

Predicting Stock Prices Using a Recurrent Neural Network (RNN) with Long Short-Term Memory (LSTM)

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Aim

On average, investing in stock market generates higher return than any other option but with higher risk. To gain possible maximum benefit on stocks, the prediction of stock prices must be committed. Investigation of past stock prices and other related companies' factors by using a recurrent neural network (RNN) in cooperation with long short-term memory (LSTM) is implemented to develop a model that can ultimately predict stock prices.

Datasets

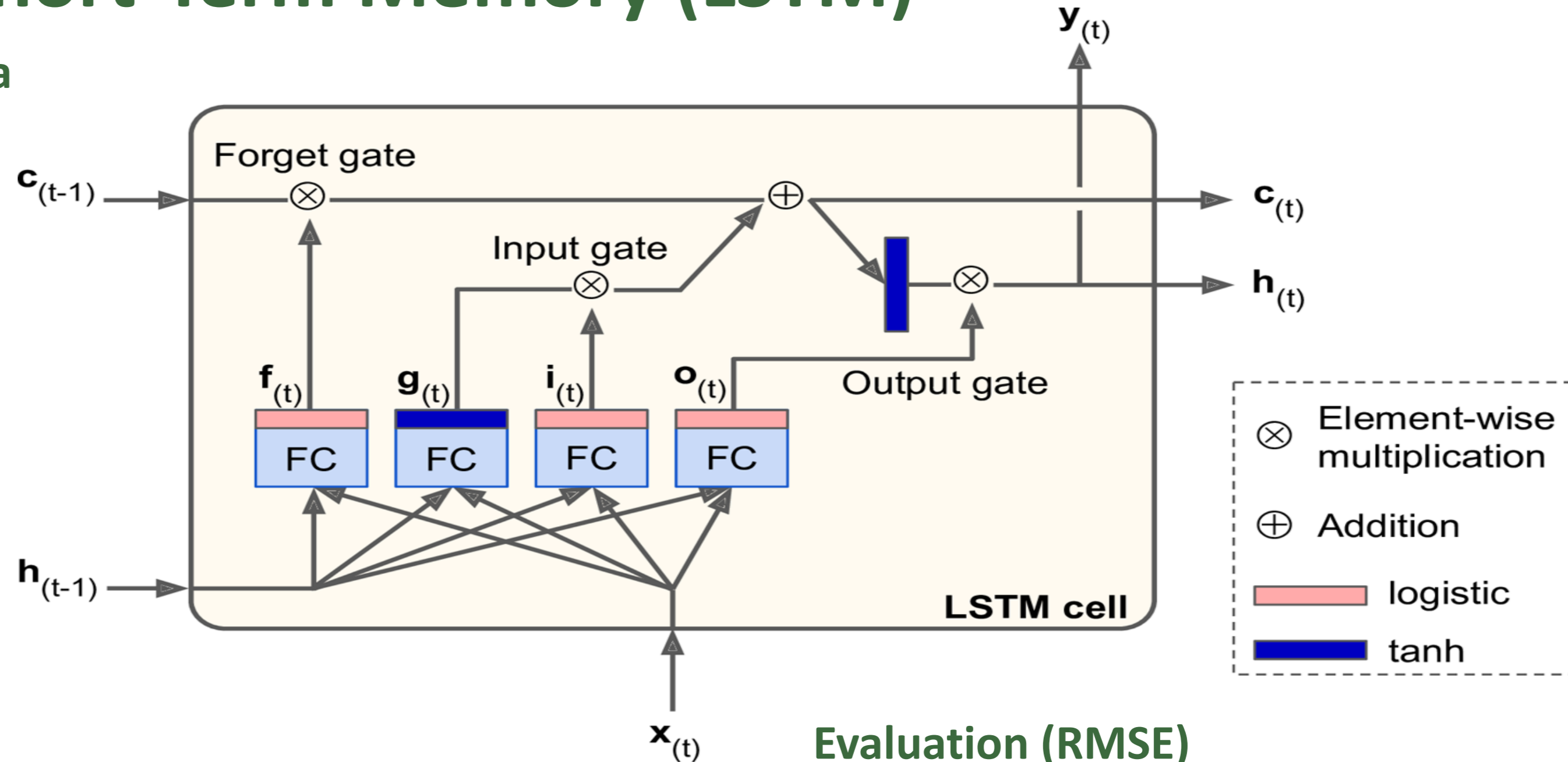
Dataset A:

Financial factors

Year	EPS	P/E
2014	4.26	20.90
2015	4.90	20.86
2016	5.73	16.23
2017	5.69	17.32
2018	8.36	13.99

Dataset B: Historical prices

Date	Open	High	Low	Close	Volume
1973-02-21	2.014104	2.014104	1.980707	1.993552	1255300.0
1973-02-22	1.983276	1.983276	1.967862	1.975569	817400.0
1973-02-23	1.975569	1.978138	1.957586	1.960155	1990000.0
1973-02-26	1.960155	1.983276	1.952448	1.970431	2768500.0
1973-02-27	1.970431	1.990983	1.944741	1.947310	4247700.0



Methodology

- **Fundamental Analysis:** Dividend Discount Model (DDM), Earning per share (EPS) and Price to Earning (P/E ratio)
- **Technical Analysis:** Moving Average (MA) and Bollinger Bands.
- **Machine learning with Dataset A.**
- **A Recurrent Neural Network (RNN) with Long Short-Term Memory (LSTM) with Dataset B.**

Evaluation (RMSE)

Methodology	Dividend Discount Model (DDM)
Fundamental Analysis	93.1223
Methodology	Moving Average (MA)
Technical Analysis	0.0693
Methodology	Linear Regression
Model with Fundamental Factors	56.5886
Methodology	LSTM
Model with Technical Factors	0.0569

Further Experiment

Stock simulation in two market Thai and USA.

Resources and Software

