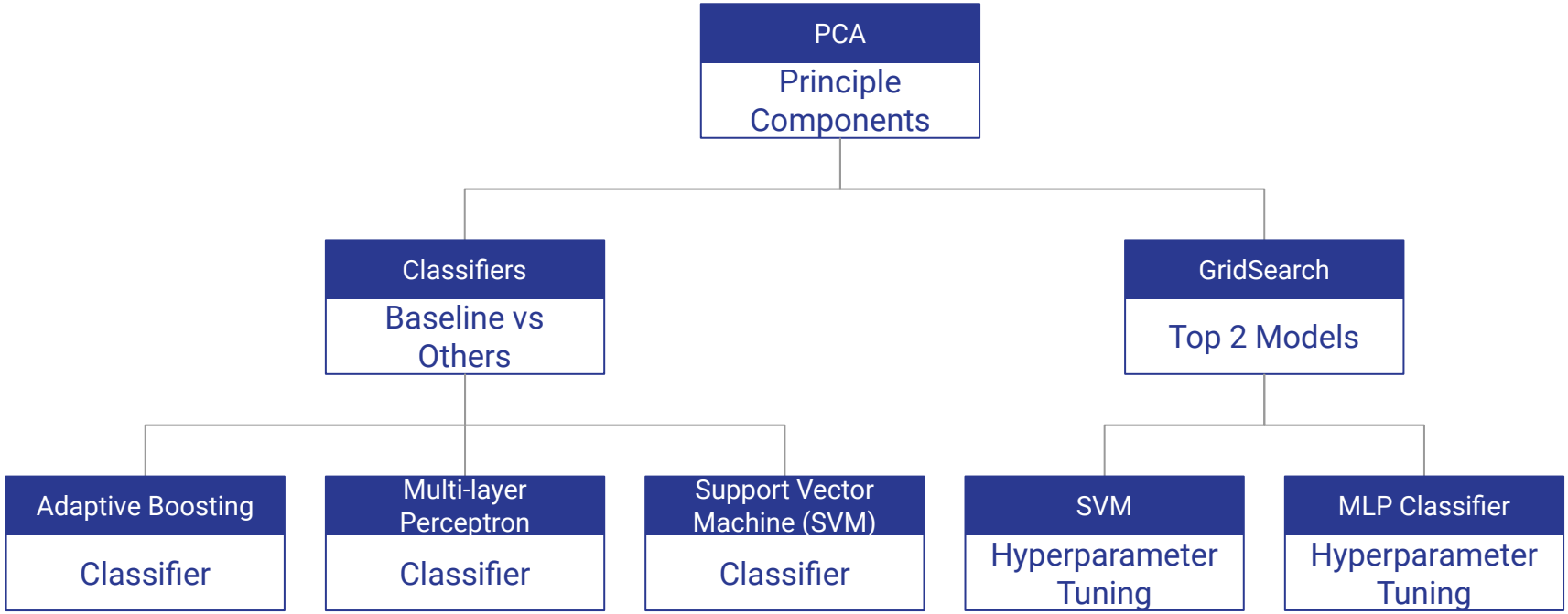
Baseline: **97.2 %**

Final Model: **99.1%**


97.2%
TEST
ACCURACY
99.1%
TEST
ACCURACY
GridsearchCV with
SVM and MLP
Classifiers == **99.1%**
BASELINE
SVM
MLPClassifier
GRIDSEARCH -
SVM
GRIDSEARCH -
MLPClassifier
FINAL
(TIED)
97.9%
TEST
ACCURACY
99.1%
TEST
ACCURACY

