

Trung Vu

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EDUCATION	Oregon State University (OSU), Corvallis, OR PhD., Computer Science - Machine Learning GPA: 3.97/4 (current) Hanoi University of Science and Technology (HUST), Hanoi, Vietnam B.Eng., Computer Science, <i>Honors program</i> : Talented Engineers Thesis: Abstractive text summarization for single-document on Vietnamese texts (graded A+, top 1/400) GPA: 8.78/10 (convertible to 4-scale: 3.69/4, top 5%) High School for Gifted Students, Hanoi, Vietnam Affiliated with Hanoi National University of Education Subject of specialization: Mathematics	2016-present Advisors: Raviv Raich 2009 - 2014 2006 - 2009
RESEARCH INTEREST	I am passionate about optimization theory, random matrix theory, perturbation theory and machine learning for signal processing. My research focuses on the study of convergence properties and acceleration techniques for iterative first-order methods in structured non-convex optimization problems. Examples of problems I have been working during my PhD at OSU are the convergence analysis of iterative hard thresholding methods for low-rank matrix completion, of projected gradient descent for minimizing a quadratic with spherical constraints, and of momentum method for deconvolution. In addition to theoretical work, I had the opportunity to work on some fascinating applications including threat evaluation in air defence systems, smart irrigation control in vineyards, and multiple instance learning for histopathological image analysis.	
PUBLICATIONS	<ol style="list-style-type: none">1. Trung Vu, Evgenia Chunikhina, and Raviv Raich, "Perturbation Expansions and Error Bounds for the Truncated Singular Value Decomposition," preprint arXiv:2009.07542, 2020.2. Trung Vu, Phung Lai, Raviv Raich, Anh Pham, Xiaoli Z. Fern and UK Arvind Rao, "A Novel Attribute-based Symmetric Multiple Instance Learning for Histopathological Image Analysis," IEEE Transactions on Medical Imaging, 2020.3. Trung Vu and Raviv Raich, "On Convergence of Projected Gradient Descent for Minimizing a Large-scale Quadratic over the Unit Sphere," In Proceedings of IEEE International Workshop on Machine Learning for Signal Processing (MLSP), October 13-16, 2019 Pittsburgh, PA, USA. 2nd Student Paper Award!4. Trung Vu and Raviv Raich, "Local Convergence of the Heavy Ball method in Iterative Hard Thresholding for Low-Rank Matrix Completion," In Proceedings of IEEE International Conference on Acoustics Speech and Signal Processing (ICASSP), pp. 3417-3421. IEEE, 2019.5. Trung Vu and Raviv Raich, "Accelerating Iterative Hard Thresholding for Low-Rank Matrix Completion via Adaptive Restart," In Proceedings of IEEE International Conference on Acoustics Speech and Signal Processing (ICASSP), pp. 2917-2921. IEEE, 2019.6. Trung Vu, Raviv Raich. "Adaptive Step Size Momentum Method For Deconvolution," In 2018 IEEE Statistical Signal Processing Workshop (SSP), pp. 438-442. IEEE, 2018.7. Thi-Minh-Tam Nguyen, Viet-Trung Vu, The-Vinh Doan, Duc-Khanh Tran. "Resolution in linguistic first order logic based on linear symmetrical hedge algebra," In International Conference on Information Processing and Management of Uncertainty (IPMU) in Knowledge-Based Systems, pp. 345-354. Springer, Cham, 2014.8. Thi-Minh-Tam Nguyen, Viet-Trung Vu, The-Vinh Doan, Duc-Khanh Tran. "Resolution in Linguistic Propositional Logic Based on Linear Symmetrical Hedge Algebra," In Proceedings of The Fifth International Conference on Knowledge and Systems Engineering (KSE), pp. 327-338. Springer, Cham, 2014.	

9. Duc-Khanh Tran, **Viet-Trung Vu**, and Minh-Tam Nguyen. “Fuzzy linguistic propositional logic based on refined hedge algebra,” In 2013 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), pp. 1-8. IEEE, 2013.
10. **Viet-Trung Vu**, The-Vinh Doan. “Fuzzy Linguistic Propositional Logic based on Refined Hedge Algebra,” In Proceedings of 2012-2013 Scientific Research Conference of Hanoi University of Science and Technology, School of Information and Communication Technology (SoICT), 2013.

RESEARCH EXPERIENCE

Research Assistant at Oregon State University

2016-2018

Supervisor: Dr. Raviv Raich, Associate Professor

Commercialization Project with SmartVineyards: Development and validation of an intelligent decision support system to improve irrigation management in vineyards and other west coast crops.

- Preprocessing data measured from a real-time system of soil moisture sensors, irrigation sensors and weather sensors. Building a cloud-based system (Databricks platform) that processes raw sensor data automatically.
- Collaborating with faculties from 6 different departments at Oregon State University and Washington State University to build an intelligent decision support system to guide the growers around irrigation management.
- Implementing machine learning algorithms to classify noise in data, predict soil moisture time series and predict irrigation decision with high accuracy.

R&D Engineer at Viettel R&D Institute, Hanoi, Vietnam

2014-2015

Supervisor: Dr. Tran-Su Le, Deputy Director of Centre C4I

Threat Evaluation and Weapon Assignment (TEWA) systems in military surface-based air defence environment.

- Headed a team of three R&D engineers investigating real-time threat evaluation algorithms including Fuzzy Logic, Bayesian Networks, and Neural Networks. All of those new algorithms outperform the rule-based method ran by the system at that time.
- Developed an explicit GUI tool for easily constructing and training Bayesian Networks.
- Designed a more complete evaluation of TEWA systems by adding stimulation situations, collecting both real-world data and generated data from battle tactics.

Research Assistant at HUST, Hanoi, Vietnam

2013-2014

Supervisor: Assoc.Prof., Dr. Huong Thanh Le, Department of Information System

Abstractive text summarization for single-document on Vietnamese texts.

- Created a ground-truth dataset of approximately 200 documents with their corresponding human-generated summaries and applied natural language processing tools for processing Vietnamese texts.
- Researched sentence reduction and sentence generation techniques that involve Conditional Random Field, Hidden Markov Model, word graphs and algorithms for graph traversal.
- Evaluated the performance of the system using ROUGE-N metric to demonstrate that the proposed approach achieves better performance than a baseline method.

Research Assistant at HUST, Hanoi, Vietnam

2011-2014

Supervisor: Dr. Khanh Duc Tran, Department of Information System

Fuzzy linguistic logic with the truth domain based on hedge algebra.

- Developed theoretical concepts of fuzzy logic based on linear symmetrical hedge algebra and extended the result to refined hedge algebra and propose an optimized resolution procedure with maximal reliability.
- Led the undergraduate student research group on Fuzzy Logic.
- Submitted three international conference papers, one of which is the top-tier FUZZ-IEEE 2013.

REFERENCES

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