Minji Lee
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Education

PURDUE UNIVERSITY   West Lafayette, IN
Ph.D. Candidate, Technology   May 2021 – Aug 2024
Master of Science, Computer and Information Technology   Aug 2019 – May 2021
SEJONG UNIVERSITY   Seoul, South Korea
Bachelor of Fine Arts and Bachelor of College of Software Convergence   Mar 2012 – Feb 2017

Experience

Purdue University   West Lafayette, IN
Research Assistant in M2M Lab   Mar 2024 – Present
- Developing a DiT model combined with Patch n' Pack to create high-resolution images of people, trained on a vast dataset comprising real-world images containing individuals, primarily sourced from the COCO dataset.
- Designing and conducting experiments and simulations to test hypotheses and validate model predictions.

LG Innotek   Seoul, South Korea
Inno MLOps Research Aide in AI/BigData Solution Team   Jul 2023 – Aug 2023
- Designed and revised the MLOps platform (InnoMLOps) for manufacturing model utilization, enhancing the production of core components for mobile devices, automotive displays, semiconductors, and smart products.
- Developed an autonomous machine learning pipeline system as well as an AI model re-learning algorithm, resulting in a 2.1% improvement in model deployment efficiency.
- Generated +1,200 synthetic datasets using a diffusion model noise, enhancing data quality and quantity for training.
- Conducted research to compare and evaluate MLOps platforms such as AWS SageMaker, MLFlow, TFX, and Kubeflow, considering both business processes and performance metrics.

Argonne National Laboratory   Lemont, IL
Research Aide in Mathematics and Computer Science Lab   May 2022 – Aug 2022
- Aimed to create an Ansible script for the NVidia Nano node platform for students and scientists to develop edge-to-cloud software pipelines, fostering collaboration and innovation in data analysis and research.
- Utilized to explore the capabilities of machine learning and deep learning for intelligent sensor designs, facilitating experimentation and advancement in Sage Project [1].

Argonne National Laboratory   Lemont, IL (Virtual)
Research Aide in Mathematics and Computer Science Lab   May 2021 – Aug 2021
- Implemented integration of Node-RED into the IBM cloud computing platform and web portal inside of Docker managed by Kubernetes.
- Analyzed geographical and meteorological data from local conditions and events, facilitating real-time data collection in diverse environments wildfires, heatwaves, and storms.

Skills & Interests

Mathematics: Proficient in algebra, calculus, and statistics, with the ability to analyze and interpret complex mathematical models and familiarity with mathematical optimization techniques and probability theory.
Python3: Proficient in Python programming language, with experience in developing applications, scripts, and data analysis tools using libraries such as NumPy, Pandas, and Matplotlib.
PyTorch: Proficient in deep learning, adept at debugging dependency issues to ensure seamless implementation across diverse OS, with experience in building and training neural networks for computer vision.
Docker: Proficient in Docker containerization, capable of packaging applications and their dependencies into lightweight, portable containers for easy deployment and management.
Kubernetes: Familiar with Kubernetes container orchestration platform, including deployment, scaling, and management of containerized applications in production environments such as Argonne National Laboratory.

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Language proficiency
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- Fluent: English, Korean, and Japanese
- Moderate: Chinese

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Leadership and Activities
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Purdue University West Lafayette, IN
PMRI Education for Korean ROTC Military Officers Translator Sep 2023 – Oct 2023
- Acted as an interpreter for a specialized AI program designed for military officers, also serving as an assistant leader for a group of 17 officers.
- Sponsored by the Korean government institute for technology in collaboration with Purdue Military Research Institute (PMRI).
- Conducted seminars on the concept of confusion matrix in machine learning and facilitated hands-on experiences with computer vision in Python.
- Delivered lectures on UAV, UAS, antenna networking, and Explainable AI.

Purdue University West Lafayette, IN
NLP Research Assistant: Political Compass Evaluation of ChatGPT Aug 2023 – Dec 2023
- Collected +20 datasets to reveal the consistency of results of a ChatGPT political biases prompt using ChatGPT 4.0 Political Compass [2] plugin.
- Conducted natural language processing research based on the different model such as BERT and GPT family.
- Utilized XAI techniques including LIME and Shapley value analysis to interpret the behavior and decision-making processes of ChatGPT models.
- Revealed a bias towards progressive and libertarian views, with the average coordinates on the political compass being (-6.76, -6.18) (with (0, 0) the center of the compass, i.e., centrism and the axes ranging from -10 to 10), supporting the claims of prior research.

Purdue University Wichita, KS, USA and West Lafayette, IN, USA
Fallen Tree Detection Research Aide Jan 2022 –May 2022
- Utilized OpenCV library to process UAV aerial images obtained across diverse seasonal datasets on the Linux platform. Developed and optimized scanning techniques employing the Haar Cascade algorithm for robust tree detection.
- Conducted comprehensive comparisons between Haar Cascade-based methods and metrics derived from deep neural networks for performance evaluation.
- Proactively addressed and resolved intricate dependency-related challenges, including software version discrepancies, library conflicts, and system architecture disparities, ensuring smooth project execution.

Purdue University West Lafayette, IN
IITP Undergraduate Visiting Scholar Manager Aug 2019 – May 2021
- Instructed undergraduate-level classes on Python and Java socket programming at CNIT Polytechnic, guiding students through fundamental concepts and practical application.
- Facilitated hands-on learning experiences such as developing socket applications, allowing students to apply theoretical knowledge to real-world scenarios.
- Tutored and lectured on advanced machine learning topics, supporting participants for graduate school admissions and industry careers; as a result, achieved a 38% acceptance rate to top institutions like Princeton University and the UChicago as graduate students, as well as securing leading industry positions at companies like Samsung and SK Hynix.

Sejong Purdue Research Program 2016 West Lafayette, IN
Visiting Scholarship Manager May 2016 – Aug 2016
- Conducted extensive research as a student focusing on military army detection using advanced techniques in image processing and data analysis.
- Utilized aerial UAVs to collect relevant data and developed a comprehensive demo and simulation to showcase the effectiveness of the proposed methods.
- Engineered a mock-up prototype integrating cutting-edge, demonstrating practical applications and potential advancements in military surveillance and detection systems.

References

[1] Sage Project: https://www.anl.gov/mcs/sage-a-softwaredefined-sensor-network

[2] Political Compass: https://www.politicalcompass.org/