



REIT ETF Forecasting

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What is REIT ETF?

Real Estate Investment Trust Exchange-Traded Funds



REIT

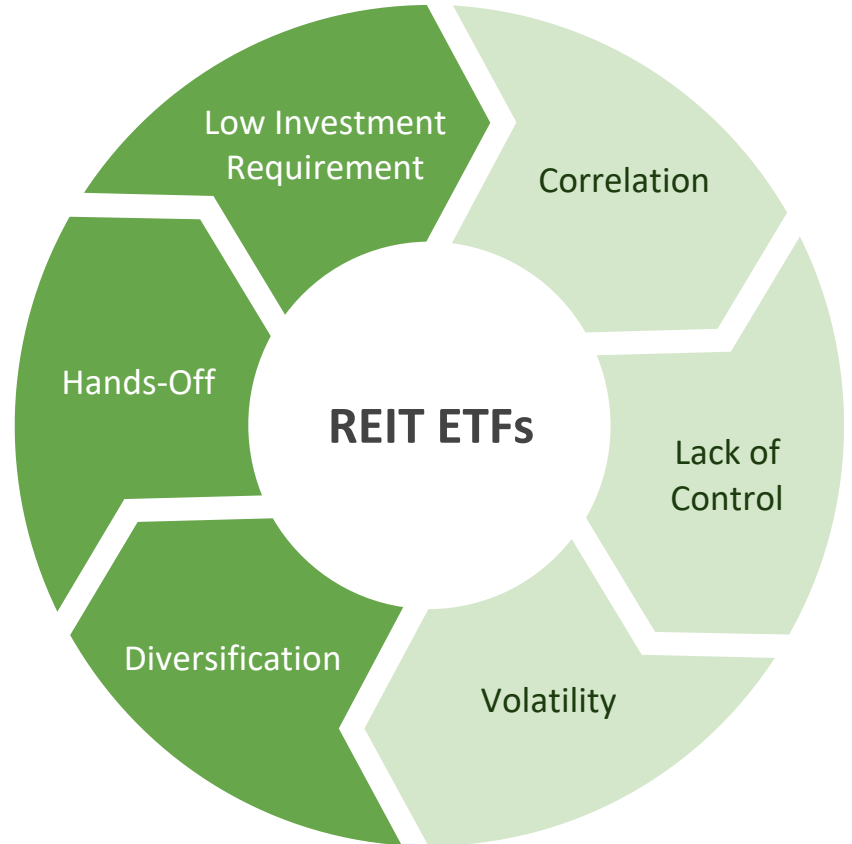
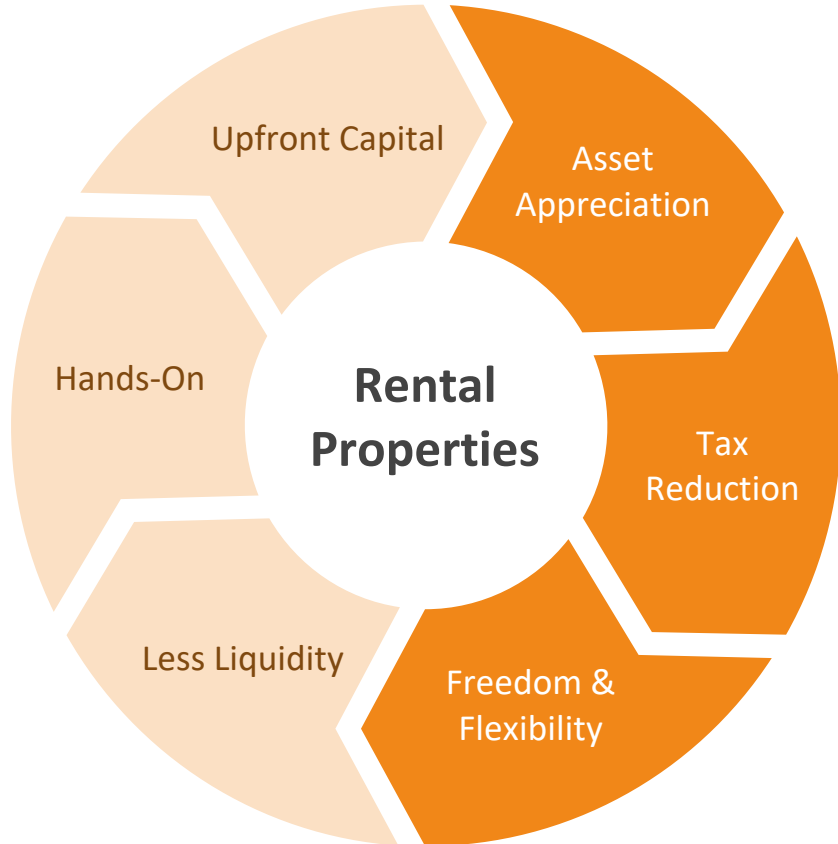
- Owns and/or manage income producing commercial real estate
- Pay 90% of income to shareholders as dividends quarterly