Modeling

Process Map

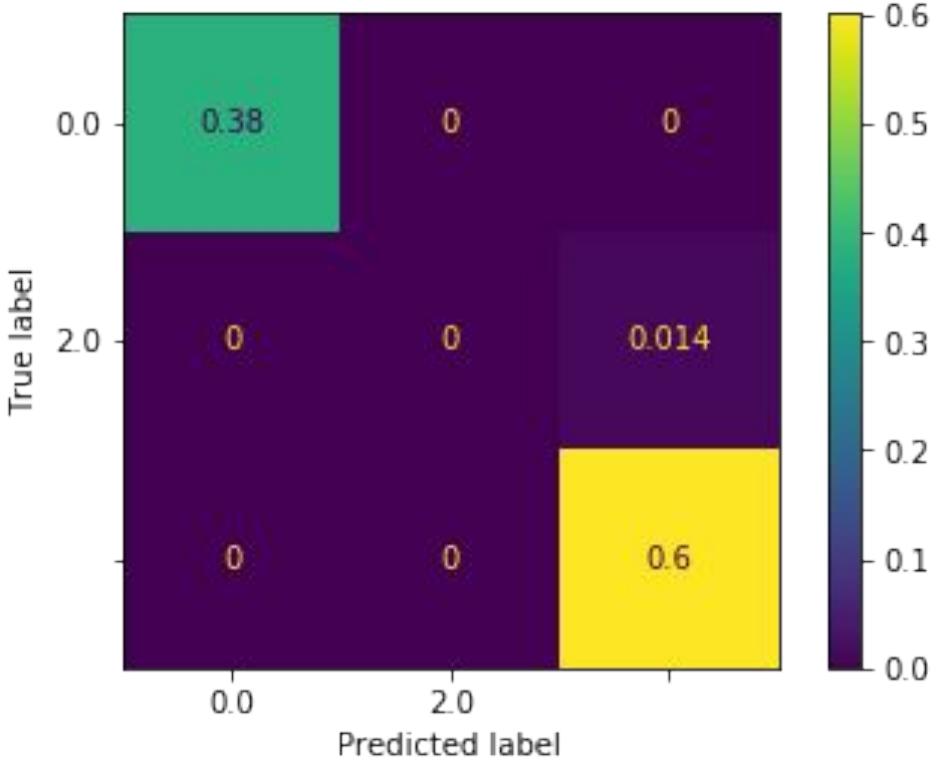

PCA
Principle Components
Classifiers
Baseline vs Others
GridSearch
Top 2 Models
Adaptive Boosting
Classifier
Multi-layer Perceptron
Classifier
Support Vector Machine (SVM)
Classifier
SVM
Hyperparameter Tuning
MLP Classifier
Hyperparameter Tuning

Grid Search SVM Classifier - Confusion Matrix:

~__% of oversold stocks were correctly classified.

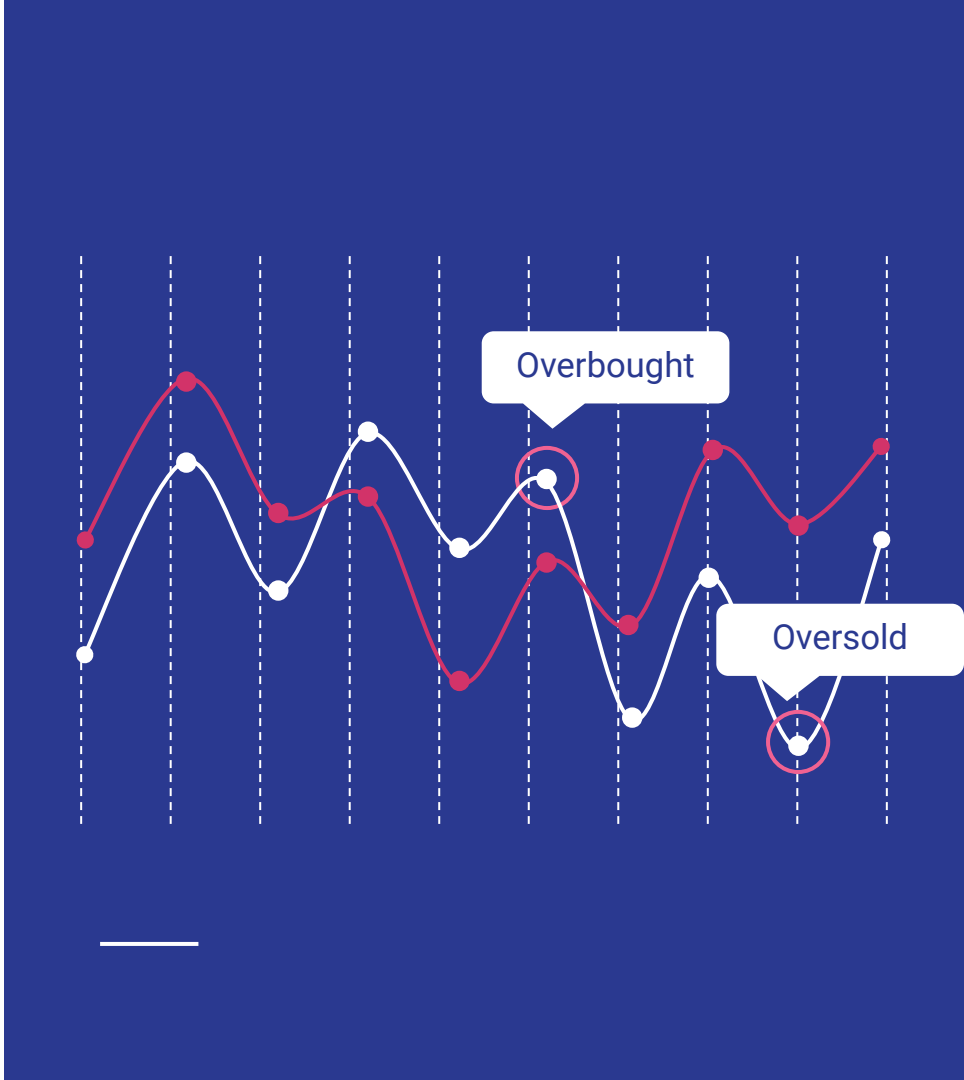
~__% of overbought stocks were also classified correctly.

