YUANPENG QU

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EDUCATION

University of Tsukuba — Ibaraki, Japan
PhD 3rd year in Intelligent and Mechanical Interaction Systems — *Apr 2023 – Mar 2026 (Expected)*

University of Tsukuba (Num of A: 10/12) — Ibaraki, Japan
Master of Engineering in Intelligent and Mechanical Interaction Systems — *Apr 2021 – Mar 2023*

Jilin University (GPA: 3.87/4) — Jilin, China
Bachelor of Engineering in Computer Science — *Sept 2016 – July 2020*

RESEARCH EXPERIENCE

Intent-aware Diffusion for Sequential Recommendation — June 2024 – Present
Ph.D. Research — *University of Tsukuba, Ibaraki*

- **Model:** Proposed InDiRec, a contrastive learning framework that combines intent clustering and conditional diffusion to generate semantically aligned augmented views for sequence embedding representation learning. Trained with a Transformer backbone (SASRec) using multi-task learning for recommendation, diffusion, and contrastive alignment.
- **Data:** 5 public real-world datasets (e.g., Amazon Review, ML-1M), with over 2M user–item interaction records, preprocessed into sequential format (user_id item1 item2 ...) representing each user's behavior history.
- **Results:** Achieved an average improvement of +13.2% in HitRate and +20.7% NDCG over strong baselines; maintained robust performance under sparse and noisy conditions. Accepted at SIGIR 2025 (Full paper track, Core A*).

Latent-Guided Diffusion for Efficient Sequential Recommendation — Jan 2024 – Dec 2024
Ph.D. Research — *University of Tsukuba, Ibaraki*

- **Model:** Developed LGD4Rec, a generative framework combining VAE-based latent space encoding and diffusion modeling. Introduced latent-space-only diffusion and classifier-free personalized guidance to enable efficient and controllable item sequence generation.
- **Data:** 4 benchmark datasets with user-item sequences preprocessed into latent representations via variational encoding.
- **Results:** Achieved up to +9.7% HitRate and +7.7% NDCG improvements over strong baselines, with approximately 2× faster training than full-space diffusion models. Accepted at ICONIP 2024 (Oral, Core A).

Explainable Recommendation via Filter-Enhanced Transformer — Jan 2022 – Dec 2023
M.Sc. Research — *University of Tsukuba, Ibaraki*

- **Model:** Proposed TSIER, a Transformer-based model with an FFT-based filter layer to extract clean time-series signals from user histories. Designed a modified attention mask to align predicted items with sequential context, enabling joint learning of recommendation and explanation tasks.
- **Data:** Used Yelp, TripAdvisor, and Amazon datasets; each sample constructed as a 4-tuple consisting of the user's purchase history embedding, target item ID, review-based feature vector, and tokenized review text (Max 100 characters).
- **Results:** Outperformed baselines with up to +2.0% on the explanation generation task and +3.9% on the sequential recommendation task, generating more relevant and interpretable explanations.Published in IEEE Access, 2024 (IF 3.4).

SELECTED PUBLICATION

First author & Peer reviewed

- **Y. Qu** and H. Nobuhara: Intent-aware Diffusion with Contrastive Learning for Sequential Recommendation. In Proceedings of the 48th International ACMSIGIR Conference on Research and Development in Information Retrieval (SIGIR), Padua, Italy, July 13-18, 2025.[**Just Accepted, Core A***]
- **Y. Qu** and H. Nobuhara: Intent Representation Learning for Sequential Recommendation via Latent Guided Diffusion. 31st International Conference on Neural Information Processing (ICONIP), Auckland, New Zealand, Dec 2-6, 2024.
- **Y. Qu** and H. Nobuhara, "Generating Explanations for Explainable Recommendations Using Filter-Enhanced Time-Series Information," in IEEE Access, vol. 12, pp. 78480-78495, 2024.
- **Y. Qu** and H. Nobuhara: Explanation Generated for Sequential Recommendation Based on Transformer Model. Joint 12th International Conference on Soft Computing and Intelligent Systems and 23rd International Symposium on Advanced Intelligent Systems (SCIS&ISIS), Ise-Shima, Mie, Japan, Nov 29 - Dec 2, 2022. [**Best Student Presentation Award**]