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



1

Regression

- \$?

- 15 REIT ETFs
- Initial approach → VNQ

2

Classification

- Up or down?

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

LSTM: long short-term memory

NuSVC: nu support vector machine

Model Evaluation (Regression)

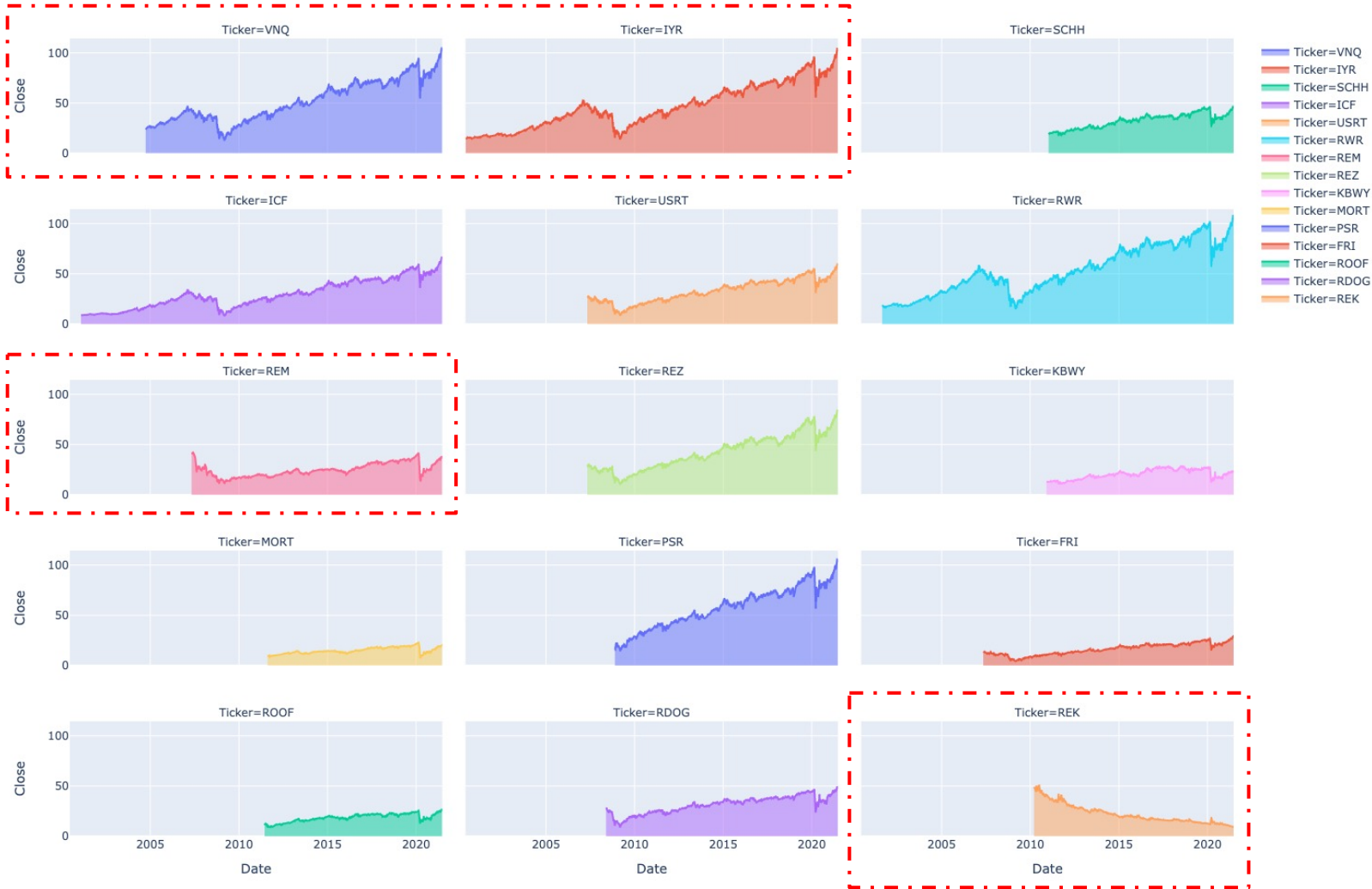
