
HYBRID SENTIMENT-MOMENTUM STRATEGY IN CRYPTOCURRENCY MARKET

YANG (ALLEN) WANG (12211975)

HUIJIE (CYNTHIA) REN (12214286)

MINGHAO (KRYSTAL) ZHANG (12213916)

HYBRID SENTIMENT-MOMENTUM STRATEGY

- Combining a momentum trading strategy and market sentiment analysis, the Hybrid Sentiment-Momentum strategy understands sentiment by mining news data to identify positions in a dynamic momentum portfolio formed of 6 cryptocurrencies
- Daily updated portfolio assets and long/short positions of the portfolio
- Robust investment rationale backed by solid mathematical foundation
- Backtesting period: Dec. 17th 2017 to May 2nd 2019
- Cumulative return of 229%
- Sharpe Ratio of 2.68

INVESTMENT UNIVERSE & ASSETS

The investment universe consists of assets that:

- ❑ have relatively long trading history and large market capitalizations
- ❑ have 13 coins in total

Bitcoin (BTC)	Dogecoin (DOGE)	Feathercoin (FTC)
IXcoin (IXC)	Litecoin (LTC)	Megacoin (MEC)
Namecoin (NMC)	Novacoin (NVC)	Nxt (NXT)
Omnicoin(OMNI)	Peercoin (PPC)	Primecoin (XPM)
XRP (XRP)		

COMPETITIVE EDGE

- ❑ Minimal requirement of computing power
- ❑ Easy to replicate: only simple and basic econometric and regression techniques used
- ❑ No reliance on pre-existing dictionaries which are not designed for our purpose
- ❑ Double dynamic adjustments: dynamic position sizing based on market conditions and dynamic asset allocation based on coins' past performances
- ❑ Not constrained by liquidity: cryptocurrency is highly divisible

MODEL CONSTRUCTION

PORTFOLIO ASSET ALLOCATION

- ❑ Guided by trend following trading by Richard Donchian, which has been popular since mid 20th
- ❑ Model parameters:
 - ❑ n: number of coins; n=3
 - ❑ d: look-back window; d=60
- ❑ Apply momentum by
 - ❑ Ranking coins based on past performances
 - ❑ Building portfolios that take long and short positions in 3 best-performing and worst-performing coins of the day respectively

