Stock AI Assistant

3nd Hons Meeting

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Project Overview

Major Change (Bad news…)

1. Shift from cloud to local computing
2. No mobile apps
3. No enough easily accessible fundamental analysis

Major Change (Good news!)

1. Focus narrowed to only technical analysis
2. Now model uses real-time technical indicators to predict stock price in the past (testing purpose), present (tomorrow), and future (multiple days in advance)
3. Evaluation infrastructure is set up

Current Progress: Summary

LSTM Training and Testing Data Preparation

1. Transform the time series data so that it is stationary.
2. Transform the observations to have a specific scale.
3. Transform the time series into a supervised learning problem

Univariate Models

1. Persistence baseline models for univariate one-step and multi-step forecasting
2. LSTM one-step forecasting (predicting stock price for one day in advance)
3. LSTM multi-step forecasting (predicting stock price for more than one day in advance)

Model Evaluation

1. Mean squared error
2. Trend accuracy (tomorrow's price is predicted to be up and the actual price is up too, thus the trend is correct)

Current Progress: Achieved

LSTM Training and Testing Data Preparation

1. Raw price data

2018-01-02	43.67
2018-01-03	44.98
2018-01-04	46.88
2018-01-05	45.80
2018-01-08	45.55
2018-01-09	42.97
2018-01-10	43.31

2. Transform the time series data so that it is stationary by differencing.

[1.31],
[1.9],
[-1.08],
[-0.25],
[-2.58],
[0.34]

3 Transform the observations to have a specific scale.

[0.73660714]
[1.]
[-0.33035714]
[0.04017857]
[-1.]
[0.30357143]

4 Transform the time series into a supervised learning problem

	var1(t-1)	var1(t)
1	0.736607	1.000000
2	1.000000	-0.330357
3	-0.330357	0.040179
4	0.040179	-1.000000
5	-1.000000	0.303571

Current Progress: Achieved

Univariate 1-step Baseline (a quick example)

Stock price prediction for MU
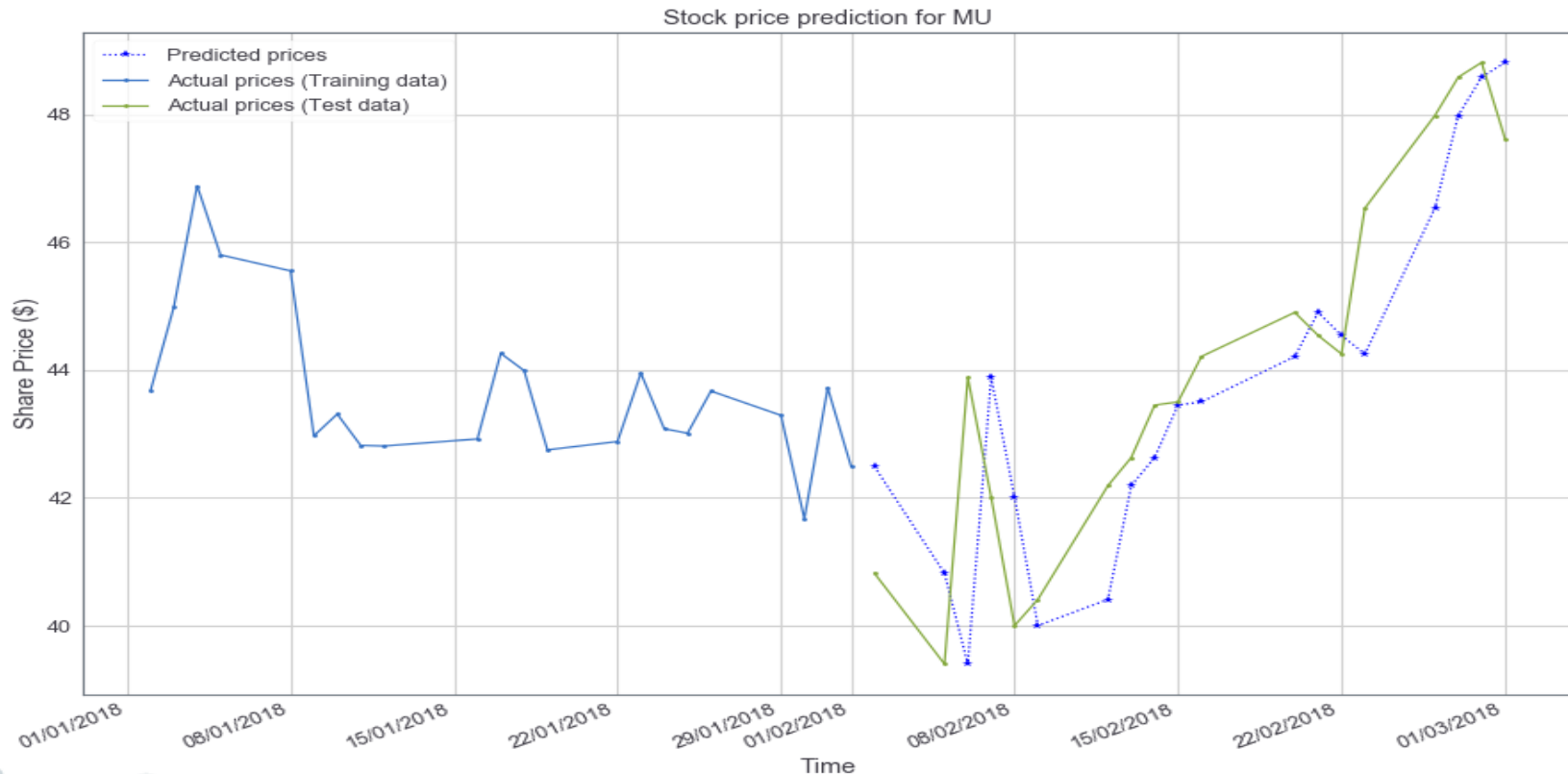
1. LSTM RMSE Score: 1.572 US dollar
2. LSTM trend Score: 0 %