MAE, RMSE

- Lower value indicates prediction is close to the actual

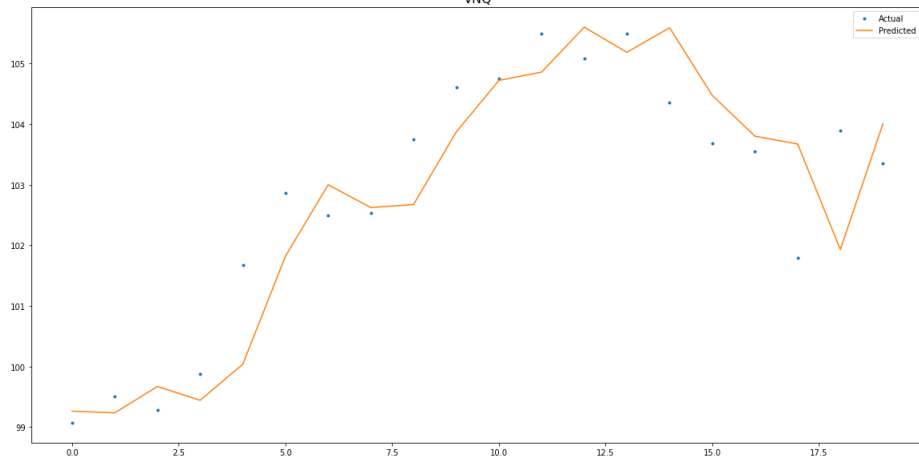
R²

- Between 0 and 1, with 1 being perfect

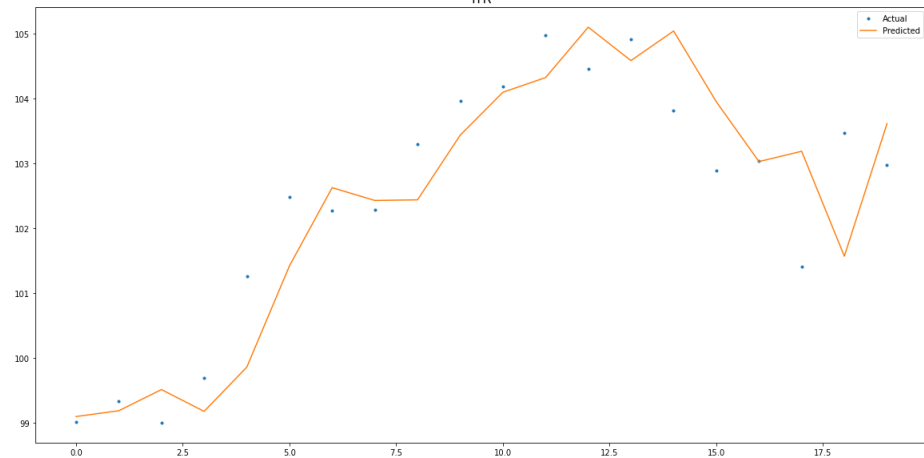
	<i>MAE</i>	<i>RMSE</i>	<i>R²</i>
VNQ	0.7335	0.9228	0.7897
IYR	0.6964	0.8815	0.7768
SCHH	0.3267	0.4127	0.7970
ICF	0.4575	0.5758	0.8336
USRT	0.4590	0.5658	0.8040
