

Tuyen P. Le | Resume

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*"Humans should be worried about the threat posed by
artificial intelligence." **Bill Gates***

Education

Kyung Hee University <i>Master and Ph.D., 4.14/4.3</i> Research Topics: Deep Reinforcement Learning, Machine Learning, Big Data, Robotics	South Korea 2014/03–2019/02
Bach Khoa University <i>Bachelor, 8.46/10.0</i> Honor program	Ho Chi Minh City 2008–2013
Luong Van Chanh Gifted High School <i>Diploma, 9+/10</i> Subjects taken: Mathematics, Physics, Chemistry, English ...	Phu Yen province 2005–2008

Ph.D. Dissertation

Title: *Deep Hierarchical Reinforcement Learning Algorithms in Partially Observable Markov Decision Processes*

Supervisors: TaeChoong Chung

Abstract: In recent years, reinforcement learning has achieved many remarkable successes due to the growing adoption of deep learning techniques and the rapid growth in computing power. Nevertheless, it is well-known that flat reinforcement learning algorithms are often not able to learn well and data-efficient in tasks having hierarchical structures, e.g. consisting of multiple subtasks. Hierarchical reinforcement learning is a principled approach that is able to tackle these challenging tasks. On the other hand, many real-world tasks usually have only partial observability in which state measurements are often imperfect and partially observable. The problems of RL in such settings can be formulated as a partially observable Markov decision process (POMDP). In this paper, we study hierarchical RL in POMDP in which the tasks have only partial observability and possess hierarchical properties. We propose a hierarchical deep reinforcement learning approach for learning in hierarchical POMDP. The deep hierarchical RL algorithm is proposed to apply to both MDP and POMDP learning. We evaluate the proposed algorithm on various challenging hierarchical POMDP.

Key words: Hierarchical Deep Reinforcement Learning, Partially Observable MDP (POMDP), Semi-MDP, Partially Observable Semi-MDP (POSMDP)

Experience

Professional.....

Software Engineer at KMS Technology Vietnam

Ho Chi Minh City

2013–2014

Ranked: Top 26 best workplaces in Vietnam

Website: <https://www.kms-technology.com/>

Description: Develop some mobile applications (iOS and Android): Football statware, Basketball Statware, pixNotes (a tool for internal use).

Miscellaneous.....

Internship at Recobell (Yello Mobile)

Seoul City

2015–2016

Website: <http://www.recobell.com>

Description: Develop mobile applications (iOS and Android). Sometimes, I did the jobs related to web applications on AWS

Internship at Polliwog Corp.

Seongnam City

2014–2015

Website: <http://www.polliwogeda.com/xenew/>

Description: Develop algorithm (C++) to find a shortest path in a Printed Circuit Board (PCB).

Internship at VNG Corp.

Ho Chi Minh City

2012–2013

Website: <https://vng.com.vn/>

Description: Work in a group to develop a website using state-of-the-art technologies.

Research Projects

2017-06-01 ~ 2020-05-31.....

NRF-2017R1D1A1B04036354

한국과학재단

2017–2020

Description: 자기균형 문제를 위한 Deep 강화학습 알고리즘 개발 및 응용 (Developing Deep Reinforcement Learning Algorithm for Self Balancing Problem and Its Applications)

2014-11-01 ~ 2017-04-30.....

NRF-2014R1A1A2057735

한국과학재단

2014–2017

Description: 다양한 이동로봇의 지능적 제어 알고리즘 개발 및 응용 (Development and Application of Intelligent Control Algorithms for Various Mobile Robots)

2010-05-01 ~ 2015-04-30.....

NRF-2010-0012609

한국과학재단

2010–2015

Description: 동적인 환경에서 이동로봇의 충돌회피를 위한 강화학습법 개발 및 응용 (Development and application of Reinforcement learning for Robot Obstacle Avoidance in Dynamic Environment)

Languages

Korean: Intermediate level (TOPIK I level 2)

Read, Write, Speak (simple form)

English: Influence

Second language

Vietnamese: Influence

Mother language

Computer skills

Programming Languages: Python, Java, C++, Objective-C, Swift, Matlab, RDF, HTML, XML, CSS, Javascript.

