PHUC 'JERRY' NGO

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EDUCATION

Beloit College *Beloit, WI*
Computer Science and Mathematics Major August 2019 - Present
Major GPA: 4.0/4.0
Expected Graduation Date: June 2023

RESEARCH AND WORK EXPERIENCE

Computer Vision Group @ MIT CSAIL *August 2021 - Present*
Undergraduate Researcher *Advised by Phillip Isola, Swami Sankaranarayanan*

- Design a pipeline to test how a large vision-language model, CLIP, performs as a visual system.
- Generate images of optical illusion, shape and color to compute CLIP's response to those stimuli.
- Discover that CLIP is fooled by human optical illusions and that CLIP's understanding of cognitive concepts like color-emotion association or shape language is correlated with human psycho-visual experiments.

Theory of Computation Group @ MIT CSAIL *June 2021 - August 2021*
Undergraduate Researcher *Advised by Aleksander Mądry, Dimitris Tsipras and Saachi Jain*

- Studied the effect of data augmentation on deep representations.
- Trained ResNet18 models on CIFAR-10 with augmentation like grayscale, rotation and adversarial attack.
- Discover that data augmentation is not enough to achieve rotation invariant from standard and augmented representation analysis

Mathematics and Computer Science Department, Beloit College *October 2019 - June 2021*
Research Assistant (2021) *Advised by Donghoon Kwon*

- Performed a deep comparative analysis on machine learning models such as KNN, SVM, ANN using leaf dataset.
- Achieved an accuracy of 76.18% with ANN.

Research Assistant (2019, 2020) *Advised by Darrah Chavey*

- Coded module for the graph iterator that produces a stream of all possible graphs with specific attributes.
- Derived a bitmanipulation code to exchange row and column of a compressed adjacency matrix.
- Doubled the speed and performance of executing the task compared to brute force.

Information Technology Department, Beloit College *October 2020 - June 2021*
IT Programmer

- Wrote automated scripts that process raw student data.
- Managed users in Active Directory and Google servers.

PUBLICATION

P. H. Ngo and D. Kwon, "A Study on Comparative Analysis of Machine Learning Algorithms Using the Leaf Dataset," Journal of Industrial Information Technology and Application (JIITA), Vol. 5, Number 4, 2021.

TALKS

MIT Summer Research Program Poster Session, *Large Vision Language Model is Fooled by Optical Illusions*, August 2022.
Spring Research Symposium, *Psychological Experiments on CLIP: Could a Machine Learning Model Capture Human Cognition?*, Beloit College, April 2022.
Spring Research Symposium, *StyleWav: Guiding Image Synthesis Using Audio*, Beloit College, April 2022.
Midstates Consortium Undergraduate Research Symposium, *How Data Augmentation Affects What Neural Networks Learn*, November 2021.
IEEE MIT Undergraduate Research Technology Conference, *The Effect Of Data Augmentation on Deep Representations*, October 2021.
MIT Summer Research Program Poster Session, *How Data Augmentation Affects What Neural Networks Learn*, August 2021.
International Symposium on Innovation in Information Technology and Application, *A Study on Comparative Analysis of Machine Learning Algorithms Using the Leaf Dataset*, February 2021.

AWARDS

Presidential Scholarship *2019-2023*
- Awards $32,000 annually

Beloit College Grant *2019-2023*
- Awards $10,300 annually

MIT Summer Research Program, *Participant* *2021, 2022*

Ferwerda Merit Scholars *2021, 2022*
- Awards around 15 students at Beloit College with academic excellence in natural science.

Google Computer Science Research Mentorship Program, *Recipient* *2021*

Jackson J. Bushnell Mathematics Prize *2020*
- Recognizes excellence in mathematics of one freshman.

Consolation prize in the **Vietnamese National Olympiad in Informatics** *Top 100* *2018*

TEACHING EXPERIENCE

Learning Enrichment & Disability Services, Beloit College *November 2021 - Present*
Tutor
- Courses: Discrete Structures, Calculus I.
- Host one-on-one tutoring sessions to help students with coursework.

Mathematics and Computer Science Department, Beloit College *August 2020 - Present*
Teaching Assistant
- Courses: Intro to Object Oriented Programming, Data Structures and Algorithms.
- Organize office hours each week to help students understand programming concepts and approach the projects.
- Create JUnit tests for weekly course projects.

RELEVANT COURSEWORK

Computer Science: Algorithm Design & Analysis, Data Structures and Algorithms, Threads & Operating Systems, Computer Architecture, Computer Models & Languages, Computer Network, Intro to Object-Oriented Programming, Software Engineering Capstone, Database Capstone, Convolutional Neural Networks for Visual Recognition.
Math: Linear Algebra, Mathematical Statistics, Discrete Structures, Vector Calculus, Real Analysis, Abstract Algebra.
Other Courses: Principles of Economics, General Physics.

RELATED SKILLS

Key Skills: Machine Learning Algorithms, Deep Learning, Data Visualization, Data Analysis, Data Mining.
Programming Tools: Python, C++, Java, SQL, PHP, Git.
Packages: PyTorch Scikit-Learn, Matplotlib, NumPy, Pandas, Jupyter Notebook.
Platform: Linux, Windows, MacOS.
Languages: Vietnamese (Native), English (Full professional proficiency), Chinese (Elementary proficiency).
Others: Familiar with 3D printing, laser cutting, soldering.

LEADERSHIP AND COMMUNITY INVOLVEMENT

MakerLab *President, Supervisor* *February 2020 - Present*
- Oversee and instruct students how to use the 3D scanner, soldering iron, laser cutter, heat gun, and etc.
- Coordinate and prepare the material for monthly events.

Beloit College Minecraft Server *Administrator* *November 2020 - Present*
- Get funded by Beloit College to maintain a school Minecraft server.
- Code and install plugins, mods for the server.
- Manage the player base using database and Discord.

Putnam Practice Group *Member* *September 2020 - June 2021*
- Meet weekly to practice solving mathematical problems from the Putnam competition.

Students Who Code Project *President* *July 2017 - September 2020*
- Founded the first programming organization for high school students in Can Tho City.
- Developed simplified guides on modern languages, such as XML, Python, C++, with many real-life projects and even mobile applications.
- Introduced programming language to more than 200 students and held five events at school.