REIT ETF Forecasting

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What is REIT ETF?

Real Estate Investment Trust Exchange-Traded Funds

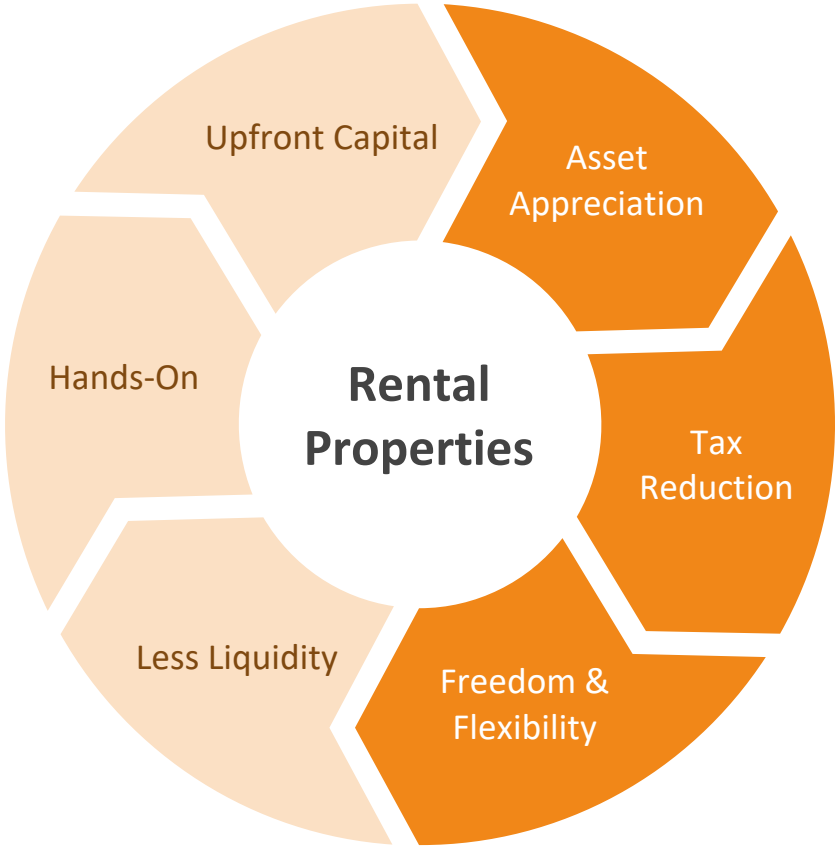
REIT

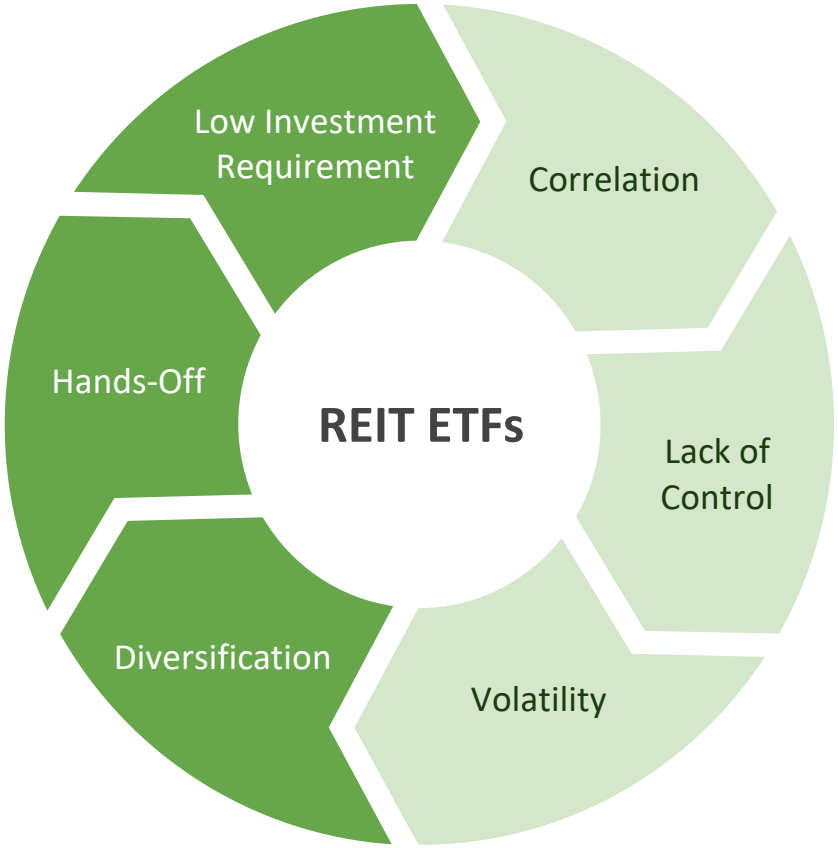
- Owns and/or manage income producing commercial real estate
- Pay 90% of income to shareholders as dividends quarterly

ETF

- Basket of securities that trade on an exchange, just like a stock

Real Estate Investment





Business Goal

Predict future price and movement through machine learning.