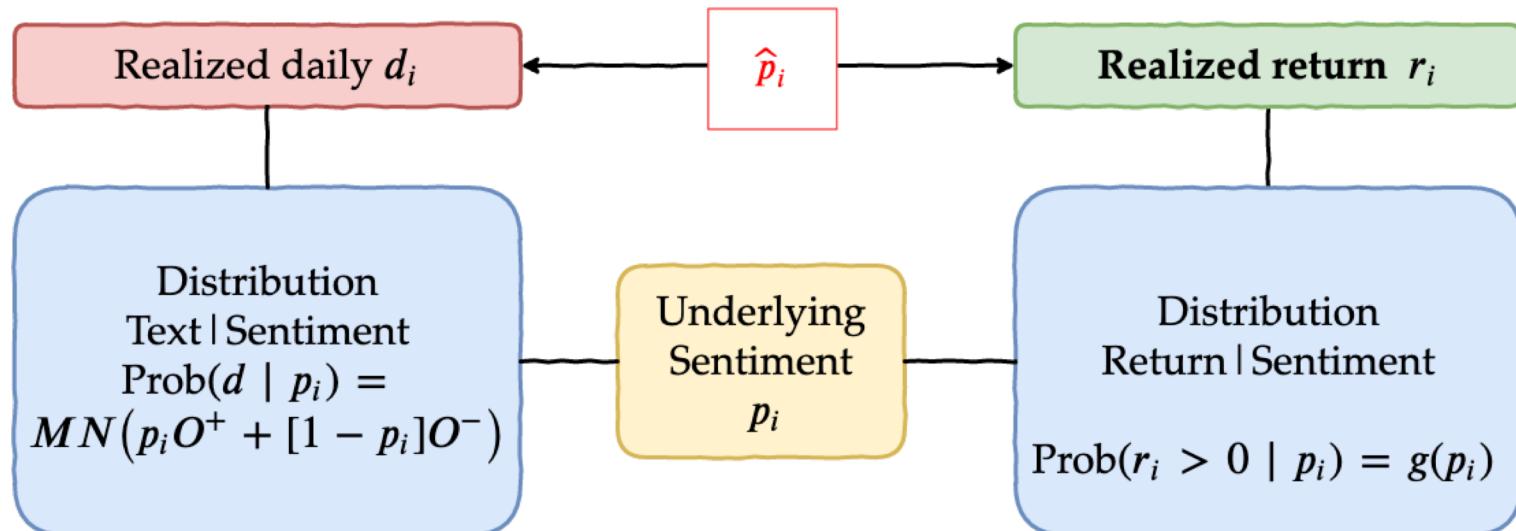
MODEL CONSTRUCTION

POSITION SIDES AND SIZES DETERMINATION

- ❑ Inspired by a new study using textual data to predict asset returns (Ke, Kelly and Xiu, 2019)
- ❑ Simple but robust estimation by regression that overcomes difficulties in finding analytical solutions which exist in other estimation methods such as MLE
- ❑ Our model solves a supervised learning problem, with:
 - ❑ Input: sentiment-charged words from all posts of a day
 - ❑ Label: corresponding daily return
- ❑ We then have only 3 steps in our strategy:
 - ❑ Train the model using in-sample input & label
 - ❑ Predict out-of-sample labels
 - ❑ Trade based on predicted labels

