What's Tomorrow's Bitcoin Price?

Defining the trading strategy

- **One security:** bitcoin
- **One binary signal:** 0 is short, +1 is long
- **One-step-ahead:** forecast tomorrow's return

Objective is capital preservation and growth, above a HODL strategy, that cannot be attributed to randomness.

Model employs two prediction methods

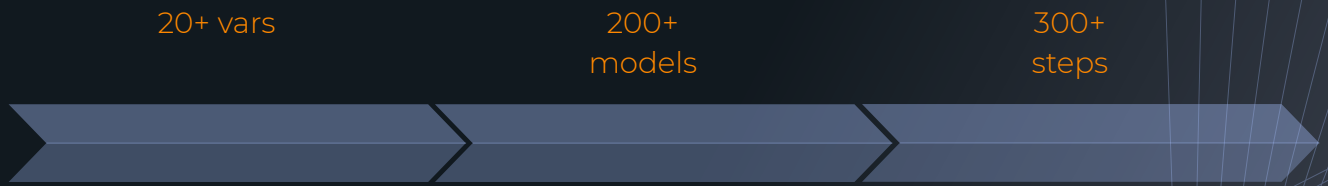
Linear

ARIMAX: model for time series, identifies significant lags and moving averages. Ensembled to Voting Classifier.

Non-Linear

Decision Tree: included time series as features to predict binary target. Ensembled to Random Forest.