~__% error rate of classification.



Overbought vs Oversold

Overbought	Oversold
EXC	ROYT
ASML	FLS
BAM	HPE
IRT	

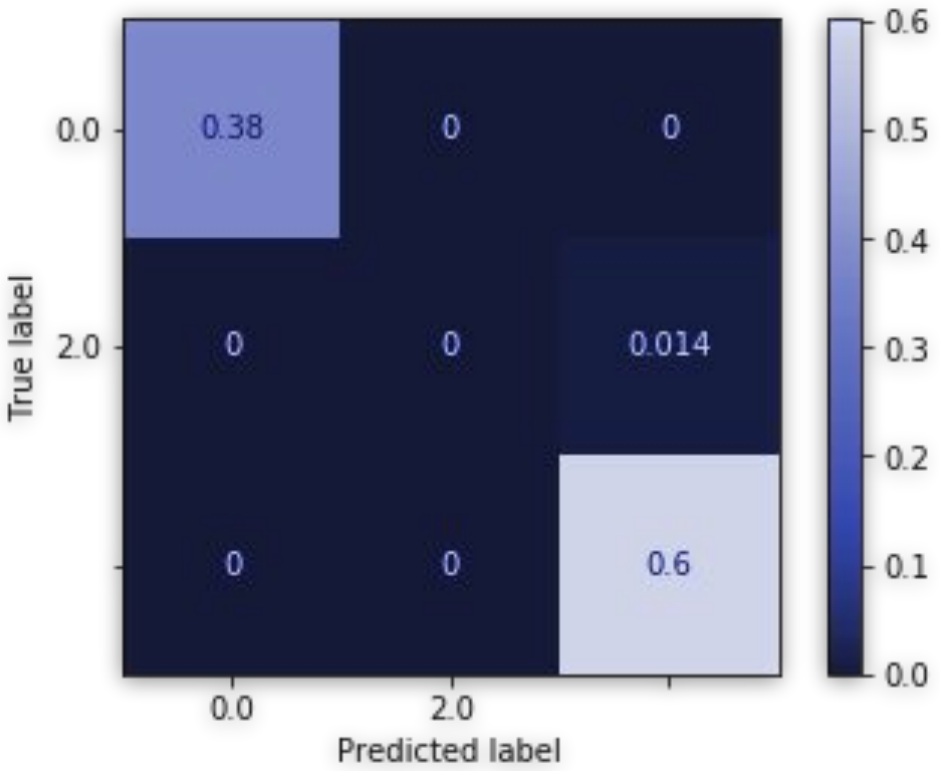


Grid Search MLP Classifier - Confusion Matrix

~38% of oversold stocks were correctly classified.

~60% of overbought stocks were also classified correctly.

~1.4% error rate of classification.



Future Work - Questions to Consider

If any stocks are classified as a **oversold**, which would yield the highest return?

If any stocks are classified as a **overbought**, which would yield the steepest decline?

If any stocks are classified as a **neither**, which positions should be exited or re-entered?

- ARIMA Models
- Autoregressive Integrated Moving Average Models

Thank You!

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