# Ren Zhiyan

Master Student, The University of Tokyo
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**Address:** Kashiwa, Chiba, Japan
**Nationality:** Chinese **Age:** 22 **Gender:** Female

## CAREER OBJECTIVE

Aspiring data engineer and system developer with foundational experience in Python, computer vision, and data analytics. Known for strong English communication skills and the ability to quickly absorb guidance and integrate solutions in goal-oriented environments. Eager to grow in real-world technical teams through contribution, iteration, and continuous learning.

## EDUCATION

**The University of Tokyo** Kashiwa , Japan
Master Student, Department of Environmental Systems, Graduate School of Frontier Sciences Sep. 2024 – Present

- Affiliated with the Mizuno Laboratory, under the supervision of Prof. Katsunori Mizuno.
- Exploring the application of computer vision and machine learning techniques to address environmental challenges, particularly in the context of marine litter detection.
- Currently focusing on research design, dataset exploration, and method selection for future multispectral UAV-based detection tasks.
- Collaborating with lab members on a joint research paper and weekly presentations in a bilingual environment.
- ***Key Courses***: Foundations of Environmental Informatics and Sensing, Ocean Data Science, Intelligent World Informatics Lecture I & V, Natural Language Processing, Software Cloud Development Project Practice I.
- Earned the highest available grade (A) in all completed courses.

**Tohoku University** Sendai , Japan
Exchange Student through JYPE Program, IIC Laboratory (Machine Learning Research) Oct. 2023 – Feb. 2024

- Conducted research on cross-modal pedestrian re-identification using variational distillation information bottleneck (VIB) under the supervision of Prof. Shinichiro Omachi.
- Presented research outcomes in English at international lab meetings and final poster sessions.
- Gained deeper insights into Japanese academic culture and society, and built lasting friendships with international peers from diverse backgrounds.
- ***Key Courses***: Individual Research Training, Ecology and Evolution, Japanese Culture, Beginning Comprehensive Japanese.
- Achieved the highest possible grade (AA) in all courses completed.

**Xidian University** Xi'an , China
Bachelor of Science in Computer Science, School of Computer Science and Technology Sep. 2020 – Jun. 2024

- Completed a four-year undergraduate program in computer science with a concentration in big data and intelligent systems.
- GPA: **3.8**/**4.0**. Ranked among the top 20% of the department.
- Key Courses: Data Mining, Machine Learning, Computer Vision, Artificial Intelligence, Data Visualization, Multimedia Processing, Python Programming, Software Engineering, Linear Algebra.

## SKILLS & RESEARCH FIELDS

**Languages:**
Chinese (native), English (TOEFL 103, TOEIC 850, fluent academic use), Japanese (intermediate reading/listening; beginner writing/speaking; actively improving)
**Programming:**
Python (proficient), C (intermediate), Java (intermediate), SQL (basic), HTML/CSS/JS (basic), LaTeX (proficient)
**Frameworks & Tools:**

PyTorch, TensorFlow, OpenCV, Git, Linux, Jupyter Notebook,Excel, Power BI, ChatGPT

**Technical Interests:**

Applied Machine Learning, Computer Vision, Object Detection, Data-Driven Problem Solving, AI for Social Impact

## HONORS, PUBLICATIONS & PATENTS

### Honors & Scholarships

- JASSO Scholarship, Japan Student Services Organization (***Oct. 2023 – Jan. 2024***)
- Outstanding Student Award, Xidian University (***2023***)
- National / Provincial Awards in Innovation Competitions: **China Undergraduate Computer Design Competition** (2023: National Third Prize, 2022: Provincial First Prize), **National Innovation Training Program** (2023 & 2022: Outstanding Conclusion), **Challenge Cup Shaanxi** (2023: Provincial First Prize), **"Internet+" Innovation Competition** (2022–2023: Multiple Provincial Awards)
- Intramural Scholarships, Xidian University (***2021–2023: Third to First Class***)

### Selected Publications

- Zhao, F., **Ren, Z.**, et al. (2025). *Smart UAV-assisted rose growth monitoring with improved YOLOv10 and Mamba restoration techniques*. Smart Agricultural Technology, 10, 100730.
- Zhao, F., **Ren, Z.**, et al. (2024, Sept). *YOLOv10 and Mamba-Based Super-Resolution for Smart Rose Growth Monitoring Using UAV Imagery*. In *CCSB 2024 (IEEE)*. **Best Poster Award**
- Zhao, F., et al. (2025). *Seafloor debris detection using underwater images and deep learning-driven restoration*. Marine Pollution Bulletin, 214, 117710.
- Zhao, F., et al. (2025, March). *Underwater Sea Cucumber Detection Using Consumer-Grade Amphibious UAV*. In *IEEE UT 2025*.