The process is iterative



Feature Engineering

- Lags
- Technicals
- Cointegration

Voting Classifier

- ARIMAX
- Select Top
- Ensemble

Random Forest

- Decision Tree
- Tuning
- Ensemble

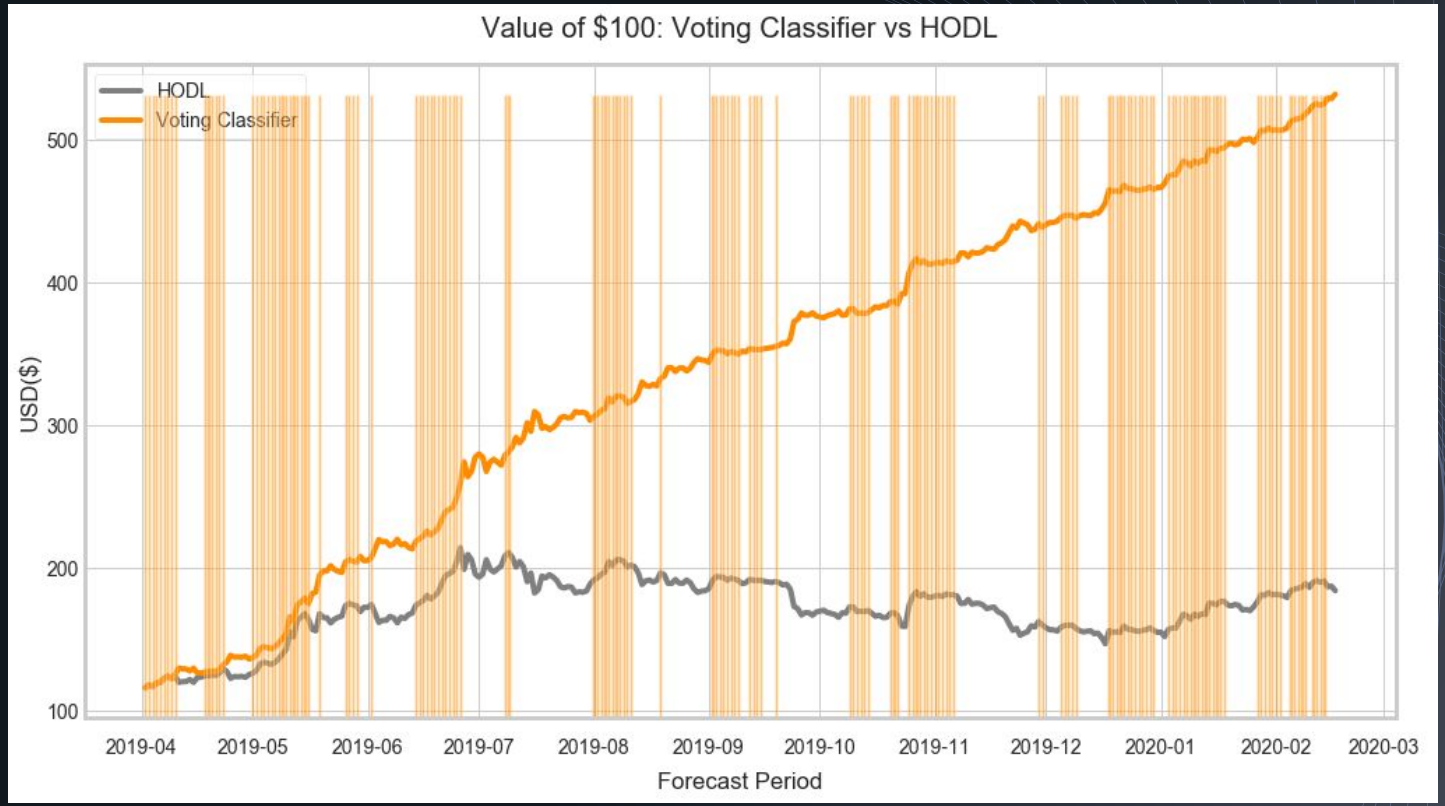
Results analysis

Trading models showed high accuracy for one-step-forecasts

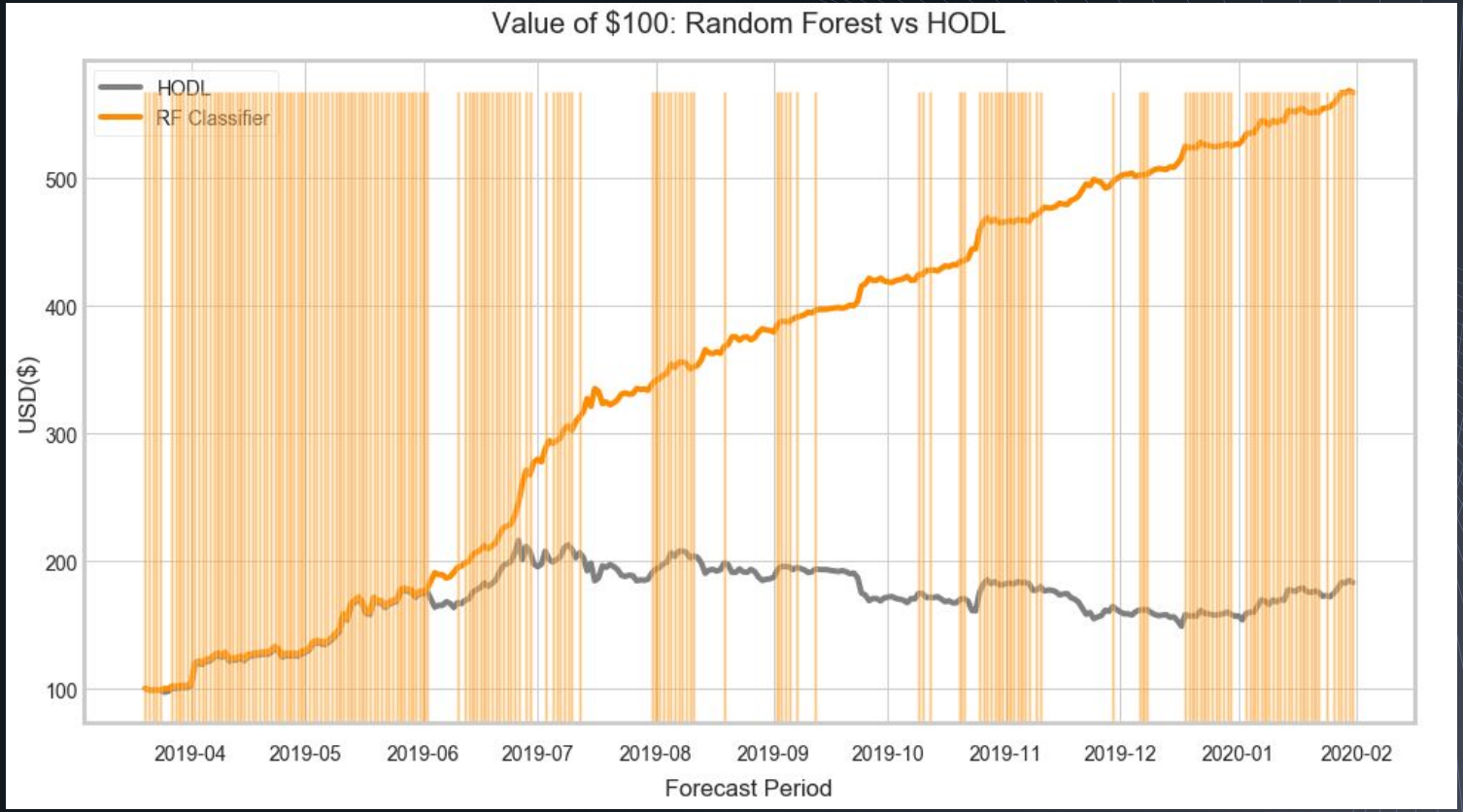
1.

