Wenqi Zhao

Phone: (+86)188-5212-8835 | Email:zwq@stu.cqu.edu.cn

EDUCATION

Chongqing University   Chongqing, China

Master of Mathematics in Computational Mathematics, College of Mathematics and Statistics   Sep 2021 - Jun 2024

- Overall GPA: 3.58/4.00 (85.58/100)

Core Courses: Image processing(94), Probability theory and mathematical statistics(97), Scientific computing(94), Numerical Solution of Partial Differential Equation(90), etc.

Jiangsu Normal University   Xuzhou, China

Bachelor of Science in Mathematics, College of Mathematics and Statistics   Sep 2017 - Jun 2021

- Overall GPA: 3.3/4.00 (83/100)

- Core Courses: C Programming Language(98), Differential Geometry (90), Point-Set Topology(89), Mathematical Statistics(89), Ordinary Differential Equations(88).etc.

PUBLICATIONS

- **Zhao, W.**, Sang, J., Cheng, F., Shu, Y. & Li, D. (2025). RefLSM: Reflectance-based Level Set Model for Medical Image Segmentation in the Presence of Severe Intensity Inhomogeneity. ***Submitted** to **Transactions on image processing.***

- Cheng, F., Li, X., Wu, H., Sang, J., & **Zhao, W.** (2024). Recent Advances on Multi-Modal Dialogue Systems: A Survey. ***Advanced Data Mining and Applications(ADMA) 2024***.

- **Zhao, W.**, Sang, J., Shu, Y., & Li, D. (2024). Robust image segmentation and bias field correction model based on image structural prior constraint. ***Expert Systems with Applications***, 251, 123961.

RESEARCH EXPERIENCE

RefLSM: Reflectance-based Level Set Model for Medical Image Segmentation in the Presence of Severe Intensity Inhomogeneity.

Individual Project   Advisor:Professor Yonglu Shu, Professor Dong Li, Chongqing University   Chongqing, China   Sep 2024- Present

- Developed a segmentation model for image segmentation and bias field correction, constructing an innovative framework based on the reflectance component from Retinex theory to capture intrinsic texture information in medical images even with bias field interference.

- Incorporated a binary level set function to enhance the robustness of the model to images against noise.

- Introduced a novel prior constraint term to effectively restore image intensity and improve boundary localization, significantly enhancing the bias field correction and segmentation accuracy.

- First authored and contributed to the model conceptualization, methodology design, validation, data curation, writing of the original draft, review and editing, and visualization tasks.

Recent Advances on Multi-Modal Dialogue Systems: A Survey   Chongqing, China

Research Collaborator   Advisor: Professor Xue Li, The University of Queensland   Mar 2024 - Sep 2024

- Conducted a comprehensive review of recent advancements in multi-modal dialogue systems, categorizing them based on seven task types

- Compiled and analyzed benchmark datasets used in pre-training and fine-tuning stages, highlighting their relevance to multi-modal conversational agents.

- Compared evaluation metrics and identified key challenges such as modality gaps, biases in evaluation metrics, long non-linguistic contexts, and harmful content in conversational AI.

- Proposed future research directions to improve the integration of multi-modal interactions in conversational systems.

Robust Image Segmentation and Bias Field Correction Model Based on Image Structural Prior Constraint   Chongqing, China

Individual Project   Advisor:Professor Yonglu Shu, Professor Dong Li, Chongqing University   Apr 2023 - March 2024

- Proposed an innovative variational model for image segmentation and bias field correction, incorporating structural prior constraints to segment images with blurry edges under non-uniform illumination.

- Developed a novel spatial prior constraint term using image reflectance to enhance segmentation accuracy against illumination interference.

- Introduced adaptive regularization and the binary level set assumption to improve segmentation efficiency and robustness against noise.

- Designed and conducted extensive comparative experiments using five evaluation metrics (Dice, IoU, Accuracy, JS, and VOE) on diverse image types, including medical, natural, and synthetic images.