Data and Methods

yahoo! finance

1 **Regression**

- 15 REIT ETFs
- Initial approach → VNQ

2 **Classification**

- Train, Validation, and Test
- LSTM model ***regression***
- NuSVC model for ***classification***

Model Evaluation (Regression)

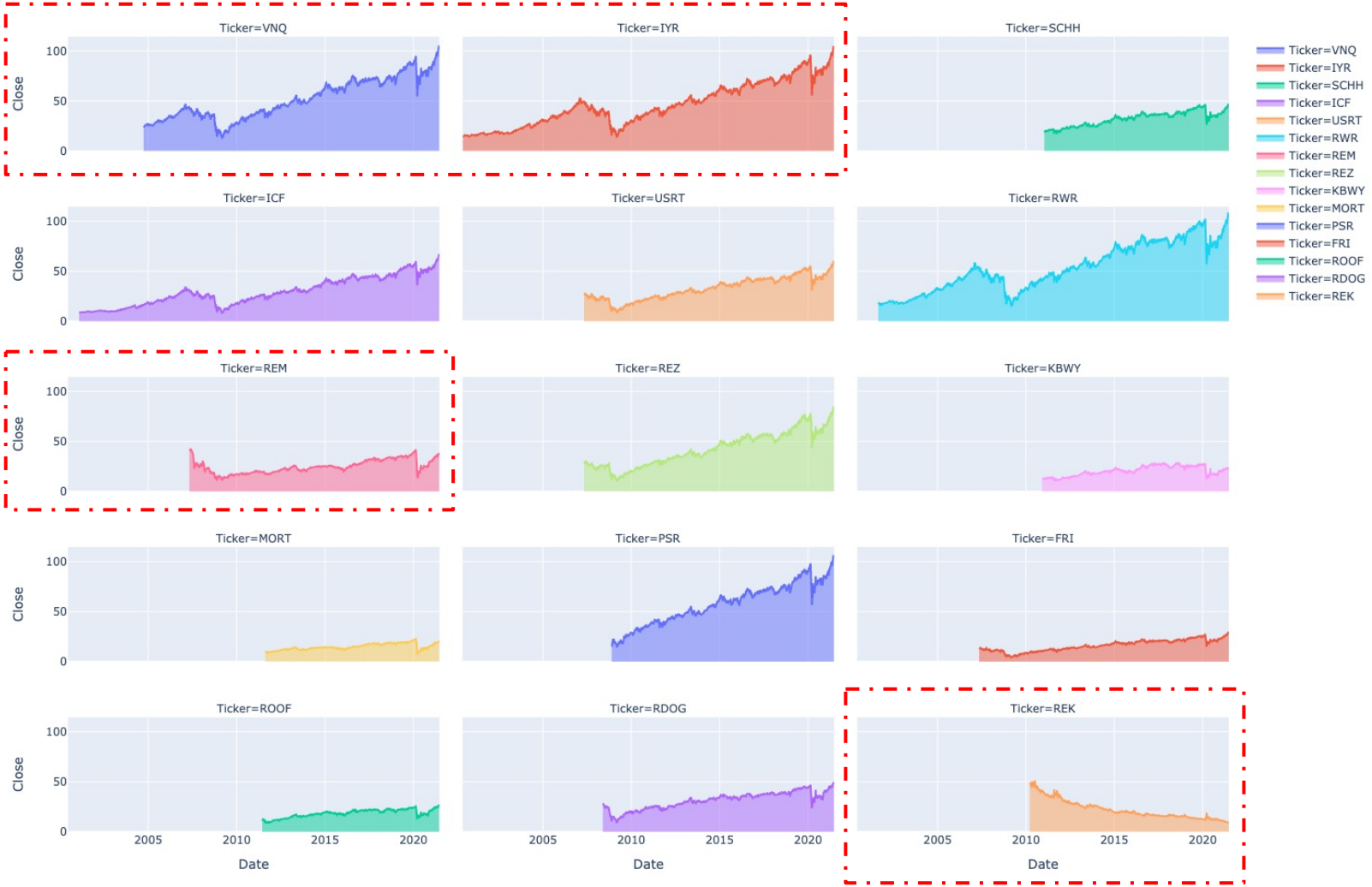
$MAE, RMSE$

- Lower value indicates prediction is close to the actual

R^2

- Between 0 and 1, with 1 being perfect

	MAE	$RMSE$	R^2
VNQ	0.7335	0.9228	0.7897
IYR	0.6964	0.8815	0.7768
SCHH	0.3267	0.4127	0.7970
ICF	0.4575	0.5758	0.8336
USRT	0.4590	0.5658	0.8040
RWR	0.8603	1.0646	0.7603
REM	0.3174	0.3787	0.6797
REZ	0.5915	0.7644	0.7894