Signal vs Benchmark

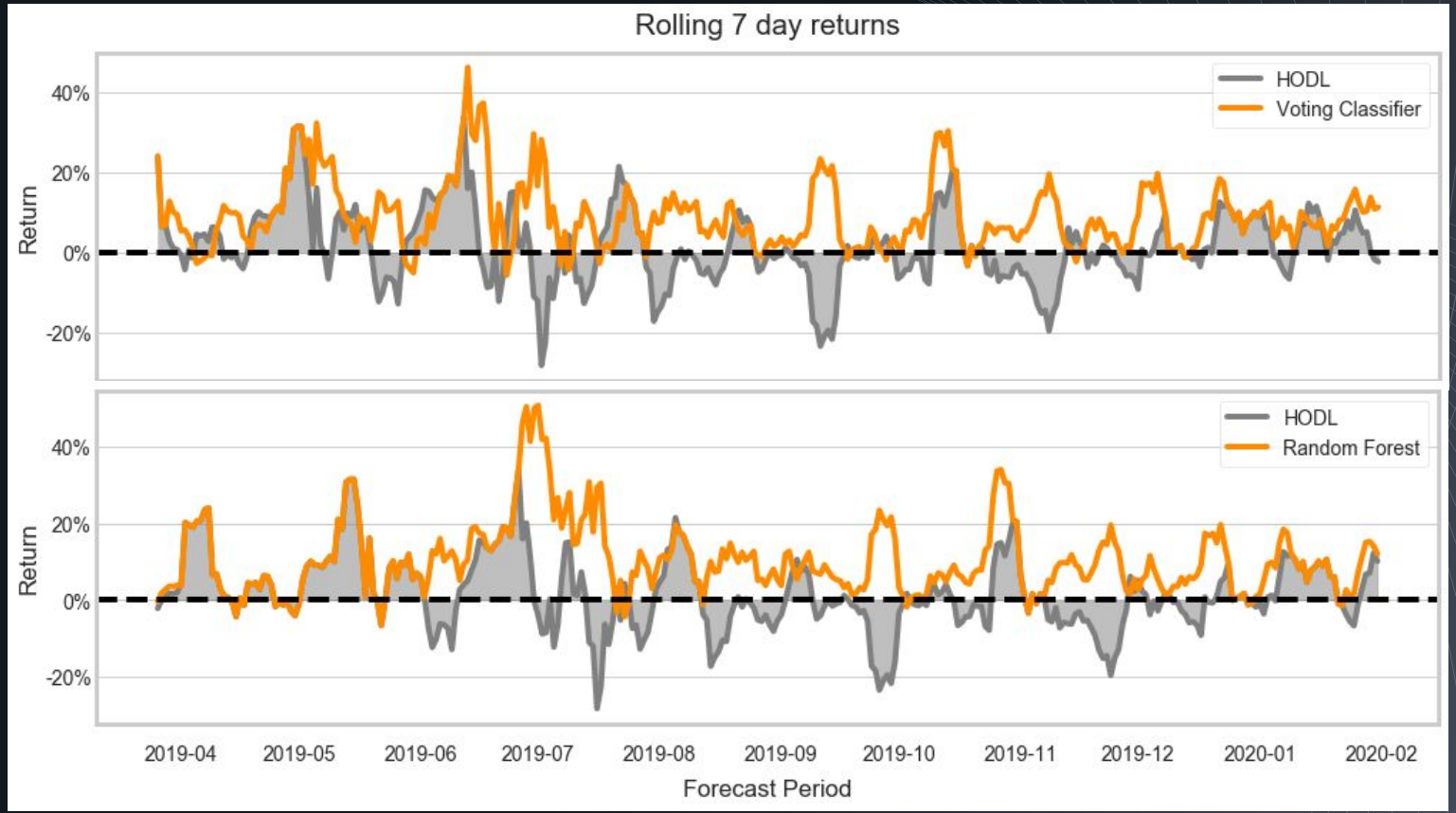
Tracking buy and sell decisions, cumulative, and rolling return



Voting Classifier buy, sell decision (buy in orange columns)



RF Classifier buy, sell decision (buy in orange columns)