### Patents

- Appearance Design Patent (2023): Steel Counting GUI for Mobile Phones
- Software Copyright (2022): JiaCaiLiShu — Smart Steel Pipe Counter WeChat Applet

## RESEARCH EXPERIENCE

### Marine Litter Detection using UAV-based Multispectral Imaging

Master Student, Mizuno Lab, The University of Tokyo — Dec. 2024 – Present

- Designing a controlled water-tank experiment to simulate ocean conditions and collect multispectral imagery of marine litter.
- Preprocessing and analyzing spectral data to support classification, with a focus on integrating computer vision and machine learning techniques into detection workflows.
- The project involves ongoing exploration of spectral detection strategies, band selection, and the application of visual recognition pipelines under diverse marine litter conditions.
- Within this broader context, studying the adaptability of visual recognition methods across underwater and surface environments.

### Smart Rose Monitoring via Object Detection and Image Super-Resolution

Second Author, Supervised by Prof. Mizuno Katsunori, The University of Tokyo — Jun. 2024 – Mar. 2025

- Contributed to a UAV-based rose monitoring system combining object detection (YOLOv10) and image restoration (Mamba-based super-resolution) using multispectral imagery.
- Focused on model interpretation and performance validation through Grad-CAM-based visualization and comparative analysis of prediction outputs.
- Involved in the full research workflow, including method design discussions, experiment planning, result analysis, and manuscript writing.
- Co-authored two papers (journal & conference), one of which received the Best Poster Award at IEEE CCSB 2024.

### Gesture Recognition in Low-Light Conditions using Variational Information Bottleneck

Project Lead, Supervised by Lecturer Li Yunan, Xidian University — Jun. 2023 – Jun. 2024

- Led a full-stack gesture recognition project targeting low-light environments, from dataset construction to model design and evaluation.
- Proposed a novel multi-branch neural network integrating the Variational Information Bottleneck and representation distillation, with additional compactness and mutual information constraints.
- Achieved notable improvements in recognition accuracy over baseline models through iterative training and ablation analysis.
- The project was supported by the National Innovation and Entrepreneurship Training Program.

## PROJECTS

**Spotify Track Analysis and Music Recommendation Prototype**
Self-Initiated Project — Mar. 2025 – Present

- Conducted exploratory analysis of Spotify audio features using Excel and SQL-style queries to uncover genre, tempo, and mood-related patterns.
- Organized and cleaned data across multiple fields including loudness, energy, and valence to support clustering and comparison.
- Designed interactive dashboards in Power BI to visualize track groups, feature distributions, and genre preferences.
- Prototyping a basic recommendation logic using similarity metrics, with planned extension to real-time API integration.

**Sea State Clustering and Maritime Accident Risk Mapping**
Team Leader and Main Developer, Ocean Data Science (The University of Tokyo) — Jan. 2025 – Feb. 2025

- Led a team project analyzing sea state data and maritime accident records to assess hazard risk in the East China Sea.
- Integrated wave, wind, and incident datasets; applied MiniBatch KMeans and PCA to cluster sea conditions and identify high-risk patterns.
- Created hazard maps based on cluster distribution and spatio-temporal accident density.
- Proposed improvements using AIS data for real-time hazard prediction, combining analytical and operational perspectives.

**Recipe Clustering Analysis Using KMeans and NLP**
Independent Project, Data Mining Introduction (The University of Tokyo) — Dec. 2024 – Jan. 2025

- Conducted a solo project analyzing a 5,000-entry recipe dataset combining numeric, categorical, and textual data.
- Extracted TF-IDF features from ingredients and cooking steps; applied KMeans and PCA for pattern discovery and dimensionality reduction.
- Evaluated feature impact using Random Forest and visualized cluster patterns through heatmaps and scatter plots.
- Built a prototype recommendation framework informed by clustering insights.

**JiaCaiLiShu – Smart Steel Pipe Inspection and Warehousing System**
Frontend Developer and CV Logic Contributor, Xidian University — Dec. 2022 – May 2024

- Co-developed a full-stack WeChat mini program enabling automated steel pipe counting using OpenCV-based image segmentation and Python Flask backend.
- Led frontend UI/UX design for real-time warehouse inventory, image capture, and result visualization.
- Participated in testing and logic review of the recognition pipeline using ResNet for accurate pipe orientation detection.
- Completed the full integration pipeline from image input to MySQL warehouse registration; the project received multiple provincial awards and national recognition.

## ADDITIONAL INFORMATION

- **Interests:** Music, Movie, Programming, Reading
- **GitHub:** github.com/Yoko0709
  (Portfolio setup in progress – selected project repositories will be added gradually.)