

# Stock Analysis based on Deep Reinforcement Learning

Phayung Meesad

Department of Information Technology Management  
Faculty of Information Technology and Digital Innovation  
King Mongkut's University of Technology North Bangkok (KMUTNB)  
1518 Pracharat 1 rd., Wongsawang, Bangsue, Bangkok, 10800 Thailand

**Abstract:** Artificial Intelligence (AI) applications have been growing recently based on Reinforcement learning (RL), a type of machine learning where an agent learns to behave in an environment by trial and error. The agent receives a reward for actions that lead to desired outcomes and a penalty for actions that lead to undesired results. Deep reinforcement learning (DRL) uses deep learning to represent the agent's state and the environment, allowing DRL agents to learn in complex environments with states and actions to get optimal rewards. Several domains apply DRL: game playing, robotics, and finance. In finance, DRL has been used to develop trading algorithms that can automatically buy and sell stocks. One of the challenges of using DRL for stock trading is that the stock market is a very complex environment. Several factors can affect the price of a stock, and it is difficult to predict how these factors will change in the future. A challenge is that the stock market is a very competitive environment. Many other traders are also trying to make money by buying and selling stocks. This means that it is important for DRL agents to be able to learn quickly and adapt to changes in the market. DRL agents can learn to identify patterns in the market that humans may not be able to see. They can also learn to adapt to changes in the market much faster than humans. DRL is a promising new technology for stock trading. It can be a very powerful tool for making money in the stock market. However, it is still a relatively new technology requiring improvement to overcome existing problems before being applied to real applications. This talk reviews state-of-the-art related to deep reinforcement learning and stock time series prediction with multivariate stock technical analysis.



## **Biography:**

Phayung Meesad currently is an Associate Professor at the Faculty of Information Technology and Digital Innovation, King Mongkut's University of Technology North Bangkok (KMUTNB), Thailand. He also serves as the Director of Central Library at KMUTNB. Phayung received Bachelor of Science in Technical Education (Teaching in Electrical Engineering), from KMUTNB in 1994. He received Master of Science (MS) and Doctor of Philosophy (Ph.D.) in Electrical Engineering from School of Electrical and Computer

Engineering, Oklahoma State University (OSU), Stillwater, USA, in 1998 and 2002, respectively. His research of interests are Artificial Intelligence, Big Data Analytics, Business Intelligence and Analytics, Computational Intelligence, Data Analytics, Data Mining, Data Science, Deep Learning, Digital Signal Processing, Image Processing, Machine Learning, Metaheuristics Optimization, Natural Language Processing, and Time Series Analysis.

## Recent Publications

1. Chotirat, S., Meesad, P., Unger, H. (2022). Question Classification from Thai Sentences by Considering Word Context to Question Generation, Proceedings - 2022 Research, Invention, and Innovation Congress: Innovative Electricals and Electronics, RI2C 2022, pp. 9-14. DOI: 10.1109/RI2C56397.2022.9910313
2. Cuong, N.H.H., Trinh, T.H., Meesad, P., Nguyen, T.T., (2022). Improved YOLO object detection algorithm to detect ripe pineapple phase, Journal of Intelligent and Fuzzy Systems, 43 (1), pp. 1365-1381. DOI: 10.3233/JIFS-213251
3. Chotirat, S., Meesad, P. (2022). Automatic Question and Answer Generation from Thai Sentences, Lecture Notes in Networks and Systems, 453 LNNS, pp. 163-172. DOI: 10.1007/978-3-030-99948-3\_16
4. Nguyen, T., Meesad, P. (2021). A Study of Predicting the Sincerity of a Question Asked Using Machine Learning, ACM International Conference Proceeding Series, pp. 129-134. DOI: 10.1145/3508230.3508258
5. Meesad, P. (2021) Thai Fake News Detection Based on Information Retrieval, Natural Language Processing and Machine Learning, SN Computer Science, 2 (6), art. no. 425. DOI: 10.1007/s42979-021-00775-6
6. Chotirat, S., Meesad, P. (2021). Part-of-Speech tagging enhancement to natural language processing for Thai wh-question classification with deep learning, Heliyon, 7 (10), art. no. e08216, . DOI: 10.1016/j.heliyon.2021.e08216
7. Tapsai, C., Meesad, P., Haruechaiyasak, C. (2021). Natural language interface to database for data retrieval and processing, Applied Science and Engineering Progress, 14 (3), pp. 435-446. DOI: 10.14416/j.asep.2020.05.003
8. Tran, Q.N., Meesad, P. (2021). Enhancement Multi-class Facial Emotion Detection with Emo-VGGNet, 2021 13th International Conference on Information Technology and Electrical Engineering, ICITEE 2021, pp. 232-237. DOI: 10.1109/ICITEE53064.2021.9611893
9. Mathur, S., Sharma, A.K., Meesad, P. (2021). Hybrid AI and IoT Approaches Used in Health Care for Patients Diagnosis, Intelligent Systems Reference Library, 209, pp. 97-108. DOI: 10.1007/978-981-16-2972-3\_5
10. Nguyen, H.H.C., Luong, A.T., Trinh, T.H., Ho, P.H., Meesad, P., Nguyen, T.T. (2021). Intelligent Fruit Recognition System Using Deep Learning, Lecture Notes in Networks and Systems, 251, pp. 13-22. DOI: 10.1007/978-3-030-79757-7\_2
11. Satiman, S., Meesad, P. (2021). A Sequenced Edge Grid Image Technique for Sign Language Recognition, Lecture Notes in Networks and Systems, 251, pp. 181-190. DOI: 10.1007/978-3-030-79757-7\_18

12. Chotirat, S., Meesad, P. (2021). Natural Language Processing with “More Than Words – BERT”, Lecture Notes in Networks and Systems, 251, pp. 108-116. DOI: 10.1007/978-3-030-79757-7\_11
13. Minh, T.N., Meesad, P., Nguyen Ha, H.C. (2021). English-Vietnamese Machine Translation Using Deep Learning, Lecture Notes in Networks and Systems, 251, pp. 99-107. DOI: 10.1007/978-3-030-79757-7\_10
14. Tapsai, C., Unger, H., Meesad, P. (2021). The application of Thai natural language processing, Studies in Computational Intelligence, 918, pp. 131-159. DOI: 10.1007/978-3-030-56235-9\_6
15. Tapsai, C., Unger, H., Meesad, P. (2021). Thai natural language processing programming, Studies in Computational Intelligence, 918, pp. 99-130. DOI: 10.1007/978-3-030-56235-9\_5
16. Tapsai, C., Unger, H., Meesad, P. (2021). Thai word segmentation, Studies in Computational Intelligence, 918, pp. 25-36. DOI: 10.1007/978-3-030-56235-9\_2
17. Tapsai, C., Unger, H., Meesad, P. TLS-ART-MC, (2021). A new algorithm for Thai word segmentation, Studies in Computational Intelligence, 918, pp. 37-83. DOI: 10.1007/978-3-030-56235-9\_3

**Contact:**

Phayung Meesad, Ph.D., Associate Professor  
Director, Central Library  
King Mongkut’s University of Technology North Bangkok (KMUTNB)  
Faculty of Information Technology and Digital Innovation  
Department of Information Technology Management  
9<sup>th</sup> Floor Navamintarachinee Building  
1518 Pracharat 1, Wongsawang, Bangsue  
Bangkok 10800 THAILAND  
Tel. +6681618466  
Email: phayung.m@itd.kmutnb.ac.th  
<https://orcid.org/0000-0002-3742-6457>  
<https://scholar.google.co.th/citations?user=KgPPtakAAAAJ&hl=th>