RWR	0.8603	1.0646	0.7603
REM	0.3174	0.3787	0.6797
REZ	0.5915	0.7644	0.7894
KBWY	0.2171	0.2735	0.6631
MORT	0.1721	0.2105	0.6827
PSR	0.7245	0.8927	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



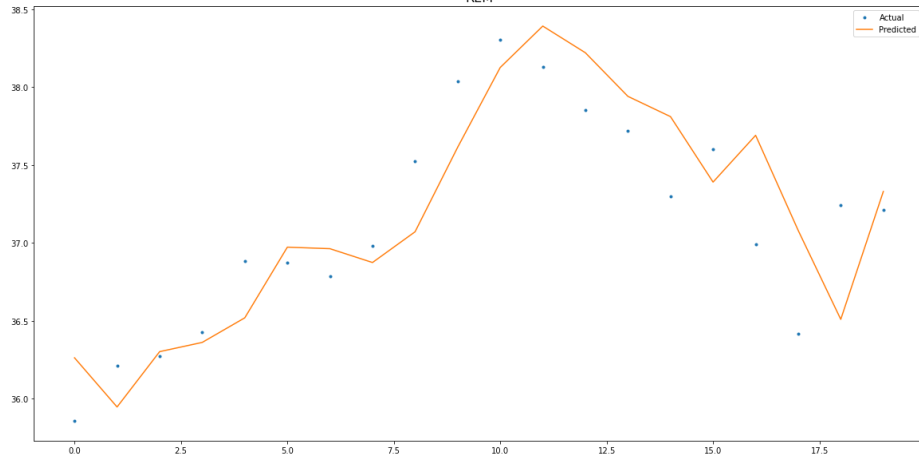
VNQ



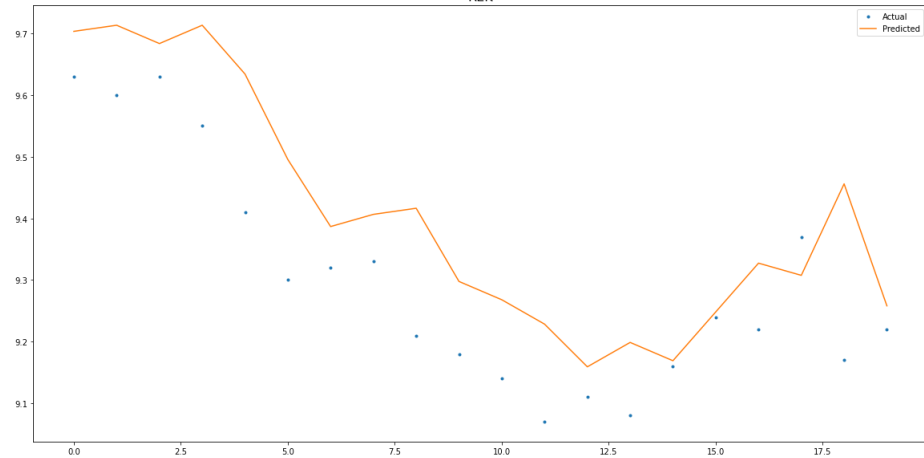
IYR



REM



REK



Model Evaluation (Classification)