Tools: Pycharm, Visual Studio, Matlab, Eclipse, XCode, Inkscape, Photoshop, Lightroom, Premiere, Draw.io.

Libraries: Cocoa, OpenCV, Tensorflow, Matplotlib, ROS, Gym AI, Hadoop, Spark

Platforms: Window, Mac, Ubuntu, AWS, iOS, Android

Courses I did

Machine Learning and Robotics: Big Data Analysis, Mobile Robotics, Data Mining, Semantic Web, Machine Learning, Artificial Intelligence

Mathematics: Graph Theory, Queuing Theory, Advanced Probability and Statistics, Engineering Optimization, Discrete Mathematics

Related CS: Query Processing, Information Visualization, Advanced Computer Graphics, Future Internet, Computer Vision, Real-time Systems, Advanced Topic in Information Security, Technical Writing

Undergraduate: Computer Architecture, OOP, Data Structure and Algorithms, Database Systems, Operating Systems, Computer Networks, Computer Graphics, Algorithmic Analysis, Distributed Systems, Cryptography

References

Dr. TaeChoong Chung

Professor

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Assistant Professor

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Publications

International Journals.....

[1] T. P. Le, N. A. Vien, and T. Chung. A deep hierarchical reinforcement learning algorithm in partially observable markov decision processes. *IEEE Access*, 6:49089–49102, 7 2018.

[2] Tuyen P. Le, Hoang Huu Viet, Sang Hyeok An, Seung Gwan Lee, Dong-Han Kim, and

Tae Choong Chung. Univector field method-based multi-agent navigation for pursuit problem in obstacle environments. *Journal of Central South University*, 24(4):1002–1012, Apr 2017.

- [3] Tuyen Pham Le, Vien Anh Ngo, P. Marlith Jaramillo, and TaeChoong Chung. Importance sampling policy gradient algorithms in reproducing kernel hilbert space. *Artificial Intelligence Review*, Oct 2017.

- [4] Hoang Huu Viet, Le Hong Trang, SeungGwan Lee, Le Pham Tuyen, and TaeChoong Chung. A shortlist-based bidirectional local search for the stable marriage problem. *Applied Intelligence*, 2018 (Major Revision).

Domestic Journals.....

- [5] 최 승 윤, Tuyen P. Le, and 정 태 충. Deep deterministic policy gradient 알고리즘을 응용한 자전거의 자율 주행 제어. *Convergence Security Journal*, 18(3), 2018.

International Conferences.....

- [6] Viet-Hung Dang, Ngo Anh Vien, Tuyen P. Le, and Taechoong Chung. A functional optimization method for continuous domains. In Yuanfang Chen and Trung Q. Duong, editors, *Industrial Networks and Intelligent Systems*, pages 254–265, Cham, 2018. Springer International Publishing.

- [7] M. A. Layek, N. Q. Thai, M. A. Hossain, N. T. Thu, Tuyen P. Le, A. Talukder, T. Chung, and E. N. Huh. Performance analysis of h.264, h.265, vp9 and av1 video encoders. In *2017 19th Asia-Pacific Network Operations and Management Symposium (APNOMS)*, pages 322–325, Sept 2017.

- [8] Tuyen P. Le and T. Chung. Controlling bicycle using deep deterministic policy gradient algorithm. In *2017 14th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)*, pages 413–417, June 2017.

- [9] Tuyen P. Le, A. Layek, N. A. Vien, and T. Chung. Deep reinforcement learning algorithms for steering an underactuated ship. In *2017 IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI)*, pages 602–607, Nov 2017.

- [10] Tuyen P. Le, Nguyen Dang Quang, SeungYoon Choi, and TaeChoong Chung. Learning a self-driving bicycle using deep deterministic policy gradient. In *18th International Conference on Control, Automation and Systems (ICCAS 2018)*, Oct 2018.