Current Progress: Achieved

Univariate 1-step Baseline (more data)

Stock price prediction for MU

Legend:
- Predicted prices
- Actual prices (Training data)
- Actual prices (Test data)
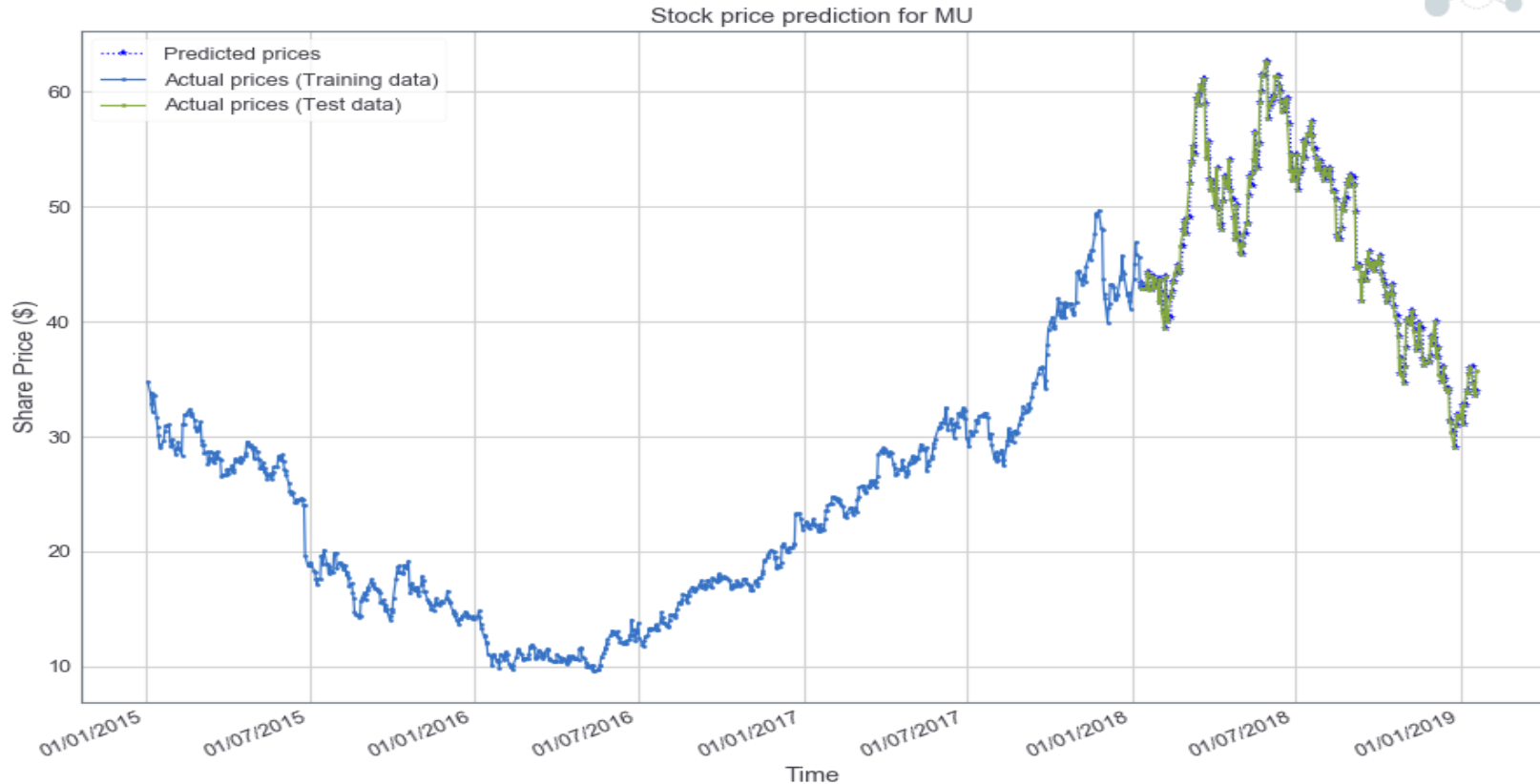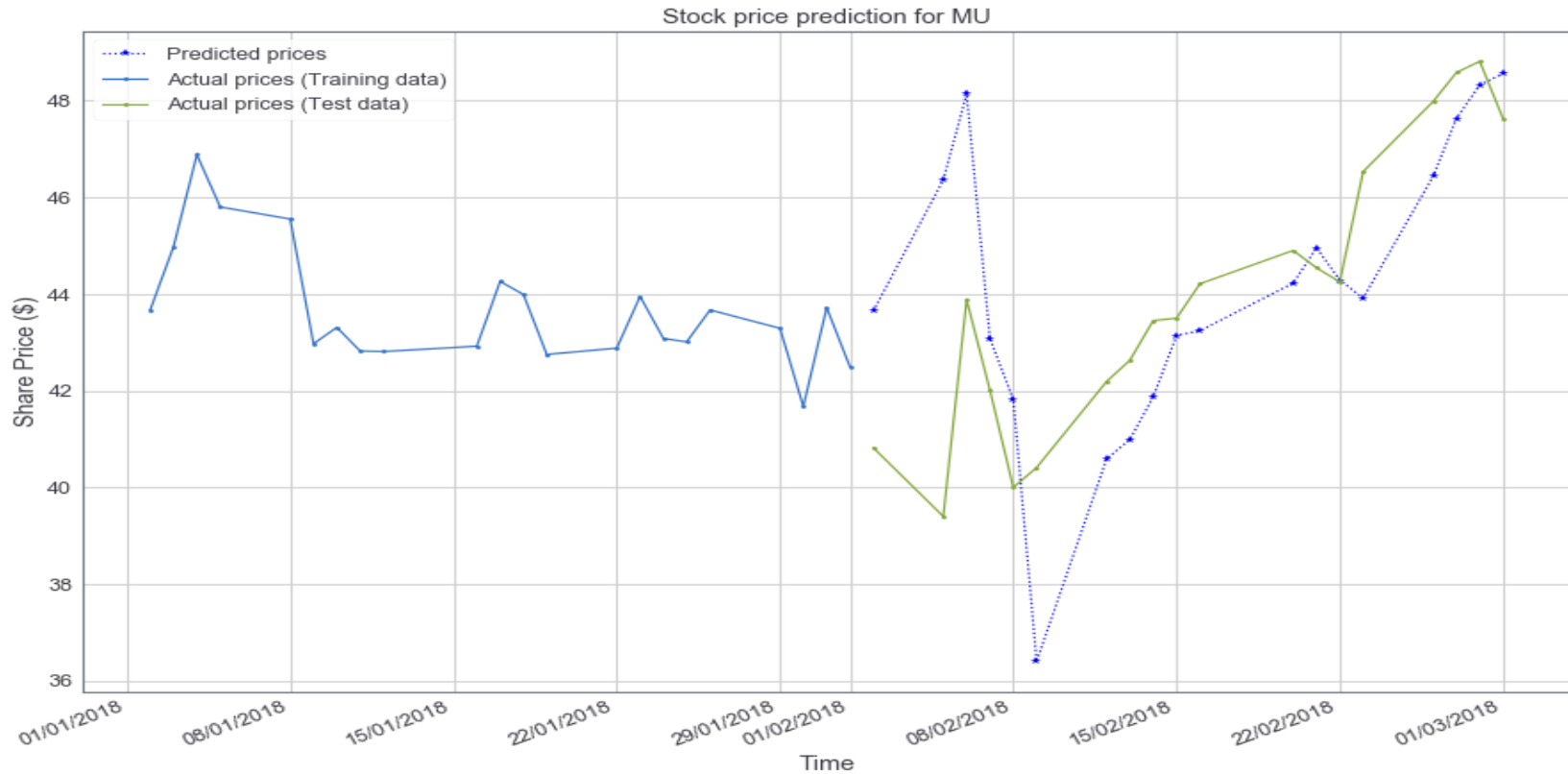
1. LSTM RMSE Score: 1.443 US dollar
2. LSTM trend Score: 0%

