

WOOJOO NA

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EDUCATION

Tufts University

Sep. 2021 - Dec. 2023

MS in Computer Science | GPA : 3.96 / 4.0

- Master's Thesis Advisor : Abiy Tasissa
- Master's Thesis : Novel Ensemble learning method with applications in Weakly Supervised Learning

[2019-2021] : Mandatory military service in the Republic of Korea Army

University of Oxford

Oct. 2016 - July 2019

B.A. (Hons) in Mathematics | GPA : 3.5 / 4.0

RESEARCH EXPERIENCE

Data Intensive Studies Center, Tufts University

Sep. 2021 - Present

Graduate Researcher, Advisor : Professor Abiy Tasissa

- Independently, developed a novel ensemble learning algorithm, *RACH-Space*. Provided theoretical and empirical evidence on its state-of-art performance in weakly supervised learning, a type of semi-supervised learning where noisy labels are given as training data. It outperforms all existing methods by large margin on 14 real-world datasets.
- Currently under review at ICLR 2024. <https://arxiv.org/abs/2307.04870>

University of Oxford, Mathematical Institute

July 2019 - Dec. 2019

Undergraduate Researcher, Advisor : Professor Christophe Petit

- Developed a novel trapdoor attack against parameters suggested at NutMiC2019 conference on Cayley hash functions, using group theoretical approach
- Presented at the 17th IMA International Conference on Cryptography and Coding <https://malb.io/imacc2019/>

University of Oxford, Department of Computer Science

July 2019 - Dec. 2019

Undergraduate Researcher, Advisor : Professor Thomas Lukasiewicz

- Worked on similarities between word embeddings of transformer encoder and the conceptual space.
- Visualized the word embedding to help infer how convex manifolds in conceptual space imply same word category
- Results providing intuition behind the fact that words that belong to the same category share low dimensional features, similar to how words are perceived in the human brain

University of Oxford, Mathematical Institute

June 2018 - Oct. 2018

Undergraduate Researcher, Advisor : Dr. Andrey Kormilitzin

- Competed in the n2c2 challenge on Adverse Drug Events and Medication Extraction in EHRs
- Expolited CNN architecture and a character level word embedding model to demonstrate a robust approach to concept extraction and relation extraction.

University of Oxford, Department of Computer Science

June 2018 - Oct. 2018

Undergraduate Researcher, Advisor : Professor Thomas Lukasiewicz

- Worked on knowledge graph completion for ontology reasoning

PUBLICATIONS

“*RACH-Space: Reconstructing Adaptive Convex Hull Space with applications in weak supervision*”, Woojoo Na (Sole Author)

- <https://arxiv.org/abs/2307.04870> (Under review at ICLR 2024)
- Sole first author of the state-of-art machine learning algorithm for weakly supervised learning.

TALKS & PRESENTATIONS

“*Novel Ensemble learning method with applications in Weakly Supervised Learning*”

December, 2023

Master's Thesis Defense, Tufts University

“*Comparing One-Way and Two-Way eHMI Systems: The Impact on Trust in Human-Robot Interaction for Autonomous Vehicles*”

May, 2023

Presentation, Tufts University

“P2-equivariant Convolutional Networks on MNIST dataset” <i>Presentation, Tufts University</i>	<i>May, 2022</i>
“Bounding worst case errors of Weak Supervision Algorithms” <i>Tufts University Mathematics Graduate Seminar</i>	<i>April, 2022</i>
“Fake news detection and its impact on financial markets” <i>Best Prize, Poster session at 2021 Republic of Korean Army Start-up competition</i>	<i>November, 2021</i>
“Security of Cayley hash functions” <i>Invited speaker at Ewha Womens University, Cryptography and Mathematics Seminar</i>	<i>January, 2020</i>
“Trapdoor attack on Cayley hash function parameters proposed at NutMic 2019 conference.” <i>17th IMA International Conference on Cryptography and Coding https://malb.io/imacc2019/</i>	<i>December, 2019</i>
“A deep learning approach to concepts extraction from medical texts.” <i>Poster session at the University of Oxford, Mathematical Institute</i>	<i>October, 2018</i>

AWARD & SCHOLARSHIPS

- '22-'23 Tuft University Linda M. Abriola Graduate Fellowship (\$ 5,000, awarded to 2 best graduate students)
- '21-'22 Tuft University Linda M. Abriola Graduate Fellowship (\$ 5,000, awarded to 2 best graduate students)
- Lady Margaret Hall Academic Development Fund for Undergraduate research, 2018 (£500)

TEACHING EXPERIENCE

Tufts University, Department of Computer Science <i>Teaching Assistant, CS170 Computation Theory</i>	<i>Jan. 2023 - May. 2023</i>
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WORK EXPERIENCE

Republic of Korea Army, 2nd Artillery Brigade (Hwacheon, Korea) <i>Sergeant, Fire Direction Operator</i> - Computed ballistics calculations regarding angle and power of cannon fires and relayed the resultant commands to 6 K9 tanks - Awarded three awards from the brigadier general of my brigade for excellence, selected / trained to participate in the 21-1 CCPT(Combined Command Post Training) to facilitate work between the US Army and Korean Army	<i>Feb. 2020 - Aug. 2021</i>
Utpal Shanghvi Global School (Mumbai, India) <i>Project Intern</i> - Worked on economic sustainability and general health of villagers in Wada, Maharashtra, India - Initiated multiple long term projects, including water purification, flower ornament sales aimed at religious ceremonies. Helped villagers borrow 20 acres of unused farmland and farming resources free of charge.	<i>July 2017 - Aug. 2017</i>

LEADERSHIP AND SERVICES

Oxford Invariants (Oxford Mathematics Society) <i>Treasurer</i>	<i>April 2018 - April 2019</i>
Oxford Mathematical Institute (Problem Solving Matters program) <i>Mentor for underprivileged high school students</i>	<i>June 2018 - Oct. 2018</i>
St.Nicholas Primary School, (Oxford, UK) <i>Volunteer Mathematics Teacher for immigrant primary students</i>	<i>Oct.2016 - April 2018</i>

SKILLS AND RELEVANT COURSEWORK

Skills: Python, C++, R, JavaScript, MATLAB, Pytorch, Tensorflow
Coursework: Software Engineering, Machine Learning, Algorithms, Computation Theory, Computer Security, Linear Algebra, Group Theory, Statistics, Probability, Calculus, Numerical Analysis, Differential Equations, Algebraic Number Theory, Algebraic Geometry, Topology, Galois Theory, Set Theory