KBWY	0.2171	0.2735	0.6631
MORT	0.1721	0.2105	0.6827
PSR	0.7245	0.8927	0.8320
FRI	0.2160	0.2672	0.8124
ROOF	0.2576	0.3274	0.7859
RDOG	0.4261	0.5212	0.7853
REK	0.1128	0.1342	0.4256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Ticker=IYR
Ticker=SCHH
Ticker=ICF
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Ticker=REZ
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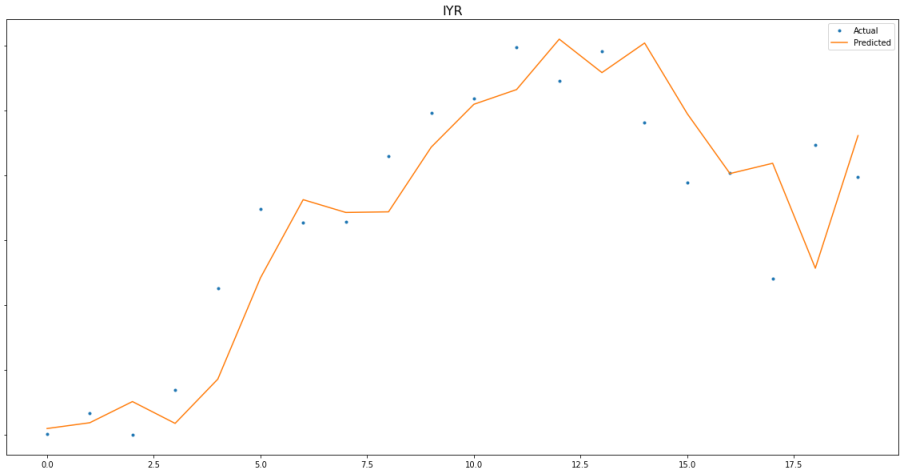
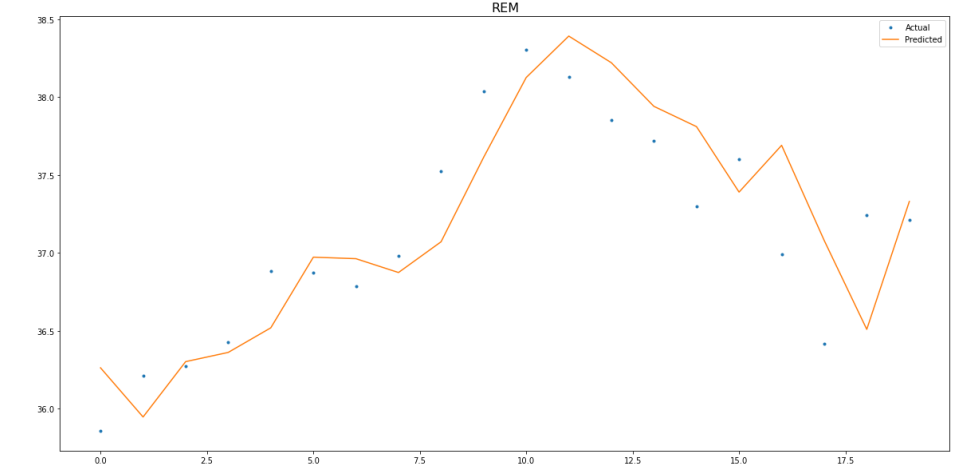
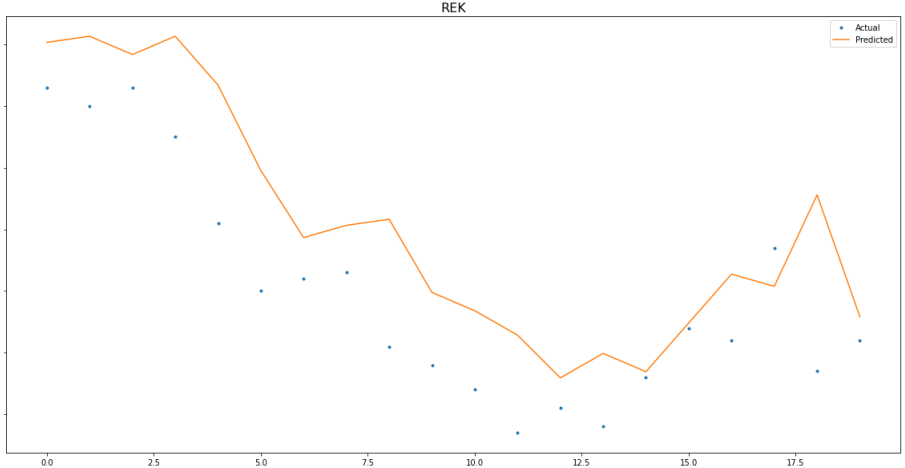
Ticker=MORT
Ticker=PSR
Ticker=FRI
Ticker=ROOF
Ticker=RDOG
Ticker=REK
Close
Date
0
50
100
2005
2010
2015
2020

