



1. Motivation Letter

Dear Professor Max Welling and UvA admission officers,

My life goal is to pursue a research career in Machine Learning. Therefore, I believe working with Professor Max Welling and AMLAB's members will get me ready for my future career.

I found out about AMLAB thanks to the paper titled "Semi-Supervised Classification with Graph Convolutional Networks" by Thomas N. Kipf and Max Welling. During that time, I was developing a graph embedding method based on network motif patterns and skip-gram model. The "normalization trick" introduced in Kipf's paper is exactly what I have been looking for. Followed Kipf's implementation on github, I injected the motif co-occurrence matrix to the second graph convolutional layer to achieve slightly better results compared to the paper. After reading more about AMLAB's other members and projects, I decided to apply for the available PhD position because I know I can learn a lot by working with people in the group.

My undergraduate major was Computer Engineering and my master major is Computer Science. I have received training in calculus, linear algebra, probability theory, computer architecture, embedded system design, network science, and machine learning throughout the years. Besides official courses provided by my affiliated institutes, I also extend my skills set by taking free courses from Udacity and Coursera. Although not being particularly stellar, I believe I have satisfied the basic requirements for the available PhD position at AMLAB.

To me, the most important factor in a working environment is the people I work with. Thanks to my time in Japan, I have learned the joy of living in an international environment. I have learned many skills thanks to friends of various backgrounds, from wifi hacking to using Teflon for leakage prevention in chemical experiments. I always learn much more from other people compared to what I can help them back. Nonetheless, I do enjoy learning and teaching (when I can). Although I cannot guarantee a scientific breakthrough in my research, but I am absolutely sure about my passion for learning. As I mentioned above, I believe being a part of AMLAB will be a great learning and working opportunity for me.

From Professor Richard Feynman's book, I found myself in the description of one man named Frederic de Hoffman. Feynman described him as follow: "Not highly trained, he liked mathematics, and worked very hard; he compensated for his lack of training by hard work". I am not a fast learner, but a deep one. I hope that there will be a chance for me to be considered for the available PhD position at AMLAB.

Sincerely,
Hoang Nguyen.



Hoang Nguyen

Full name: Nguyen Thai Hoang

gear.github.io/aboutme/
github.com/gear/



hoangnt.titech@gmail.com

Room 816, 2-2-B Aomi, Koto-ku, Tokyo 135-0064, Japan



I enjoy learning, teaching and doing research. My main interest is theoretical machine learning, especially graphical models, submodularity, and random processes on graphs.

EDUCATION

- 2015-2017 **Tokyo Institute of Technology** - *M.Eng., Teaching Assistant* Tokyo, Japan
(expected) Computer Science major in School of Computing, specializing in Complex Networks. My study is funded by the Japanese Government.
[Python, Machine Learning, Complex Networks] - GPA: 2.9/3.0 (JP)
- 2009-2014 **Hanoi University of Science and Technology** - *B.E., Research Assistant* Hanoi, Vietnam
Majored in Computer Engineering and Telecommunication (5 years program).
[VHDL, Verilog, C++, Embedded Systems, FPGA] - GPA: 3.2/4.0 (US)

AWARDS

- 2015-2017 **Japanese Government Scholarships (MEXT)** - *Master Studies* Tokyo, Japan
The Monbukagakusho (Ministry of Education, Culture, Sports, Science & Technology) Scholarship is awarded to excellent students to pursue a higher degree in Japan.
- 2009-2015 **Study-aid Scholarships** - *Undergraduate Studies* Hanoi, Vietnam
Study-aid scholarships are awarded every semester to outstanding undergraduate students of Hanoi University of Science and Technology.

RESEARCH EXPERIENCE

- 2015-now **Murata Laboratory** - *Research Assistant* Tokyo, Japan
- Studied network science and machine learning (network motifs and deep models).
- Reviewed 2 papers submitted to ICDM 2016. <August 2016>
- Presented brain network construction from EEG data using generative models at NetSci 2016. gear.github.io/bnet <May 2016>
- 2012-2015 **ESRC Laboratory** - *Research Assistant, General Manager* Hanoi, Vietnam
- Studied embedded systems design and FPGA technology.
- Implemented a network on chip architecture and improved its performance by 40% using pipelining and parallel read-write buffers. gear.github.io/noc

WORK EXPERIENCE

- Summer 2015 **Donuts Hanoi Co. Ltd** - *iOS Software Engineering Intern* Hanoi, Vietnam
Implemented bonus game scenes, ranking boards, and a multimedia newsletter for a game named "Gachinko no Tora" in C++. The game can be found at gachitora.jp.