Accuracy:

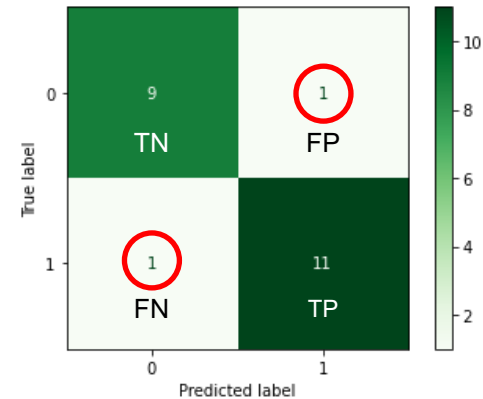
- Lower value indicates prediction is close to the actual

F1

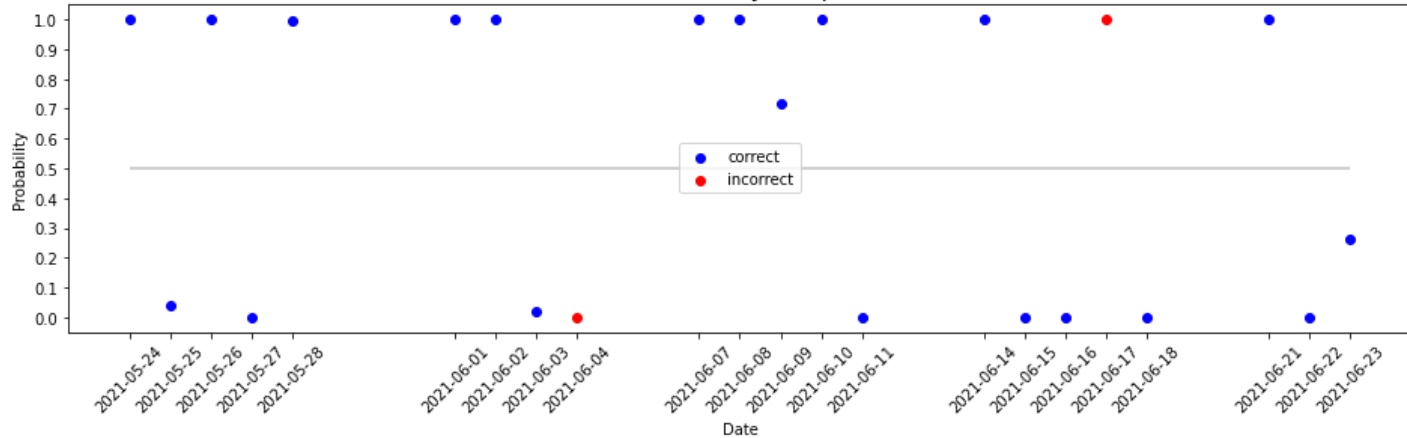
- Higher the score, less the false negatives and false positives

	<i>Accuracy</i>	<i>F1(0)</i>	<i>F1(1)</i>	
→ 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	×