VNQ
Actual
Predicted


IYR
Actual
Predicted


REM
Actual
Predicted


REK
Actual
Predicted

Model Evaluation (Classification)

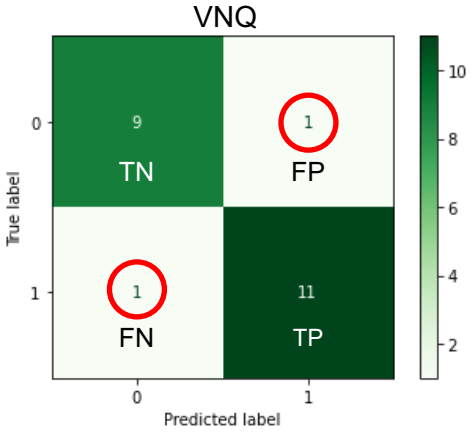
$Accuracy$:

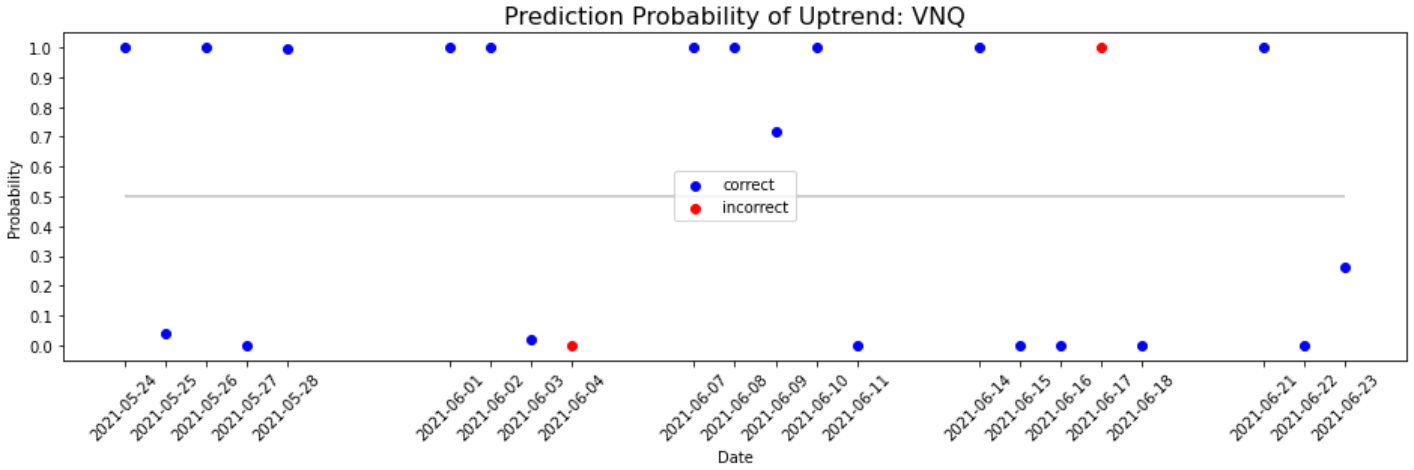
- Lower value indicates prediction is close to the actual