PROJECTS

- Deep-CREST: Deploy deep models on embedded systems (JAIST funded project).
- MAGE: Motifs Aware Graph Embedding. gear.github.io/mage
- INFECTION AR Game. github.com/gear/PLB-2015F-ARGame
- More at: gear.github.io/projects/

LANGUAGES

Vietnamese *native*
English *fluent (iBT: 103)*
Japanese *basic*

PROGRAMMING

Python, C++
Java, Javascript, HTML/CSS
Haskell, Scala, Coq

FRAMEWORKS

NetworkX, Tensorflow
graph-tool, Theano, Sklearn
Cocos2dx, Cocoa





Tokyo Institute of Technology

2-12-1 Ookayama, Meguro-ku, Tokyo, 152-8550 JAPAN

4259 Nagatsuta-cho, Midori-ku, Yokohama, Kanagawa, 226-8503 JAPAN

No.004906

Date: November 15, 2016

List of Subject and Grade
(Master Course)

Name in Full : Nguyen Hoang Thai

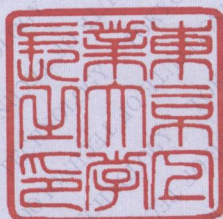
Date of Birth: November 28, 1991

Department: Computer Science

Period	Subject	Unit	Hours Per Week	Grade
10/15 - 3/16	Fundamentals of Mathematical and Computing Sciences:Computer Science	2	2	100
	Distributed Algorithms	2	2	90
	Advanced Data Engineering	2	2	95
	Complex Networks	2	2	100
	Seminar II on Computer Science	1	1	80
	Special Experiments II on Computer Science	1	4	80
	Advanced Course of Inverse Problems	1	1	92
	Human centered Informatics exercise	2	2	100
	Discrete, Algebraic and Geometric Structures I	2	2	100
	Advanced Artificial Intelligence	2	2	81
4/16 - 9/16	Machine Learning	2	2	74
	Seminar I on Computer Science	1	1	80
	Special Experiments I on Computer Science	2	4	80
	High Performance Scientific Computing	2	2	100
	Total	25		

4a. Master Records

Note :1. 100 is the highest obtainable and 60 is the lowest passable.



Yoshinao Mishima

Yoshinao Mishima



Họ tên/Name: Nguyễn Thái Hoàng

Ngày sinh/Date of birth:

28/11/1991

MSSV/Student ID: 20091164

Thời gian học/Time of study:

8/2009 - 8/2014

Chương trình học: Kỹ sư Kỹ thuật Điện tử-Viễn thông

Viện Điện tử - Viễn thông

Degree program: Engineer in Electronics and Communication Engineering

School of Electronics and Telecommunications

TT	Mã HP Course ID	Tên học phần	Course Title	Tín chỉ Credits	Điểm Grade
1	SSH1110	Những NLCB của CNML I	Fundamental Principles of Marxism-Leninism I	2	D+
2	SSH1120	Những NLCB của CNML II	Fundamental Principles of Marxism-Leninism II	3	D
3	SSH1050	Tư tưởng HCM	Ho-Chi-Minh Thought	2	D+
4	SSH1130	Đường lối CM của ĐCSVN	Revolution Policy of VCP	3	D+
5	MI1110	Giải tích I	Analysis I	4	B+
6	MI1140	Đại số	Algebra	4	A
7	PH1110	Vật lý đại cương I	Physics I	3	B
8	EM1010	Quản trị học đại cương	Introduction to Management	2	B
9	MI1120	Giải tích II	Analysis II	3	C
10	MI1130	Giải tích III	Analysis III	3	B
11	PH1120	Vật lý đại cương II	Physics II	3	D
12	IT1110	Tin học đại cương	Introduction to Computer Science	4	B
13	EE2012	Kỹ thuật điện	Fundamentals of Electrical Engineering	2	A
14	ET2000	Nhập môn kỹ thuật điện tử-viễn thông	Introduction to Electronics and Telecommunication Engineering	2	A
15	MI2020	Xác suất thống kê	Probability and Statistics	3	A+
16	PH1204	Vật lý điện tử	Electronic Physics	2	A
17	ET2030	Ngôn ngữ lập trình	Programming Language	3	B+
18	ET2040	Cấu kiện điện tử	Electronic Devices	3	A
19	ET2050	Lý thuyết mạch	Circuit Theory	3	B
20	ET3210	Trường điện từ	Electromagnetic Fields	3	A
21	ET2060	Tín hiệu và hệ thống	Signals and Systems	3	C
22	ET2070	Cơ sở truyền tin	Fundamentals of Information Transmission	2	A
23	ET3220	Điện tử số	Digital Electronics	3	A
24	ET3230	Điện tử tương tự I	Analog Electronics I	3	B
25	ET3260	Kỹ thuật phần mềm ứng dụng	Applied Software Engineering	2	A+
26	ET3280	Anten và truyền sóng	Antenna and Wave Transmission	2	D+
27	ET2080	Cơ sở kỹ thuật đo lường	Fundamentals of Measurement	2	A+
28	ET3240	Điện tử tương tự II	Analog Electronics II	3	A
29	ET3250	Thông tin số	Digital Communications	3	B+
30	ET3290	Đồ án thiết kế I	Design Project I	2	A+
31	ET3300	Kỹ thuật vi xử lý	Microprocessors	3	B
32	ET4020	Xử lý số tín hiệu	Digital Signal Processing	3	B
33	ET4010	Đồ án II	Design Project II	2	A+
34	ET3270	Thực tập kỹ thuật	Engineering Practicum	2	A
35	EE3280	Lý thuyết điều khiển I	Control Theory I	3	D
36	ET4030	Thiết kế, tổng hợp IC số và hệ thống số	Design and Synthesis of Digital IC and Systems	4	B
37	ET4250	Hệ thống viễn thông	Telecommunications Systems	3	B
38	ET4040	Kiến trúc máy tính	Computer Architectures	3	B+
39	ET4070	Cơ sở truyền số liệu	Fundamentals of Data Communication	3	A
40	ET4260	Đa phương tiện	Project in Multimedia	2	A
41	ET4450	Giải phẫu và sinh lý học	Human Anatomy and Physiology	2	A
42	ET4340	Thiết kế VLSI	VLSI Design	3	B
43	ET4230	Mạng máy tính	Computer Networks	3	C
44	ET4290	Hệ điều hành	Operating Systems	2	B+
45	ET5020	Đồ án thiết kế III	Design Project III	3	A+
46	ET4350	Điện tử công nghiệp	Industrial Electronics	2	B
47	ET4360	Thiết kế hệ nhúng	Embedded System Design	2	A