- First authored and contributed to the Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing, Visualization.

PROJECT EXPERIENCE

Improved LGDF Model Based on Multi-Scale Mean Filtering Preprocessing   Chongqing, China

Team Leader, Course Project   Sep 2022 - Jan 2023

- Developed the LIGDF model with a multi-scale statistical analysis framework by integrating low-pass filtering, significantly improving segmentation efficiency and robustness under varying illumination conditions.
- Proposed a completely new regularization term function, which converges to a steady state faster than traditional regularization term functions to improve the segmentation speed.
- Segmented images with non-uniform intensity while also performing intensity correction, thereby improving the corrected images.

Addressing Imbalanced Data Problem in Credit Risk Prediction using Machine Learning   Chongqing, China

Individual Project, College Contest Project   Feb2022 - Jul 2022

- Applied advanced techniques, including SMOTE oversampling and KNN analysis, to synthetically balance the dataset by generating minority class samples.
- Utilized the threshold moving method to optimize ROC curve thresholds, improving predictive accuracy through weighted treatment of imbalanced data.
- Conducted rigorous experimentation with diverse classifiers: Logistic Regression, SVM, Decision Trees, Random Forest, and Neural Network models, achieving remarkable results with the Random Forest model and attaining an impressive 96.77% overall accuracy and an outstanding 97.90% accuracy in prediction.

CNN Research Project :Mask Detection   Chongqing, China

Individual Project, College Contest Project   Sep 2021 - Jan 2022

- Deployed a mask detection system by utilizing the VGG16 convolutional neural network (CNN) model and enhancing existing methodologies.
- Conducted dataset preprocessing and established its contextual significance in the context of COVID-19 prevention.
- Proficiently trained the Kernel Ridge Regression and Gaussian Processes models through strategic feature engineering, including image selections, filter adjustments, and fine-tuning of convolutional layers and employed advanced techniques such as 1x1 convolution filters, Max-pooling layers with a 2x2 window and stride, feature extraction, and weight adjustment through backpropagation.

Project: Song of Black & White – Reversi Game Development   Xuzhou, China

Team Leader, Course Project   Sep 2019 - Jan 2020

- Developed a Reversi game in C with EasyX graphics, featuring an 8x8 board, valid move detection, and piece-flipping logic.
- Implemented four AI difficulty levels (Beginner to Hard) using randomized moves, max-conversion algorithms, and positional weight tables.
- Designed Chinese-themed interfaces (start screen, difficulty selection, story and rule pages) with background music effects, and optimized rendering via batch drawing to eliminate flickering.

TEACHING EXPERIENCE

Fundamental Mathematics   Chongqing, China

Teaching Assistant   Advisor:Professor Junliang Wu, Chongqing University   Feb 2023 - Jul 2023

- Assisted professors in designing and administering weekly problem sets and examinations for 100+ calculus students, covering topics including limits, derivatives, integrals, and multivariable calculus.

Probability Theory and Mathematical Statistics   Chongqing, China

Teaching Assistant   Advisor:Professor Junliang Wu, Chongqing University   Sep 2022 - March 2023

- Designed and led tutorial sessions guiding students to apply probability models and statistical inference methods to solve practical problems, leveraging my expertise in stochastic processes and optimization algorithms.

AWARDS

- Academic First-Class Scholarship   *Chongqing University*   Sep 2022 - Jun 2023
- Academic First-Class Scholarship   *Chongqing University*   Sep 2021 - Jun 2022
- Third Prize, 11th National Mathematics Competition for College Students (Category B)   Sep 2019 - Jun 2020
  (Chinese Mathematical Society | 2019)   Jiangsu Normal University

SKILLS & OTHERS

- **Technical Skills:** Matlab, C/C++, python, LATEX, etc
- **Interests:** Highland Trekking, Badminton, Sketching

Research Interests

- Computer Vision
- Computing Methodologies
- Machine learning and data science