Yiwen Lu

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EDUCATION

Beijing Jiaotong University, Beijing, China — Enrolled: Sept 2021 — Expected: Jul 2025
Computer Science — GPA: 3.74/ 4 88.4/ 100
Key Courses: Computer Vision, Deep Learning(A), Discrete Mathematics(A), Probability Theory and Mathematical Statistics(A), Numerical Methods(A), Introduction to Artificial Intelligence(A), Fundamental of Digital System(A)

RESEARCH EXPERIENCE

2024 Summer NC State Campus GEARS Program, NC State University — Advised by: Chenhan Xu
Research Assistant

- Explored new facial recognition technologies to mitigate security threats posed by generative AI.
- Involved machine learning (deep learning), data-driven methods, and imaging techniques.

Institute for Artificial Intelligence, Peking University — Advised by: Aming Li
Research Assistant-Swarm Intelligence — Nov 2023 - Present

- Researching on swarm intelligence and evolutionary game theory.
- Studied the game strategy update mechanism under incomplete information on complex networks.

Institute of Network Science and Intelligent Systems, Beijing Jiaotong University — Advised by: Huaiyu Wan
Research Assistant-Spatio-temporal Data Mining — Apr 2023 - Present

- **Upstream Task:** A novel spatial-temporal contrastive diffusion framework for check-in sequence generation
  - Proposed an innovative spatial-temporal vector representation for encoding user interest point sequences.
  - Participated in the design of the contrastive diffusion process and conditional U-Net architecture.
- **Downstream Task:** Check-inLLM Framework
  - Developed a novel framework to leverage large language models (LLMs) for extracting insights from check-in sequences across various tasks.
  - Applied advanced techniques to enhance the model's ability to interpret and utilize check-in data effectively.

INTERN EXPERIENCE

Huawei Technologies Co., Ltd. — Beijing, China
Huawei Kunpeng Developer Program, Kunpeng BoostKit Function Library Development — Sept 2023 - Jan 2024

- Conducted disassembly and analysis of x86 programs using IDA Pro and successfully translated disassembled x86 code to ARM architecture through meticulous step-by-step replication.
- Ensured the precision of the developed libm interfaces matched exactly with the x86 imf2021 function interfaces, achieving 100% consistency in calculations.
- Validated the robustness of the implementation with over one million test cases, ensuring identical results for all input parameters.

IFLYTEK Co.,Ltd. — Hefei, China
Summer Intern, Software Engineer — Jul 2023 - Aug 2023

- Contributed to the development of the iFlyAICC Intelligent Contact Center project, integrating multiple advanced technologies including softswitch, automatic call distribution, audio/video communication, and artificial intelligence.
- Played a key role in developing critical features for the agent workspace, such as data monitoring and customer management functionalities, enhancing the overall efficiency and effectiveness of the contact center.

PUBLICATIONS

- **Check-inLLM: Mining Human Mobility Essence via Imminent Intention and Intrinsic Behavior**
  Letian Gong, Yan Lin, Xinyue Zhang, **Yiwen Lu**, Xuedi Han, Yichen Liu, Shengnan Guo, Youfang Lin, Huaiyu Wan
  NeurIPS 2024 Conference Submission
- **Research on Prediction of Key Points in Tennis Matches Based on Neural Network and Momentum Analysis**
  Yiwen Lu
  IPIIS 2024

PROJECTS

Check-inLLM Framework Dec 2023 - Present

- Proposed an imminent intention memory network (IIMN) for capturing users' imminent intentions. This network includes an imminent GRU layer with an intention-decay attention mechanism to effectively capture imminent intentions over time.
- Introduced a shared pool of human intrinsic behavior prompts (HIBP) across different domains, leveraging related past experiences to comprehensively understand human intrinsic behaviors. This allows the model to selectively recall the most representative prompts for individual check-in sequence inputs.
- Conducted extensive experimentation on four benchmark datasets across three downstream tasks, demonstrating superior performance. Notably, achieved robust results in cross-domain pre-training with an average improvement of 12.8% across all downstream tasks, highlighting the potential of foundational models in comprehending human behavior.

A novel spatial-temporal contrastive diffusion framework for check-in sequence generation

- Participated in the design of the contrastive diffusion process and conditional U-Net architecture.
- Optimized the extraction of effective data from four datasets comprising millions of records, providing high-quality learning samples covering both campus and urban check-in sequences.
- Contributed to the experimentation and evaluation of Baseline models.

3D Object Detection based on Point Cloud, Competition Project Sept 2023 - Dec 2023

- Utilized the OpenPCDet library to preprocess raw point cloud data into a format suitable for network input.
- Used the TED model's sparse convolution backbone to extract transformation-equivariant voxel features.
- Aligned and aggregated these equivariant features into a lightweight and compact representation for high-performance multi-category 3D object detection on a private competition dataset.

Exploration of medical image segmentation based on UNet and Transformer architecture, Course Project Jun 2023 - Aug 2023

- Reproduced a research paper from scratch, integrating the strengths of convolutional and attention strategies to propose an efficient self-attention mechanism.
- Introduced a novel self-attention decoder to recover detailed information from skip connections within the encoder.
- Employed advanced training techniques, including:
  - Pre-activation ResBlock: Enabled direct information flow between any two modules during forward and backward propagation, enhancing network efficiency.
  - Dice Loss: Achieved superior performance in handling class imbalance and segmenting images with small but numerous targets.

HONORS and AWARDS

Excellent Acadamic Scholarship Third Class (top 15% of School) x2 Oct 2023
Student's Innovation Training Program, Sponsored by the Ministry of Education May 2023
Outstanding Student Leader in Beijing Jiaotong University May 2023
Beijing Big Data Skills Competition Intelligent Connected Track, 4th Place Nov 2023
China Undergraduate Mathematical Contest in Modeling, Provincial 2nd Price Sept 2023
The Chinese Mathematics Competition, Provincial 2nd Price Nov 2022
Chinese Girls' Mathematical Olympiad, Bronze Price Aug 2020

SKILLS

- **Language Skills:** TOEFL: 96(22) CET-6: 584
- **IT Skills:** Python, C++/ C, Java, SQL, Deep Learning, Reinforce Learning, HTML/CSS
- **Communication Skills:** Chairman of the Scientific Research Platform, Student Science and Technology Association, Beijing Jiaotong University