Current Progress: Achieved

Univariate 1-step Forecasting (a quick example)

Stock price prediction for MU

1. LSTM RMSE Score: 2.468 US dollar
2. LSTM trend Score: 36.8 %
3. Took 74 seconds to train!

Current Progress: Achieved

Univariate 1-step Forecasting (more training data)

Stock price prediction for MU
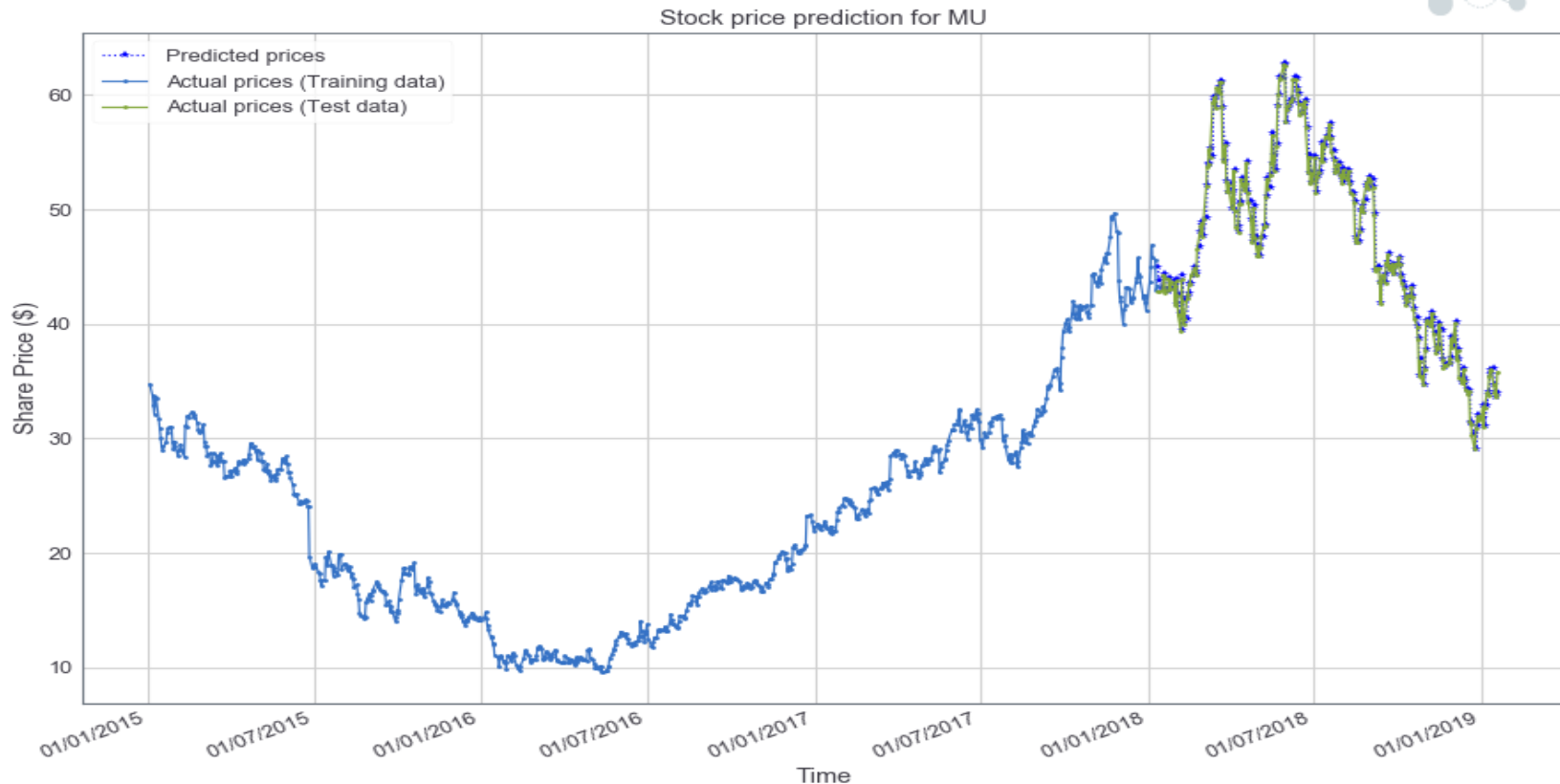
1. LSTM RMSE Score: 1.459 US dollar
2. LSTM trend Score: 51.0 %
3. Took 1 hour to train…