MODEL CONSTRUCTION

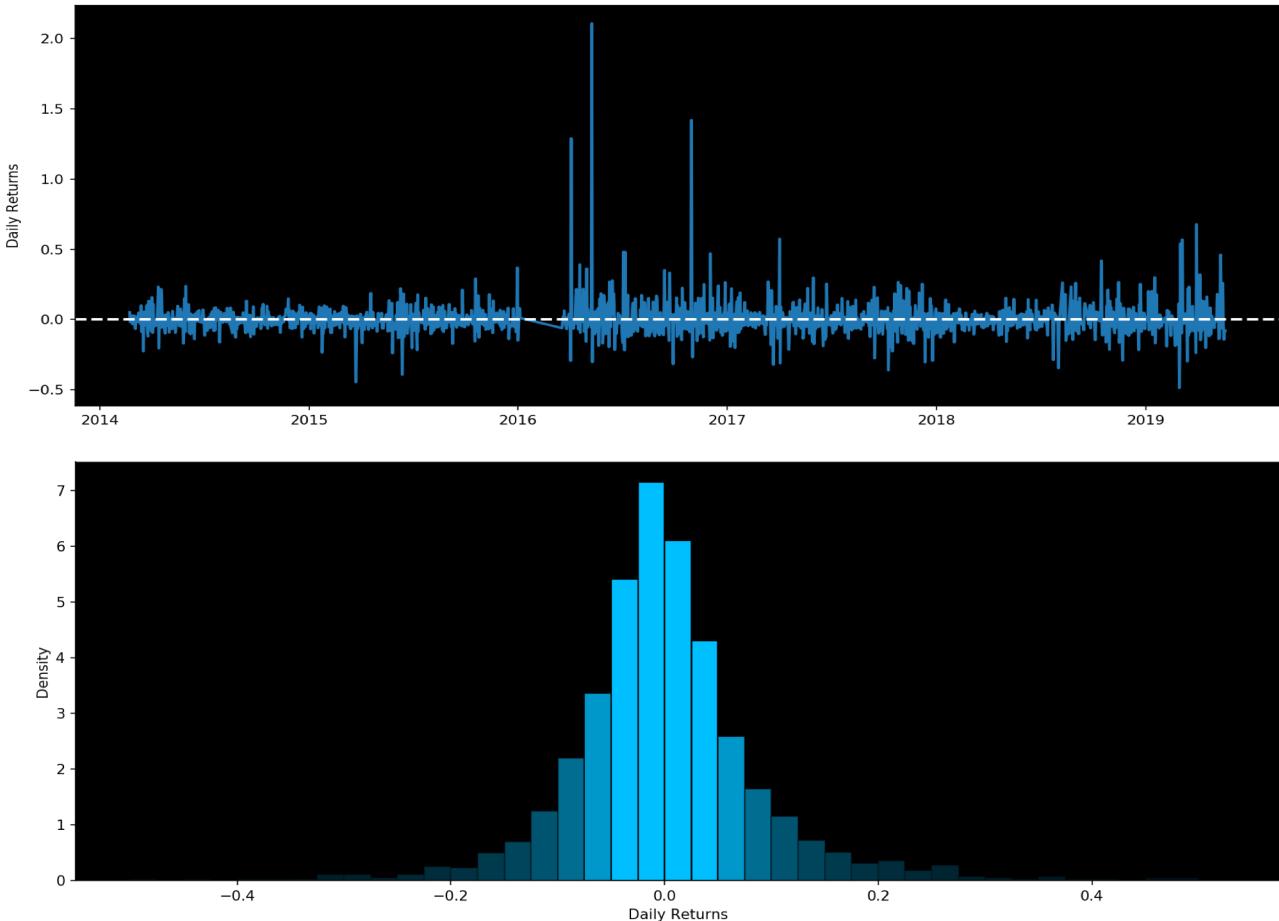
POSITION SIDES AND SIZES DETERMINATION



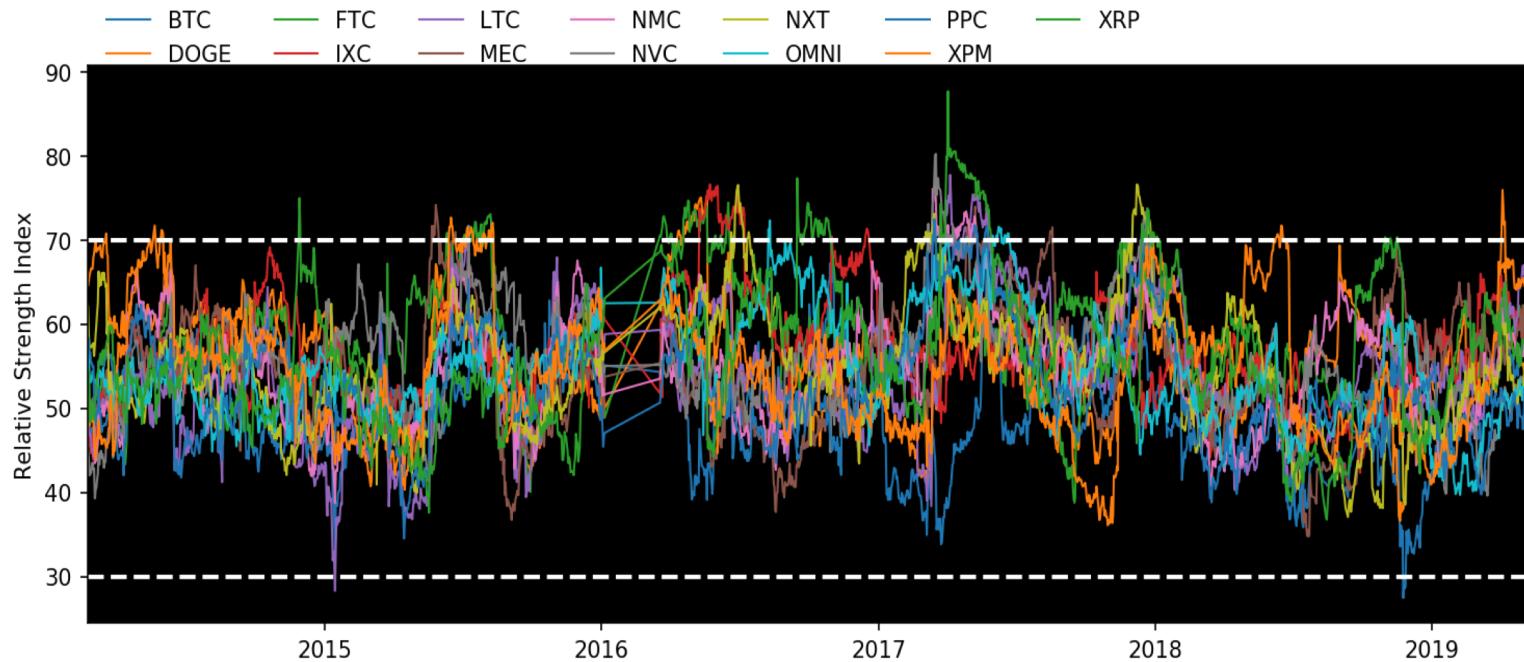
EMPIRICAL EXPLORATION

- ❑ Does momentum strategy by itself work in cryptocurrency market?
- ❑ What words make the greatest impact in cryptocurrency news articles?

