Yasong **Liu**

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Education

University of Electronic Science and Technology of China   *Chengdu, China*

Master of Science in Mathematics   *Sep.2022 - Present*

- Advisor: Huazhong Lü
- GPA: 3.77/4.0
- Relevant Courses: Data mining and machine learning, Theory of Combinatorial Design and Optimization (93), Numerical Analysis (91.9), Graph Theory and its Application (87), Computational Complexity (95), Combinatorial Mathematics (87)

Henan University of Engineering   *Zhengzhou, China*

Bachelor of Pure and Applied Mathematics   *Sep.2015 – Jun.2019*

- Relevant Courses: Mathematical analysis, Higher Algebra, C Language Programming, Probability Theory, Mathematical statistics, numerical computing methods, Operations research.

Experience

YUNDA EXPRESS   *Shanghai, China*

OMBUDSMAN   *Jun. 2019 - Mar. 2021*

- Employee of the Year
- Verify if there are any errors in the branch's accounts that may result in losses for the company.
- Investigate for any instances of corruption within the branch.
- Communicate with relevant individuals to identify responsible parties.
- Follow up promptly to recover any losses.
- By the time of departure, I had recovered losses totaling 5.1 million for the company.

Selected Honors

2023	**Model Student of Academic Records**, University of Electronic Science and Technology of China	*China*
2023	**Second-class scholarship**, University of Electronic Science and Technology of China	*China*
2022	**Third-class scholarship**, University of Electronic Science and Technology of China	*China*

Skills

Programming   Latex(proficient), Python(comptent), C(competent)

Languages   Chinese(native), English(IELTS[6.5])

Reasearch Experience

Fault-tolerant Hamiltonicity and two-disjoint-cycle-cover vertex-pancyclicity of the simplified shuffle-cube   *Chengdu, China*

(Submitted for publication)   *Nov. 2023 - Current*

- Proved that the n-dimensional simplified shuffle-cube is $(n-2)$- fault-tolerant Hamiltonian, $(n-3)$-fault-tolerant Hamiltonian-connected for $n \geq 6$.
- Proved that the n-dimensional simplified shuffle-cube is two-disjoint-cycle-cover vertex $[3, 2^{\frac{3n-2}{4}}]$-pancyclic for $n \geq 6$.
- Mainly using depth-first algorithm and mathematical induction
- Project supervisor Dr. Lü, School of Mathematics Science, University of Electronic Science and Technology of China

The vertex-pancyclicity of the simplified shuffle-cube and the vertex-bipancyclicity of the balanced shuffle-cube   *Chengdu, China*

(Submitted for publication)   *Sep. 2023 - Current*

- Proved that the n-dimensional simplified shuffle-cube is vertex-pancyclic for $n \geqslant 6$.
- Proved that the n-dimensional balanced shuffle-cube is vertex-bipancyclic for $n \geqslant 2$.
- Mainly using mathematical induction.
- Project supervisor Dr. Lü, School of Mathematics Science, University of Electronic Science and Technology of China

Two-disjoint-cycle-cover vertex pancyclicity of augmented cubes

Chengdu, China

Jan. 2023 - Sep. 2023

- Proved that an n-dimensional augmented cube is two-disjoint-cover vertex $[3, 2^{n-1}]$- pancyclic for $n \geq 3$.
- The research method adopted is mathematical induction.
- Project supervisor Dr. Lü, School of Mathematics Science, University of Electronic Science and Technology of China

Academic Projects

Handwritten digit recognition based on Softmax The goal is to use the Softmax function to recognize the given handwritten digit data. We employed gradient descent for iteration and used cross-entropy to evaluate the accuracy of the output results. Finally, we visualized the iteration results and recognized test images. Ultimately, we performed 2000 iterations, achieving a test accuracy of 93.4%. Our final code was presented in Python.

Handwritten digit recognition for digits 0 and 1 based on logistic regression We used the Sigmoid function to estimate the probability of handwritten digits, employed Binary Cross-Entropy Loss (BCELoss) to evaluate the accuracy of the output results, and applied gradient descent for iteration. Finally, we recognized the test images, achieving a test accuracy of 100%. Our final code was presented in Python.

House price prediction based on linear regression algorithm We constructed a regularized loss function to evaluate the accuracy of the output results, utilized batch gradient descent for iteration, and ultimately output the predicted curve to compare it with the actual house prices. Overall, the prediction results are quite accurate. Our final code was presented in Python.

Image Compression Processing Experiment We employed two methods for image compression:

1,Using SVD (Singular Value Decomposition) for image compression. First, we performed singular value decomposition on the matrix formed by the RGB values of the image. Next, we reconstructed the image and altered the ratio of the singular values to observe its impact on the image quality. The final result indicated that by setting the ratio of the singular values to 0.2, we could retain most of the image information, achieving a satisfactory imaging effect.

2,Using PCA (Principal Component Analysis) for image compression. We standardized the matrix and then selected some axes containing the vast majority of the variance while ignoring the remaining axes to achieve image compression. The final result showed that retaining 50 axes could yield a satisfactory imaging effect. Our final code was presented in Python.