Current Progress: Achieved

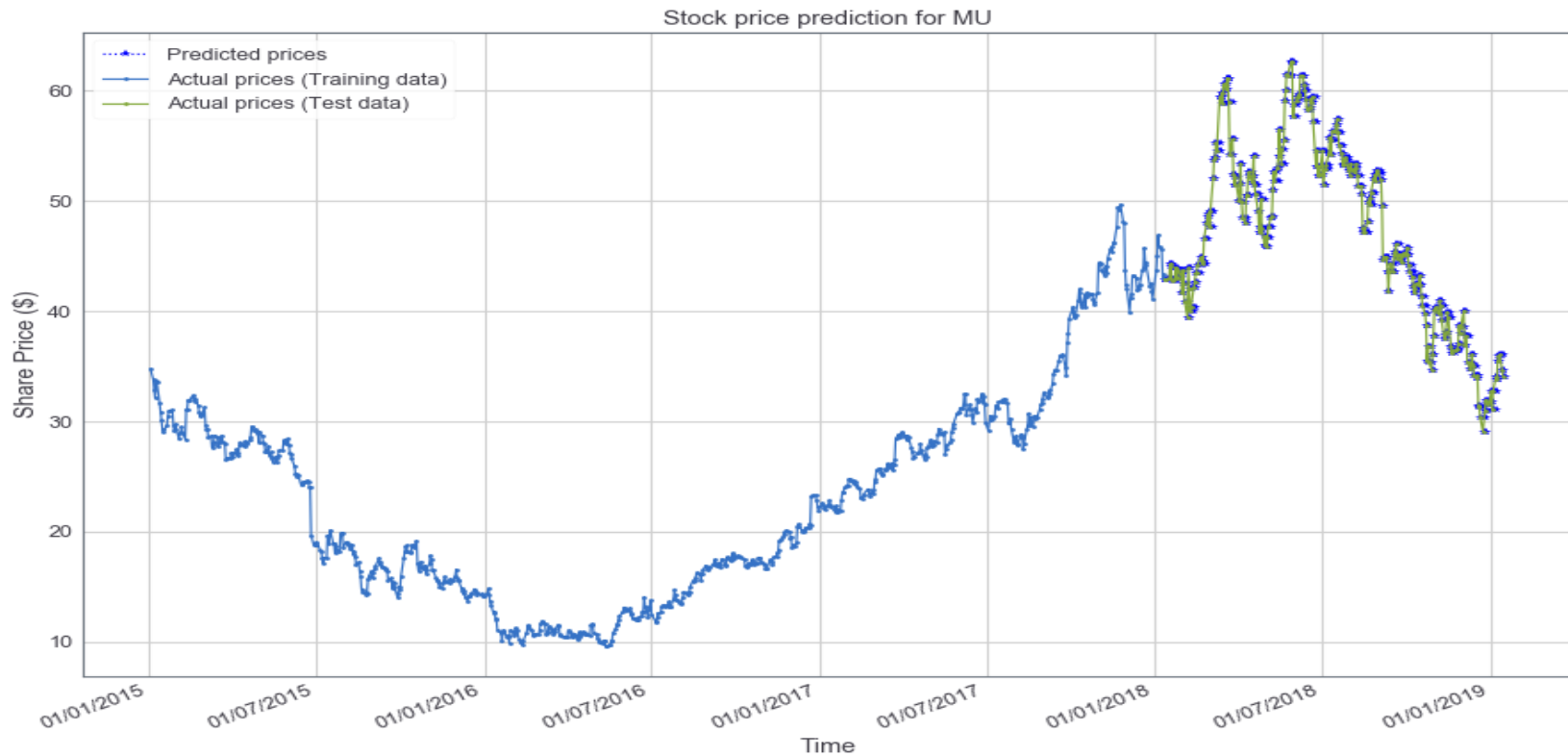## Univariate 3-step Baseline (a quick example)

Stock price prediction for MU

1. RMSE: t+1: 5.095, t+2: 4.266, t+3: 6.202   US dollar
2. Trend Score: t+1: 31.5%, t+2: 31.5% , t+3: 42.1%
3. Took 72 second to train!

Current Progress: Achieved

Univariate 3-step Baseline (more training data)