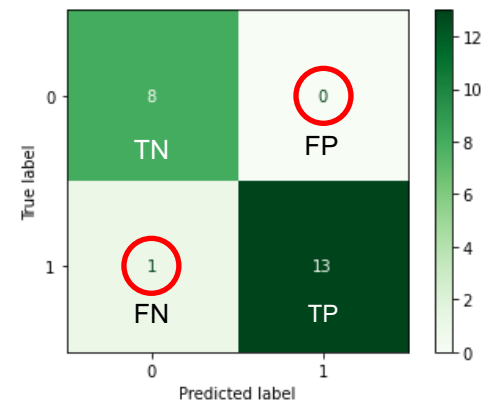
VNQ



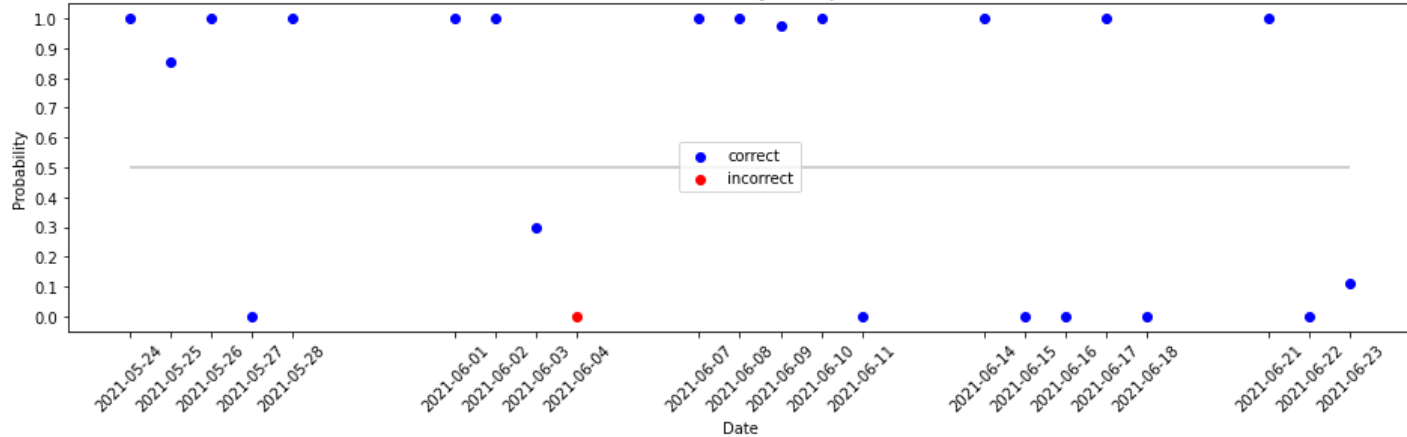
Prediction Probability of Uptrend: VNQ



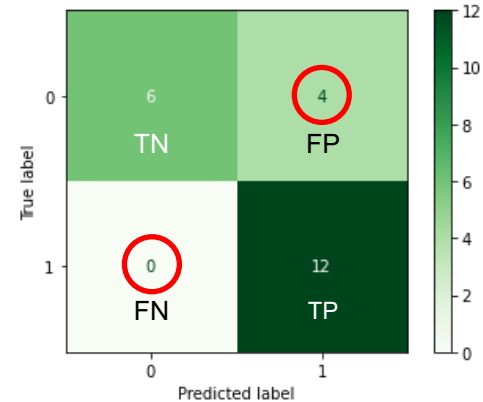
IYR



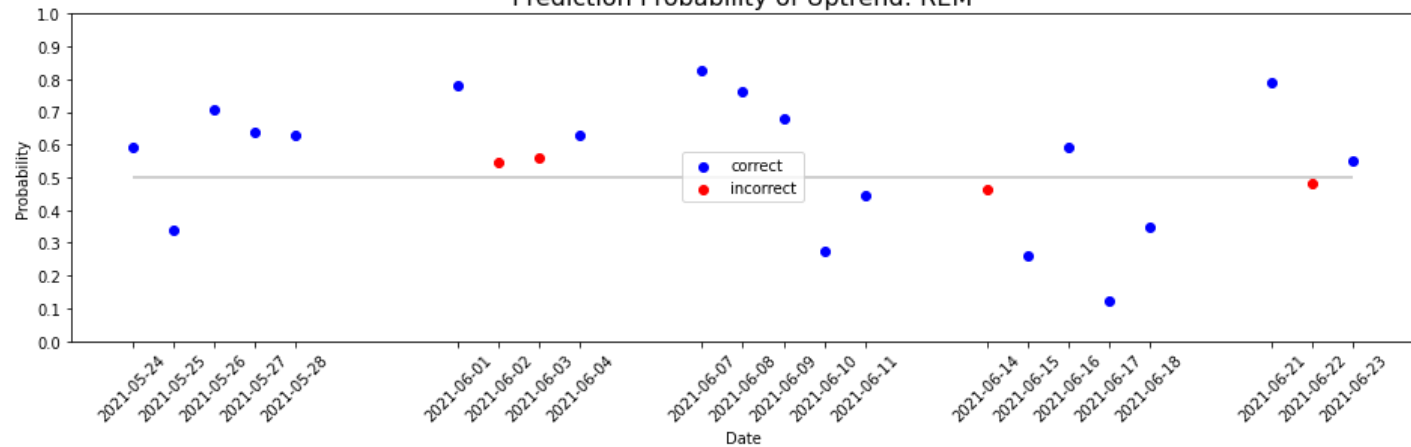
Prediction Probability of Uptrend: IYR