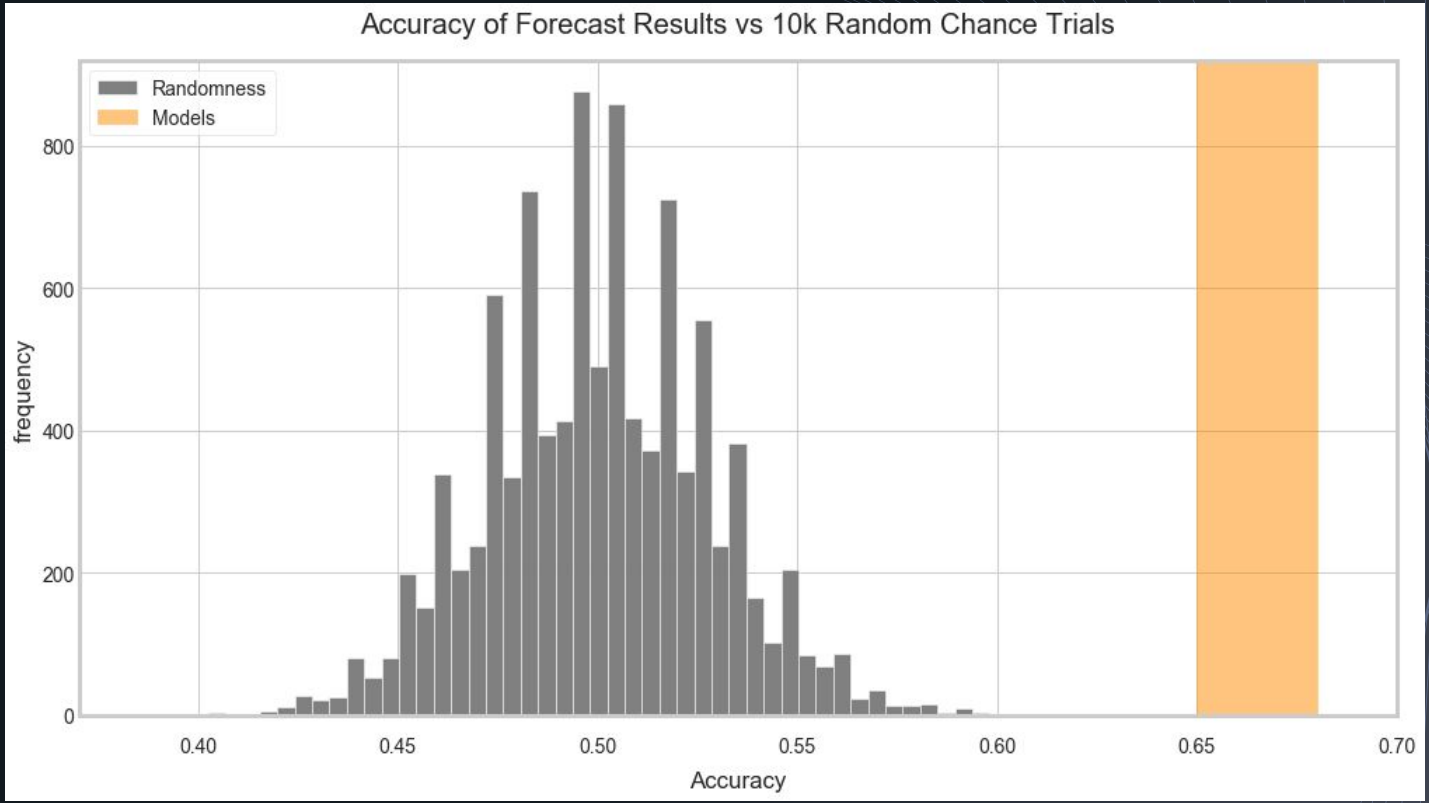


Note: forecast timeline varies slightly between models

2.

Randomness Simulation

Model accuracy versus random chance



Model accuracy range is significantly different from chance

3.
Unpacking Accuracy

Model accuracy, strengths, and tradeoffs

Voting Classifier Results

	Predicted Negative	Predicted Positive
Actual Negative	**33%**	**15%**
Actual Positive	**20%**	**32%**

65%

Total Accuracy

Insight

The ARIMAX-based ensamble is best at minimizing False Positives. This is ideal if the goal is to minimize loss.

Random Forest Results

	Predicted Negative	Predicted Positive
Actual Negative	**30%**	**19%**
Actual Positive	**13%**	**38%**

68%

Total Accuracy

Insight

The tree-based ensemble is best at minimizing False Negatives. This is ideal if the goal is to maximize appreciation.

365%

On average, trading models yield +1% daily return above bitcoin

Thanks!

Any questions?

You can reach me at achildress83@gmail.com