Domestic Conferences.....

- [11] Tae Choong Chung and Le Pham Tuyen. Pleasure of Learning. *ICCC International Digital Design Invitation Exhibition*, :131–131, 2017.

- [12] TaeChoong Chung and Le Pham Tuyen. RLVisualizer: An application for Visualizing Trajectories of Reinforcement Learning Problem. volume , pages 13–14. The Korea Contents Society, 2017.

- [13] CholJin Jong, Seung yoon Choi, JinSeok Kim, Md. Abu Layek, Tuyen P. Le, Marlith Jaramillo, and TaeChoong Chung. Study of Sound Location Tracking Mobile Robot Using Lego Mindstorms. volume , pages 1028–1029. KOREA INFORMATION SCIENCE SOCIETY, 2016.

- [14] JinSeok Kim, Seung yoon Choi, CholJin Jong, Md. Abu Layek, Tuyen P. Le, Marlith Jaramillo, and TaeChoong Chung. Selected wireless mesh network model and architecture for a communication

- interruption in the fixed wireless environment. volume , pages 1265–1267. KOREA INFORMATION SCIENCE SOCIETY, 2016.
- [15] Md Abu Layek, Ngo Quang Thai, Md Alamgir Hossain, Ngo Thien Thu, Tuyen P. Le, Ashis Talukder, TaeChoong Chung, and Eui-Nam Huh. Analysis of the Effects of Timing Presets on the Performance of H.264/AVC and H.265/HEVC Video Encoders. volume , pages 442–443. Korea Institute Of Communication Sciences, 2017.
- [16] Md Abu Layek, Ngo Quang Thai, Md Alamgir Hossain, Ngo Thien Thu, Tuyen P. Le, Ashis Talukder, TaeChoong Chung, and Eui-Nam Huh. Performance Analysis of AV1 for Video Coding in Very Low Bit Rates. volume , pages 118–120. KOREA INFORMATION SCIENCE SOCIETY, 2017.
- [17] Md. Abu Layek, Seung yoon Choi, Tuyen P. Le, Marlith Jaramillo, JinSeok Kim, Jeong cheol jin, Eui-Nam Huh, and TaeChoong Chung. Compression Efficiency Of Text Images In Hangul And Other Languages. volume , pages 777–779. KOREA INFORMATION SCIENCE SOCIETY, 2016.
- [18] Tuyen P. Le, Abu Layek, Seung yoon Choi, and TaeChoong Chung. Gathering Objects in Four-rooms Domain under Partially Observability. volume , pages 865–867. KOREA INFORMATION SCIENCE SOCIETY, 2017.
- [19] Tuyen P. Le, Md. Abu Layek, Marlith Jaramillo, CholJin Jong, Seung yoon Choi, JinSeok Kim, and TaeChoong Chung. A Non-parametric policy based Algorithm in Reproducing Kernel Hilbert Space. volume , pages 892–893. KOREA INFORMATION SCIENCE SOCIETY, 2016.
- [20] Tuyen P. Le, Md. Abu Layek, CholJin Jong, Seung yoon Choi, JinSeok Kim, and TaeChoong Chung. Reinforcement Learning of Vehicle Agent and Art work Trial using the Learning Trajectories. volume , pages 719–721. KOREA INFORMATION SCIENCE SOCIETY, 2017.
- [21] Minh N. H. Nguyen, Tuyen P. Le, Nguyen H. Tran, and Choong Seon Hong. Deep Reinforcement Learning based Smart Building Energy Management. volume , pages 871–873. KOREA INFORMATION SCIENCE SOCIETY, 2017.
- [22] Seung yoon Choi, Md. Abu Layek, Tuyen P. Le, Cheoljin Jeong, Jinseok Kim, Marlith Jaramillo, and TaeChoong Chung. A Study of Sequential Workspace Management Approach for Autonomous Mobile Robot in Path Planning Problem. volume , pages 1036–1038. KOREA INFORMATION SCIENCE SOCIETY, 2016.