MOMENTUM STRATEGY



RSI OF THE CRYPTOCURRENCIES



MOST IMPACTFUL WORDS



IMPLICATIONS

- ❑ Momentum strategy does not generate good returns
- ❑ RSI does not suggest strong and long-lasting momentum in any coins
- ❑ Some positive and negative words are beyond expectation

OUR IMPLEMENTATION

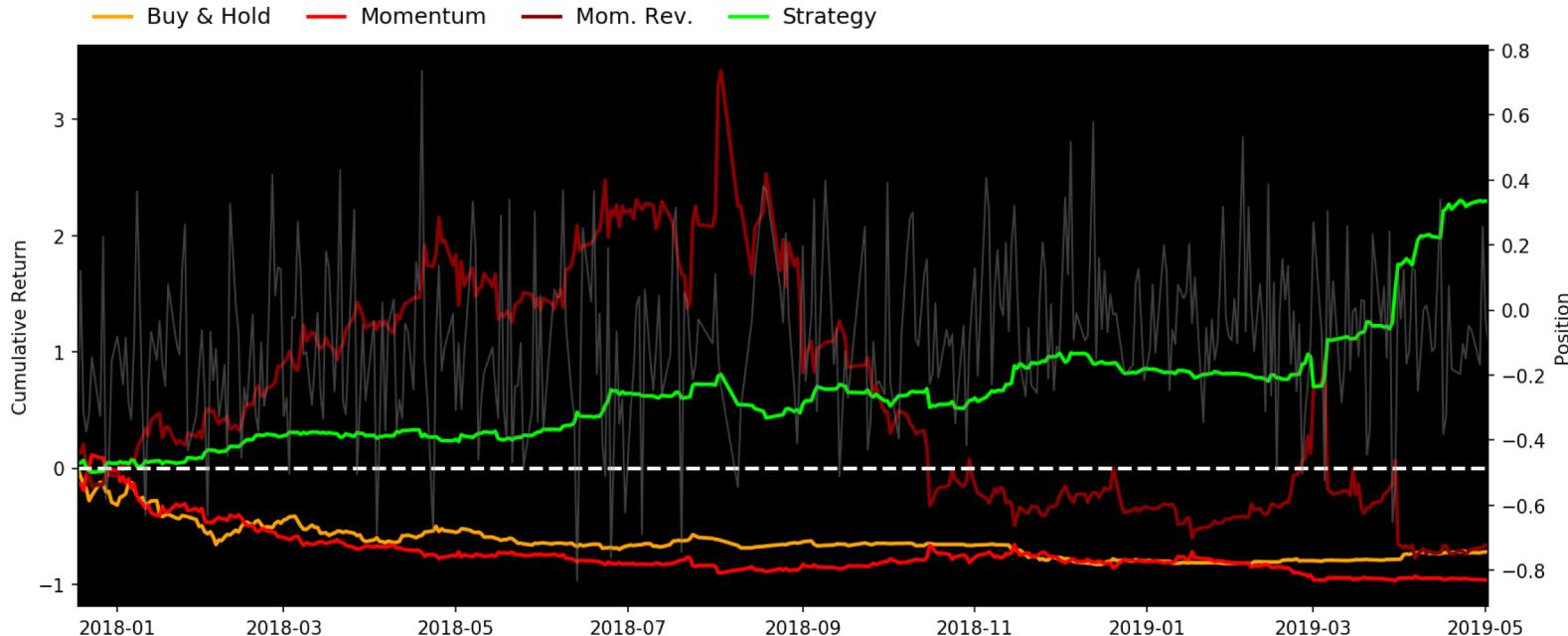
- ❑ Momentum strategy does not perform well by itself, thus we implement a hybrid strategy by
 - ❑ Forming a portfolio based on coins' momentum (long positions in 3 best-performing coins and short positions in 3 worst-performing coins)
 - ❑ Using regression to score sentiment of news data
 - ❑ Determining how many units of the portfolio to buy or sell based on sentiment score
- ❑ We enter and exit the positions at a pre-specified time (24:00:00 UTC) every day