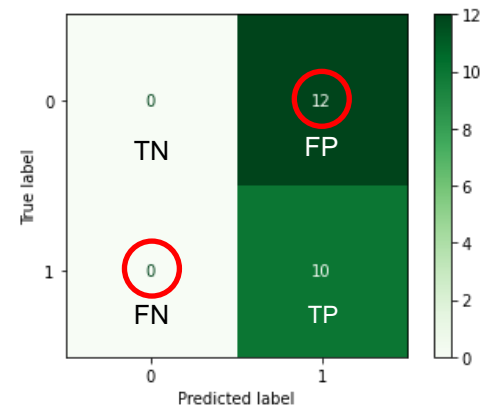
REM



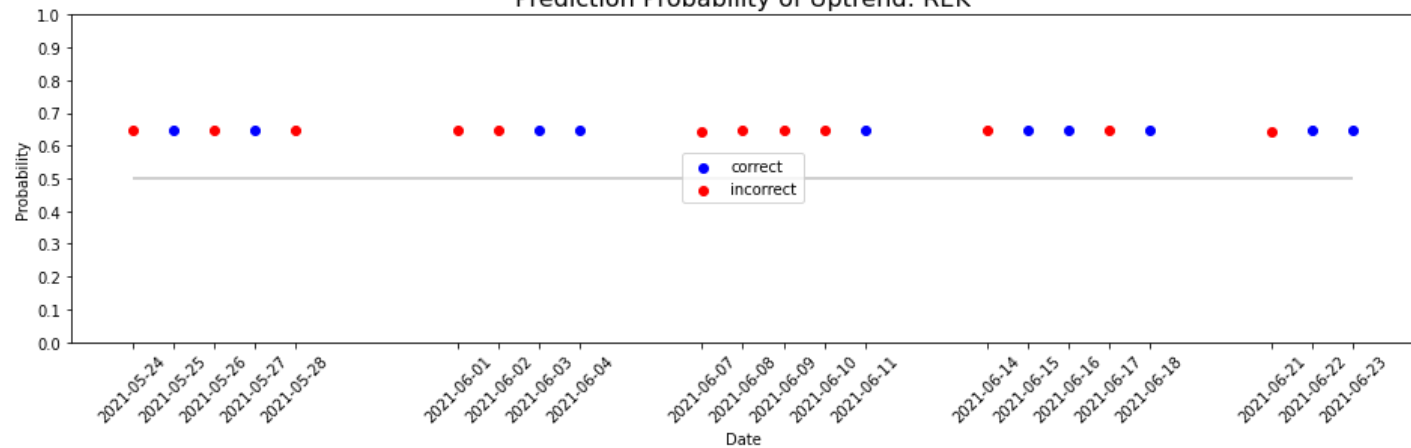
Prediction Probability of Uptrend: REM



REK



Prediction Probability of Uptrend: REK





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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