TT	Mã HP Course ID	Tên học phần	Course Title	Tín chỉ Credits	Điểm Grade
48	ET4430	Lập trình nâng cao	Advanced Programming	2	A
49	ET4400	Đo lường tự động	Automatic Measurement	2	B+
50	ET4060	Phân tích và thiết kế hướng đối tượng	Object-Oriented Analysis and Design	3	B
51	ET4310	Thông tin quang	Optical Communications	3	C
52	ET4540	Hệ thống thông tin y tế	Medical Information Systems	3	A
53	ET5011	Thực tập cuối khóa	Graduation Practicum	3	A+
54	ET5111	Đồ án tốt nghiệp kỹ sư	Graduation Project	9	A+
55	ET3550	Thực tập cơ bản	Basic Practicum	3	B+

Tổng số tín chỉ/Credits in Total: 155

Điểm trung bình tích lũy toàn khoá: 3.21 (quy đổi tương đương sang thang điểm 10: 8.42)

Cummulative grade-point average: 3.21 (convertible to 10-scale: 8.42)

Xếp loại bằng tốt nghiệp: Giỏi

Degree classification: Very good

MSSV/Student ID: 20091164

Hà Nội, ngày 10 tháng 10 năm 2014

TRƯỜNG
ĐẠI HỌC
BÁCH KHOA
HÀ NỘI
PHÓ TRƯỞNG PHÒNG ĐẠO TẠO ĐẠI HỌC
ThS. Đinh Công Việt

4b. Undergraduate Record

Ghi chú:

- Sinh viên được cấp chứng chỉ riêng cho các môn học Giáo dục thể chất và Giáo dục quốc phòng-an ninh.
- Hệ thống thang điểm được quy định như sau:

Notes:

- Separate certificates have been issued for Physical Education and Civil Service Education.
- The grading system is as follows:

Điểm chữ/Grade	A+	A	B+	B	C+	C	D+	D	F	R
Điểm số/Grade points	4.0	4.0	3.5	3.0	2.5	2.0	1.5	1.0	0	Điểm miễn/Transfer Credits
Thang 10/10-Scale	9.5-10	8.5-9.4	8.0-8.4	7.0-7.9	6.5-6.9	5.5-6.4	5.0-5.4	4.0-4.9	0.0-3.9	



5. Projects List

Motif-aware Methods for Graph Analysis

2016-now **Approach #1: Biased-random walk using motif patterns**

I came up with the idea of using statistically significant network motifs as the guiding patterns for random walks on a network. The generated context will later be fed to a word2vec model with negative sampling to learn the graph embeddings.

Approach #2: m-GCN

Based on the semi-supervised graph convolutional network model (GCN), I use motif co-occurrence matrix to improve the embedding and classification results.