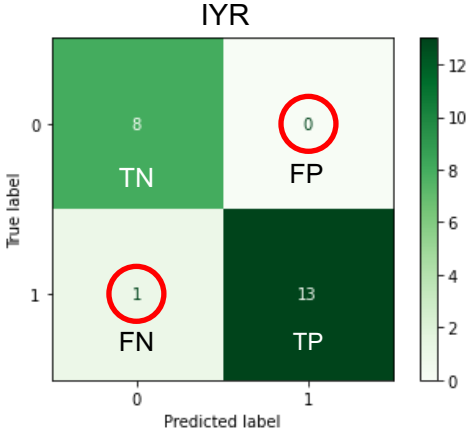
$F1$

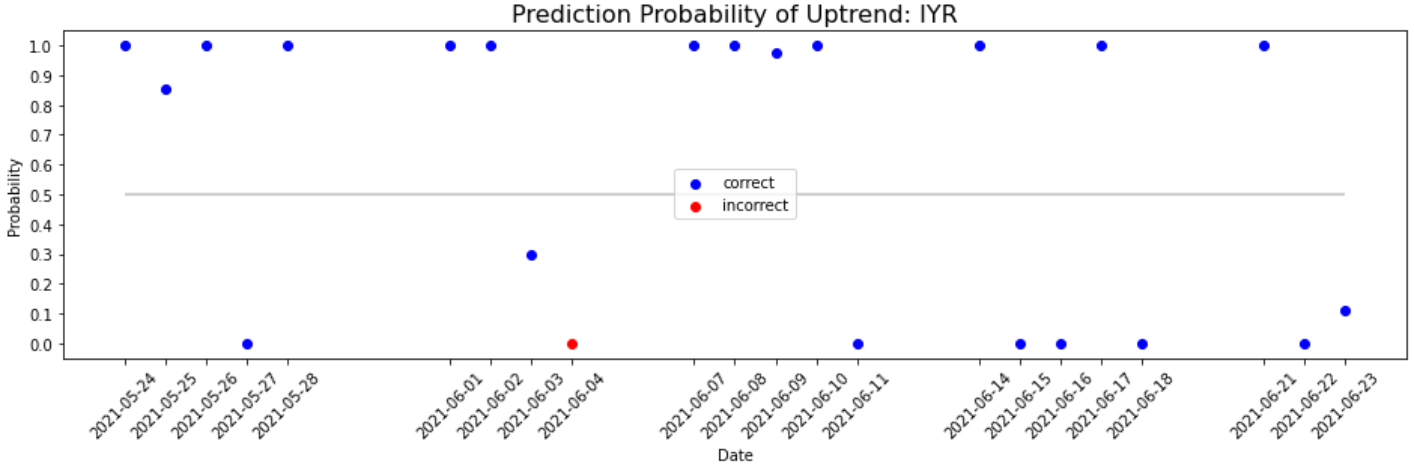
- Higher the score, less the false negatives and false positives

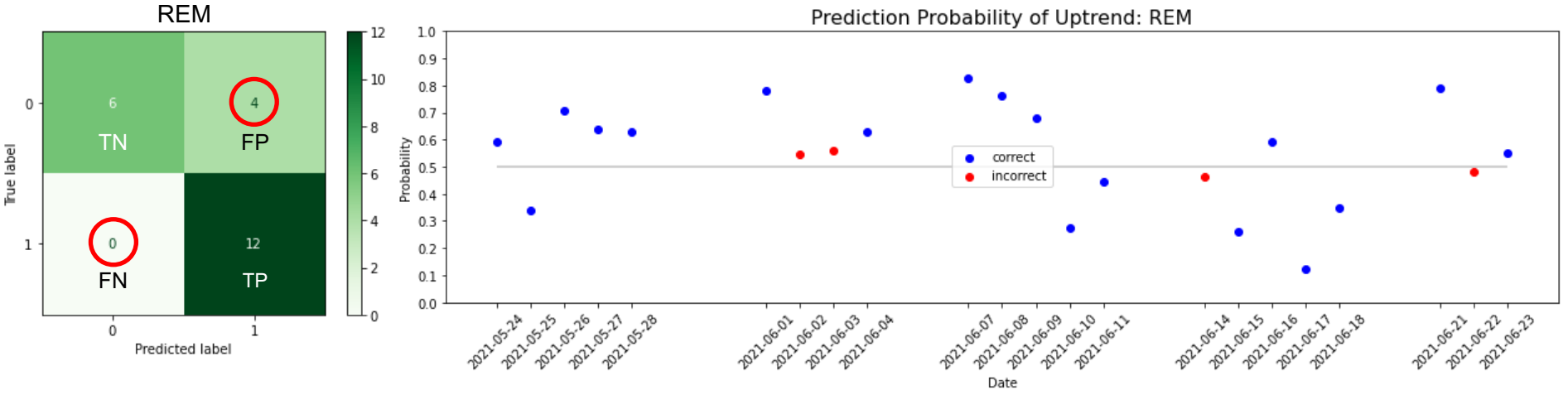
	$Accuracy$	$F1(0)$	$F1(1)$
VNQ	0.9091	0.90	0.92
IYR	0.9545	0.94	0.96
SCHH	0.9091	0.88	0.93
ICF	0.7727	0.74	0.80
USRT	0.9545	0.96	0.95
RWR	0.9545	0.95	0.96
REM	0.8182	0.75	0.86
REZ	0.9091	0.89	0.92
KBWY	0.5000	0.00	0.67
MORT	0.5455	0.00	0.71
PSR	0.9091	0.86	0.93
FRI	0.5000	0.00	0.67
ROOF	0.5909	0.00	0.74
RDOG	0.6364	0.60	0.67
REK	0.4545	0.00	0.62