Projects Experience

Matrix Factorization-based Job Recommendation System   Jan 2023 – Aug 2023

Python, Java, Pytorch, SpringBoot, MongoDB, Redis, React   *ML Web System, Tokyo*

- Built a personalized job-matching system to address response delays and low recommendation precision in traditional online recruitment platforms.
- Collected and cleaned data from 100k+ job listings and 10k+ companies via web crawling, storing results in MySQL and MongoDB databases.
- Designed a two-stage hybrid recommendation architecture:
  - Offline module: Applied Matrix Factorization to decompose the user–job interaction matrix into low-dimensional latent vectors and reconstructed predicted scores via matrix multiplication, enabling personalized job ranking.
  - Online module: Deployed real-time recommendation engine using cosine similarity over latent vectors with loss-based adjustment; achieved sub-300ms response via Redis caching.
- Developed a web-based interface using SpringBoot (Java) and React (HTML/CSS/JavaScript); supported search, login, and personalized recommendations; tested with 500+ users during pilot.

Smart Plant Pot R&D   June 2022 – Mar 2023

Python, C, ESP32, OpenCV   *AI-IoT Project, Tokyo*

- Designed and built a desktop smart plant pot equipped with multiple sensors (humidity, temperature, image sensor, etc.), a display and interactive components using ESP32 and Python.
- Integrated YOLO and OpenCV for real-time face tracking via an onboard camera and IR sensor, enabling synchronized eye-movement display on the plant pot.
- Enabled basic human–plant interaction through a trained voice model and a built-in display, while using multi-sensor data and condition-based logic to support essential environmental factors for healthy plant growth.
- Completed development and successfully delivered the product for mass production at the partner company, serving as a core member of a small team and leading the technical design & main implementation.

Full-Stack Development for Web-Based Systems   June 2019 – Oct 2020

Java, SpringMVC, MySQL, React   *Contest, Independent Project, Jilin*

- Designed and developed multiple full-stack web applications, including a logistics scheduling system & dashboard (for a supply chain competition), an online bookstore, and an e-commerce platform.
- Implemented core business logic using the Java SpringMVC framework, managed relational data with MySQL, and integrated third-party APIs (e.g., shipping, payment, product search).
- Built responsive user interfaces with HTML/CSS/JavaScript and React, supporting real-time interactions, order tracking, and user authentication.
- Built modular components for inventory tracking and logistics visualization, improving maintainability and real-time responsiveness.

Skills

- **Expertise:** Recommender System, Sequential Recommendation, Diffusion Models, Contrastive Learning, Multi-task Learning, Variational Autoencoders, Transformer, Latent Intent Modeling & Disentanglement, Explanation Generation, Item Embedding Generation, User Behavior Analysis, Causal Inference
- **Programming languages:** Python, Java, C/C++, JavaScript, HTML/CSS, SQL, Linux, Latex
- **Frameworks & Tools**: Pytorch, Tensorflow, Scikit-learn, NumPy, SpringBoot, MongoDB, React, Node.js
- **Languages:** Japanese (Fluent, JLPT N1), English (Fluent, TOEIC 845, TOEFL 85), Chinese (Native)
- **Qualifications:** Regular driver's license (AT)
- **Interest:** Travel, Photography, Badminton

Awards

- Selected for the JST SPRING Program (Next-Gen Research Fellowship, $20,000/year)
- Won the Best Student Presentation Award at the international conference SCIS&ISIS 2022
- Selected as an Outstanding Graduate of Jilin University, 2020
- Awarded First-Class Scholarship for three consecutive years, 2017 – 2020
- Received the Outstanding Student Award for three consecutive years, 2017 – 2020