Future: Motif-based diversity sampling

Currently I am working on building a diversity model based on motif conductance, determinantal point processes, and graph convolution.

Tokyo,
Japan

Deep-CREST

2017-now **Neural networks compression**

This is a JST-funded project. Our laboratory's part is to find graph-based methods for neural network compression. I am a student member of the project.

Tokyo,
Japan

INFECTION AR Game

2015-2016 **Throw a ball to the wall to kill viruses!**

I worked with two other students in this laboratory exchange project. We are assigned to create an augmented reality game using a softball and a projector. As the project leader, I divided the project into 3 sub-projects: making sensors inside the ball, designing the game, and creating a ball tracker using OpenCV. I worked on the hardware inside the ball. I used an Arduino Fio for processing, an IMU (6DOF) for spin and collision detection, and an XBee module for wireless communication.

Tokyo,
Japan

Network on Chip

2013-2015 **Designing a Network on Chip with FPGA technology**

I worked with two other students to create a Network on Chip prototype. Initially, I was in charge of designing a network router for a 2-by-2 Torus topology (virtual channels, Bellman-Ford routing algorithm). Later, when we design a 2-by-2 Mesh topology Network on Chip, I created a Network Interface for router-processor communication. I also improved the throughput of this Network Interface by employing the pipelining technique for parallel buffer read/write operations.

Hanoi,
Vietnam

Mini projects

2016-now **Machine Learning mini projects**

Some of my mini projects from online open courses can be found here:

gear.github.io/projects/

Tokyo,
Japan



6. Academic References

Associate Professor, Dr. Tsuyoshi MURATA

Department of Computer Science - School of Computing
Tokyo Institute of Technology

Tokyo,
Japan

Note: Professor Murata is my current supervisor.

Email: murata@c.titech.ac.jp

Website: www.net.c.titech.ac.jp/murata.html

Professor, Dr. Hideki KOIKE

Department of Computer Science - School of Computing
Tokyo Institute of Technology

Tokyo,
Japan

Note: Professor Koike was my supervisor during my laboratory-exchange project.

Email: koike@cs.titech.ac.jp

Website: www.vogue.cs.titech.ac.jp

Associate Professor, Dr. Ngoc Nam PHAM

Department of Electronics and Computer Engineering
School of Electronics and Telecommunications - HUST

Hanoi,
Vietnam

Note: Professor Pham Ngoc Nam was my undergraduate supervisor.

Email: nam.phamngoc@hust.vn

Website: <http://set.hust.edu.vn/index.php/en/department/dtth/78-phamngocnam>



7. Top 3 Preferred Projects

Project 4: Methods for multimodal learning and sensor fusion

One step closer to the human brain

The concept of multimodal learning is interesting to me for several reasons. Firstly, joint learning from multiple information sources has been practically proven effective, especially in noisy environments. Secondly, multimodal learning involving irregular data (e.g. knowledge graph) is challenging as most of the work so far is designed only for highly structured data (audio, video, text, etc.). Thirdly, there are many inspirational works in the field of machine learning in general such as Bimodal Deep Auto-encoder, Multimodal Residual Learning, or the DeepMind's differentiable neural computers. For me, it is exciting to explore in the field of multitask learning because the behavior of the learned models is closer to human (e.g. describing videos). Lastly, I believe that my research in multimodal learning might be able to have an impact on the performance of automated systems such as self-driving cars or automated drones. On the other hand, the results from multimodal learning can also be beneficial to project 1 and project 9.

Project 2: Methods for robust feature learning

Representation is (probably) the core of ML-related tasks

Robust features (or representations) extracted from data is desirable for any Machine Learning task. From the practical standpoint, it is important to have a robust machine behavior when an automated system is deployed in the real world. Such robust features can possibly be learned through various methods such as cross-validating training data or transfer learning. On the other hand, it is more interesting to think about robust features learning from the theoretical standpoint. The predictive power of a machine learning model can be defined and bounded under some assumptions about training data samples or the learning model architecture itself. I choose this topic as my second preferred project because of my interest in theoretical machine learning.

Project 5: Combining Generative Probabilistic Models with DL

We observes other people's behavior

To the extent of my knowledge, study about graphical models in combination with deep architecture has been an active field of research. The flexibility and robustness of generative power are proven to be supportive to the discriminative classifiers. Recent advancements in generative models (e.g. deep belief networks, GAN) promises many new hybrid generative-discriminative models. It is said that the human brain is excel at guessing what other brains are doing, therefore I am quite interested in studying about a generative model that can "observe" some other discriminative classifiers and improve their performances.