Stock price prediction for MU

1. RMSE: t+1: 1.446, t+2: 1.775, t+3: 2.047   US dollar
2. Trend Score: t+1: 0%   , t+2: 0%   , t+3: 0%

Current Progress: Achieved
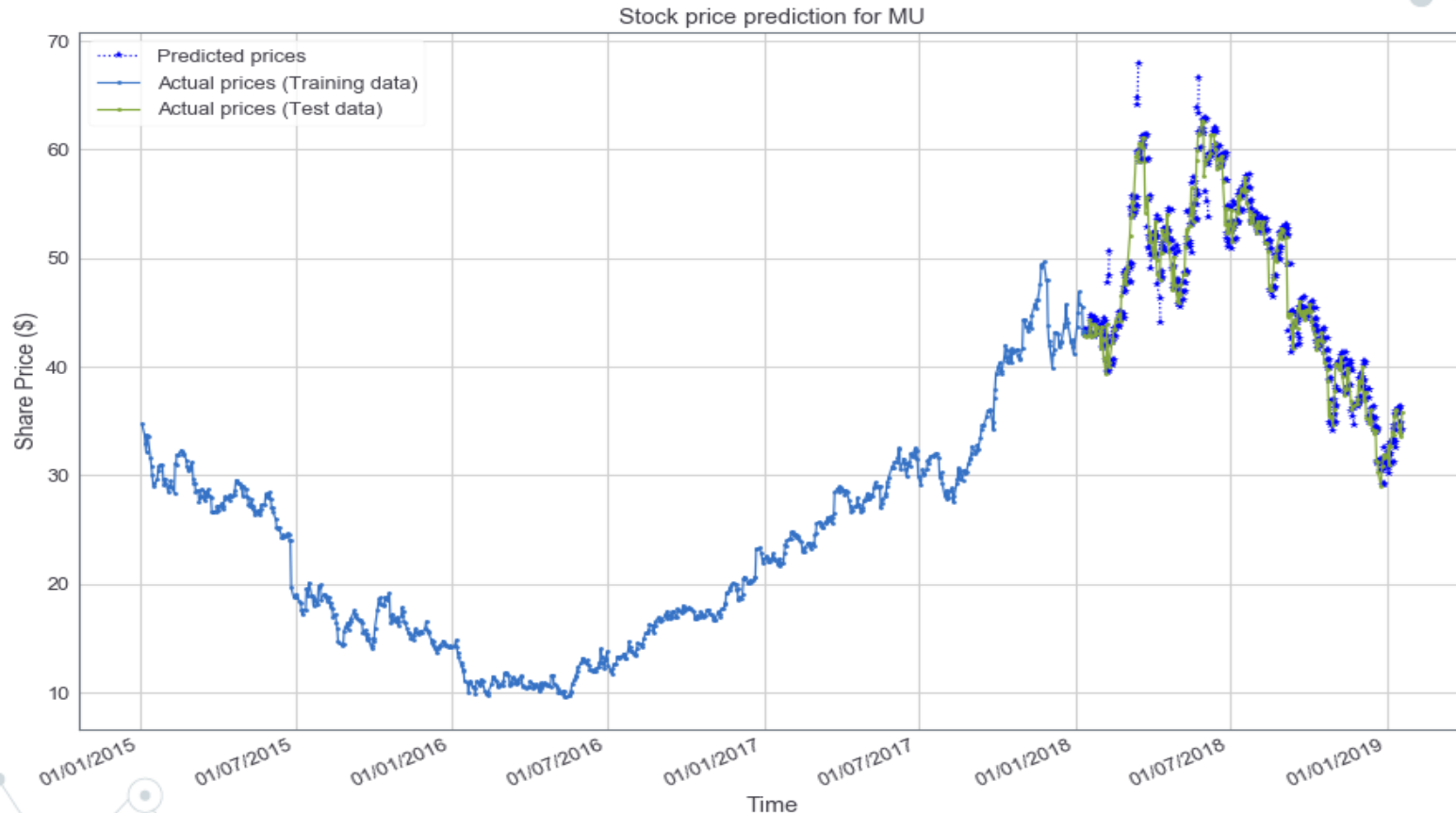
Univariate 3-step Forecasting (a quick example)

Stock price prediction for MU

1. RMSE: t+1: 5.095, t+2: 4.266, t+3: 6.202   US dollar
2. Trend Score: t+1: 31.5%, t+2: 31.5% , t+3: 42.1%
3. Took 72 second to train!

Current Progress: Achieved

Univariate 3-step Forecasting (more training data)

1. RMSE: t+1: 1.577, t+2: 2.174, t+3: 2.740   US dollar
2. Trend Score: t+1: 48.6%, t+2: 49.4%, t+3: 52.1%
3. Took 1 hour to train…

Current Progress: Next Steps

Evaluation

1. Compare to baseline models like Persistence Model Forecast
2. Training, validation, and testing set
3. Parameter optimisation

Multivariate One-step and Multi-step forecasting

1. Training data not only just include share price data but also other additional 52 indicators such as SMA,
2. Also not just price of the day prior but multiple steps prior

Timeline

Gantt Chart

Task	Timeline
Data source mining	Sep
Research & Reading	Oct
System Design	Nov
Development	Dec-Mar
Interim Write-up	Jan
Visualisation	Feb-Mar
Final Write-up	Mar-Apr

Submission (4 Apr 2019)

Start → | Semester 1 | Semester 2 |