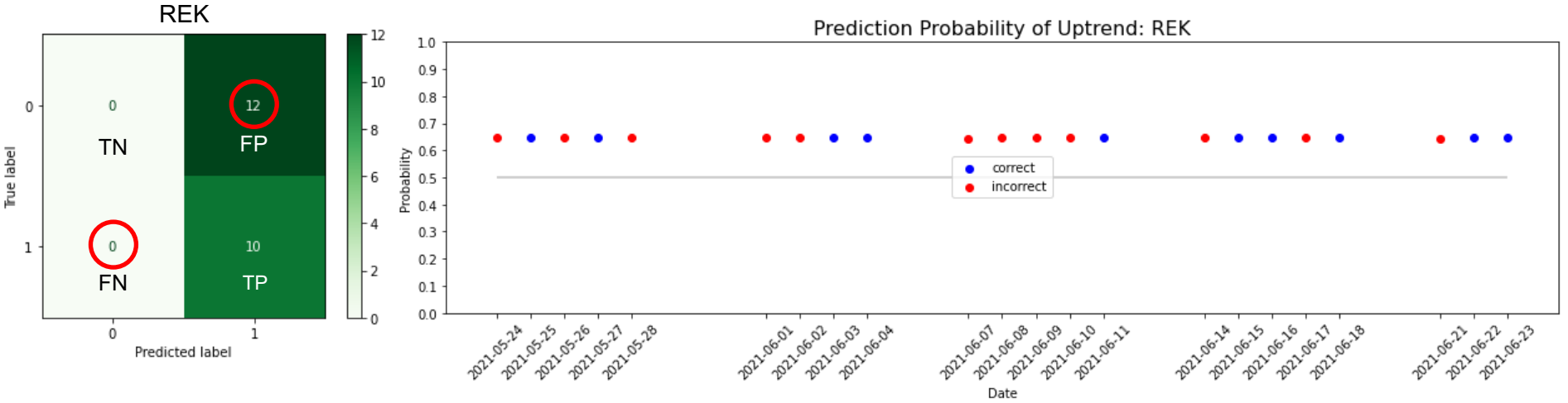

VNQ
9
TN
1
FP
1
FN
11
TP
True label
Predicted label
0
1


Prediction Probability of Uptrend: VNQ
Probability
Date
correct
incorrect


IYR
8
TN
0
FP
1
FN
13
TP
True label
Predicted label
0
1


Prediction Probability of Uptrend: IYR
Probability
Date
correct
incorrect


REM
6
TN
4
FP
0
FN
12
TP
True label
Predicted label
Prediction Probability of Uptrend: REM
correct
incorrect
Probability
Date


REK
0
TN
12
FP
0
FN
10
TP
True label
Predicted label
Prediction Probability of Uptrend: REK
correct
incorrect
Probability
Date

Conclusion

Regression (LSTM)

- MAE and RMSE are relative small
- R^2 close to 1

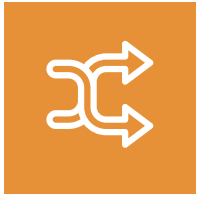
Classification (NuSVC)

- 9 out of 15 have acceptable results

Future Work

Buy/Hold/Sell

Market Sentiment



Extensive Application

Model Deployment

Thank You!

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