BENCHMARK

- ❑ Buy & hold:
 - ❑ Asset: bitcoin (BTC)
 - ❑ Positions: buy 1 unit and hold for the whole investing period
- ❑ Momentum:
 - ❑ Assets: dynamic portfolio formed by 3 best-performing and 3 worst-performing coins in the 60-day look-back window
 - ❑ Positions: buy 1 unit in each of the 3 best-performing coins and sell 1 unit in each of the 3 worst-performing coins
- ❑ Momentum reversal:
 - ❑ Assets: same as momentum strategy
 - ❑ Positions: opposite of momentum strategy

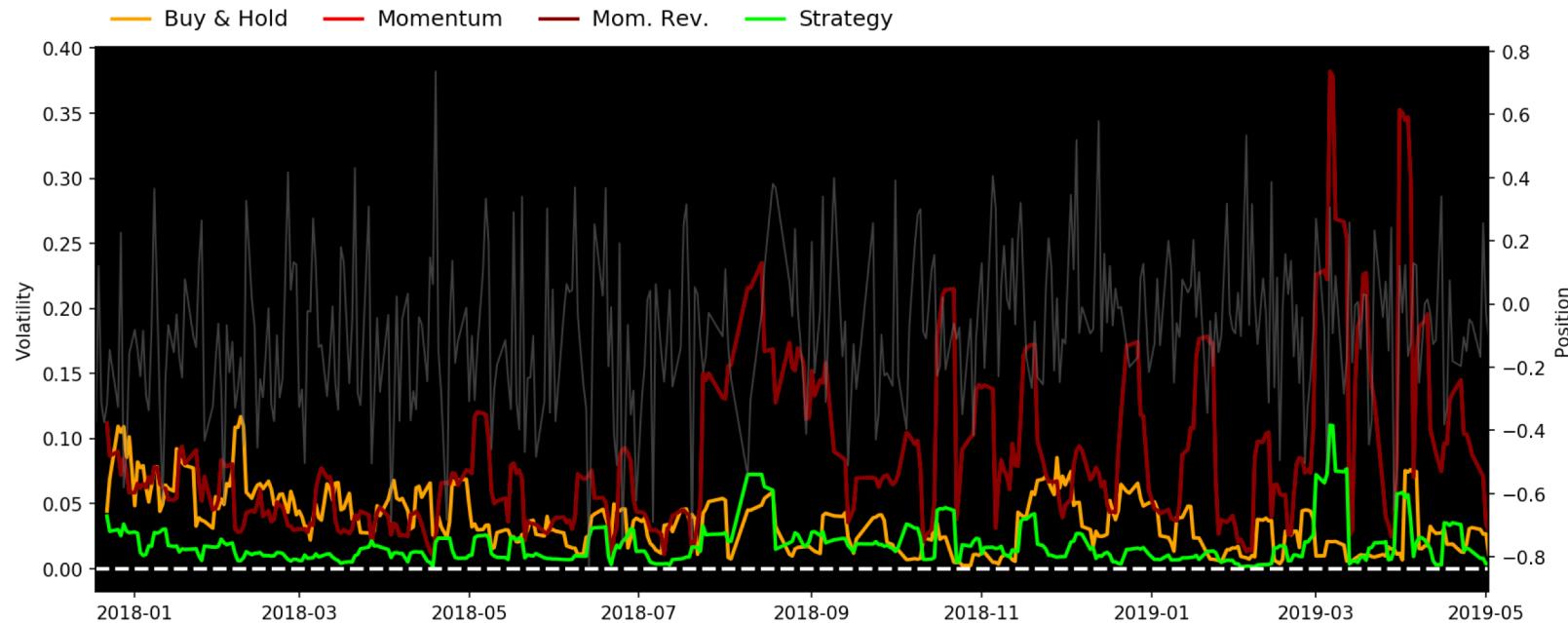
BACKTESTING RESULTS

CUMULATIVE RETURN



BACKTESTING RESULTS

VOLATILITY (STANDARD DEVIATION)



BACKTESTING RESULTS

RATIOS

Statistics	Buy & Hold	Momentum	Mom. Rev.	Strategy
Cum Return	-0.713248	-0.959112	-0.663489	2.296490
Volatility	0.043172	0.100148	0.100148	0.023350
Win Percentage	0.524051	0.437975	0.562025	0.536709
Sharpe	-0.975205	-0.605331	0.605331	2.677082
MDD	0.826419	0.970956	0.947963	0.206906

