***Yuan LIU***

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NO. 3-11, Wenhua Road, Heping District, Shenyang, P. R. China

**EDUCATION**

**Northeastern University (NEU)**  Shenyang, China

***Master of Engineering of in Electronic Information, Artificial Intelligence***  09/2021-07/2024

* GPA: 3.8/4.0 | the Second Prize Scholarship (top 10%-25%), NEU, 2023
* Core Courses: System Engineering and Decision Analysis 94, Principles of Machine Vision Detection 92, Multi-Attribute Decision Theories and Methods 91, Image Processing Analysis and Recognition 90

**Northeastern University (NEU)** Shenyang, China

***Bachelor of Engineering of in Automation***  09/2016-07/2020

* GPA:3.6/4.0 | the Second Prize Scholarship (top 10%-25%), NEU, 2019
* Core Courses: Advanced Mathematics 96, Numerical Analysis 93, C Language Programming 95, MATLAB Language and Applications 93, Digital Signal Processing 95, Microcomputer Principles and Program Design 95, Fundamental of Modern Control Theory 93, Computer Control System 91, Operating Optimization and Artificial Intelligence 90

**RESEARCH EXPERIENCE**

**Project: Intelligent Adversarial Agents Based on Decision Making and Game Theory**

***Researcher,* Deep Learning and Advanced Intelligent Planning Institute, NEU** 04/2022-04/2024

* Proposed a novel algorithm named Regret-Growing Counterfactual Regret Minimization (RGCFR) which outperforms existing algorithms in Imperfect-Information Games and achieves good results in algorithmic complexity;
* Discovered a one-order lower smoothness in non-zero-sum decision problems by analyzing numerical characteristics and introduced a self-adaptive discounting mechanism pretrained by Q-learning method;
* Learned key algorithms in decision making and reinforce learning and received systematic scientific research training during the first intelligent decision - making research;
* Won Intellectual Property Award for Registered Software Copyright of Game Theory Supported Big Data Decision System.

**Project: Autonomous Driving Image Recognition and 3D Positioning System Based on YOLO-V5 and PSM-Net**

***Research Assistant,* Institute of Image Recognition and Machine Intelligence, NEU**  09/2021-01/2022

* Proposed an integration method combining YOLO - V5's object detection and PSM - Net's 3 - D localization to achieve stereo imaging perception in autonomous driving;
* Improved CSPNet in YOLOv5 by adding new convolutional layers to the C3N structure, enhancing deep feature extraction especially for small objects and achieving better performance than several algorithms on relevant datasets;
* Engaged in a deep learning project related to self - driving, which served as my first deep learning practice and provided an opportunity to familiarize myself with intelligent decision making.

**Undergraduate Thesis & Project: An Oscilloscope Program Based on STM32 Embedded System**

***Research Assistant,* Laboratory of Innovative Electronic Technology, NEU** 03/2018-05/2019, 11/2019-04/2020

* Developed a real - time harmonic analysis and oscilloscopic STM32 embedded system based on Fast Fourier Transform and Mathematical Modelling with specific frequency and amplitude tolerances;
* Engineered system and algorithm design, proposed a real-time sub-bin frequency estimating algorithm via spectrum leakage modelling and an “overtone signal trigger stabilizer” for special signals to ensure waveform stability;
* Gained mastery in algorithm optimization, integration of math modelling and real - time signal processing, and embedded system software development through the research;
* Won the 3rd prize in the National Undergraduate Electronics Design Contest in 2018, 3rd place in the Electronics Design Contest in NEU, 2019.

**OTHER PROJECTS AND ACTIVITIES**

**GPT-2 Language Model Trained from Scratch**

***Researcher,* Deep Learning and Advanced Intelligent Planning Institute, NEU** 12/2023-present

* Reproduced GPT-2, trained on edu-fineweb dataset, reached 38% score on Hellaswag test up to 09/2024.
* A series of optimizations for the training process, introduced flash attention to GPT-2, and optimized the vocabulary size, boosted the training process by 18% on an 8-GPU(A100) group.
* Mastered CUDA, C and python mix programming, and distributed data parallel training. More funny model variants are coming this winter.

**Intelligent Drone Flight Planning Algorithm for Emergency Material Dispatching**

***Contest Participant*, The Mathematical Contest in Modeling, COMAP** 01/2019-02/2019

* Used genetic algorithm to solve the optimization problem of disaster relief material allocation in the case of limited drone range and load capacity

**Teaching Assistant on Calculus and Linear Algebra for freshman STEM students**

***Teaching Assistant*, Collaborated held by College of Science and Volunteer’s Department, NEU** 11/2017-12/2017

* Volunteer qualification: sophomore students who ranked top 3% (College-wide) in the Calculus/Linear Algebra in either their first or second semester of their freshman year.
* Helped the freshman student who needed assist (score below 80 in mid-term) on Calculus/Linear Algebra. Also introduced and explained a series of stories untold by the textbooks, like the origin and development of definitions or conventions. Especially, I introduced an intuitive, from-scratch learning path for Fourier Transform.
* Ranked the “Most Popular Senior Mentor” (top 10 out of 142, University-wide). In the final exam, my class got an average score 7.2-points (stddev=4.6) among the average of other classes (79.2).

**AWARDS**

* The Second Prize (tier H, top 10%-35%) of the Mathematical Contest in Modeling, held by Consortium for Mathematics and its Applications (COMAP), 2018, 2019
* National Mathematics Competition for Undergraduates, China, Second Prize (top 1-2%) National Prize, First (top 10%) Provincial Prize, held in 2019; Third Prize (top 2-5%) National Prize, First (top 10%) Provincial Prize, held in 2017
* Mathematics Competition held by Northeastern University, China, 10th Place, First Prize, (1-10th Place in over 2000 STEM-related freshman students), 2017

**SKILLS**

* Programming: Python, C/C++, CUDA
* Software & Tools: PyTorch, MATLAB & Simulink
* Other skills: Automatic transaction and investment by gold price prediction based on machine learning