RISK MANAGEMENT

BY PORTFOLIO STRUCTURE

- ❑ Dynamic selection of assets
- ❑ Avoid accumulating losses
- ❑ Diversified portfolio of long and short positions
- ❑ No leverage

RISK MANAGEMENT

BY PROCESS

- Daily update of positions
 - Exit current positions
 - Adjust positions based on news in the past 24 hours
- Stop-loss
 - Stop-loss feature embedded

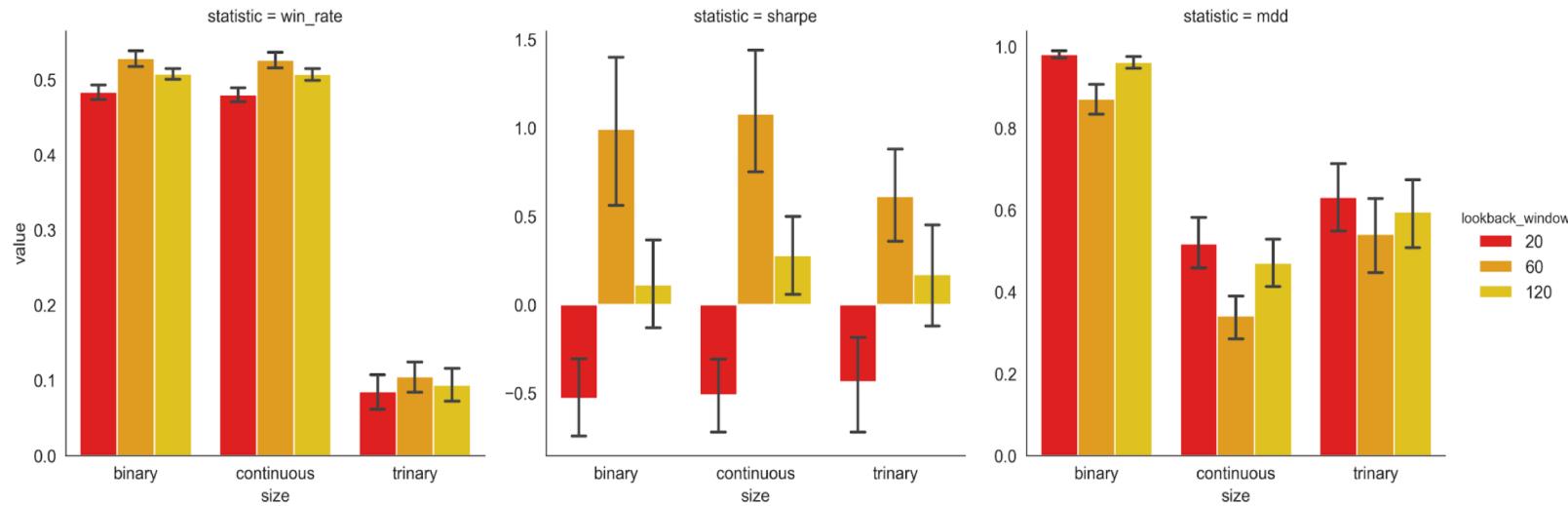


THANK YOU!



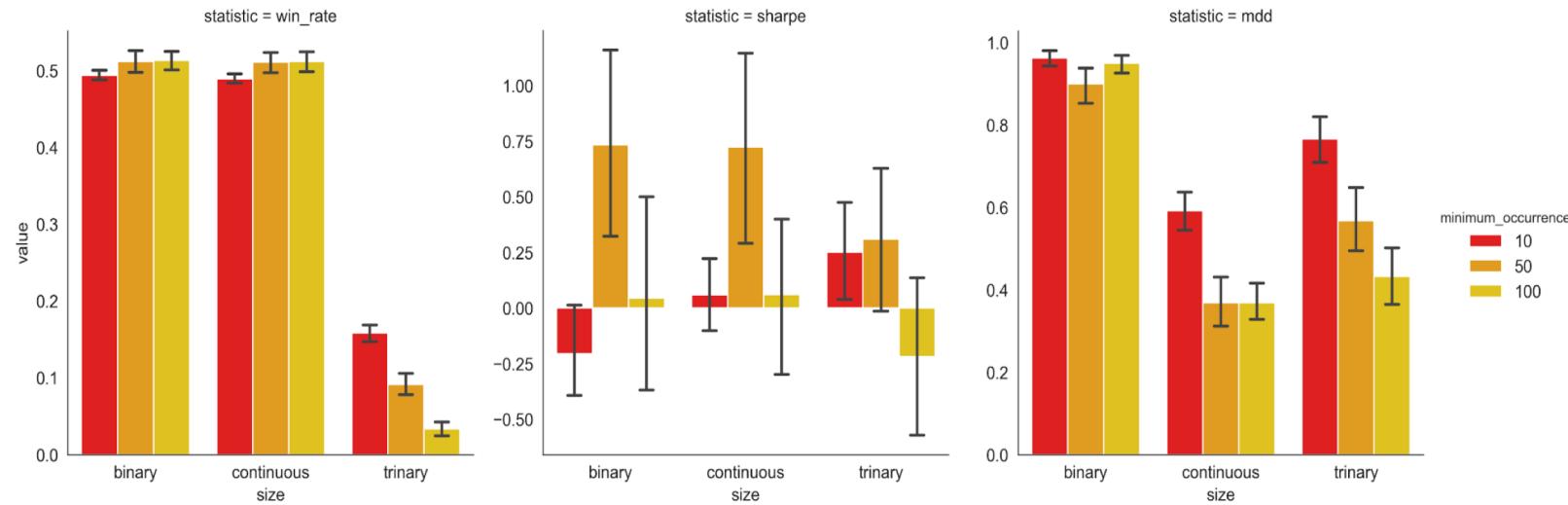
APPENDIX

MODEL SENSITIVITY TO LOOKBACK WINDOW



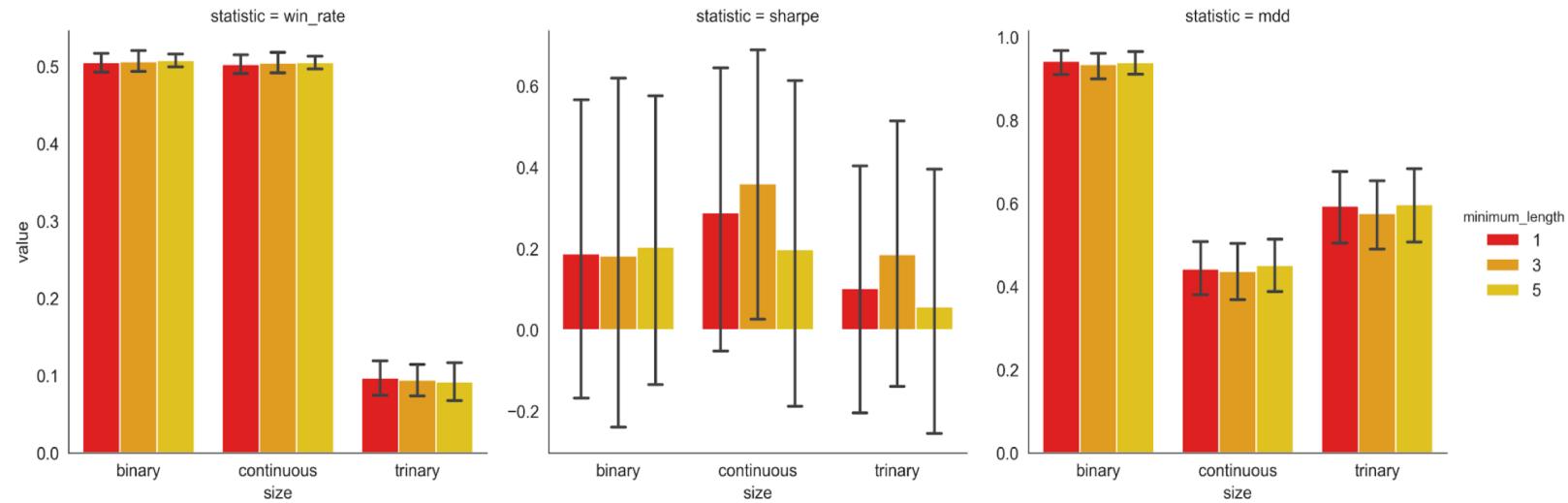
APPENDIX

MODEL SENSITIVITY TO MINIMUM OCCURRENCE



APPENDIX

MODEL SENSITIVITY TO MINIMUM LENGTH



APPENDIX

MODEL SENSITIVITY TO ALPHA

