蔡占川

助理院長/教授

所在部門: 計算機科學與工程學院

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Academic Qualification

Ph.D. in Computer Software and Theory, Sun Yat-sen University

Teaching Area

Computer Language and Programming

Fundamentals of advanced engineering mathematics

Numerical analysis

Research Area

Intelligent Information Processing

Computer Graphics and Image Processing

Multimedia Information Security

Remote Sensing Data Processing and Analysis

Applied Mathematics and Scientific Computing

Working Experience

2007 – 2008, Visiting Scholar, University of Nevada, Las Vegas, USA

2008 – Feb 2022, Assistant Professor/ Associate Professor/ Professor, Faculty of Information Technology, Macau University of Science and Technology, Macau, China

Mar 2022 – Present. Professor, School of Computer Science and Engineering, Faculty of Innovation Engineering, Macau University of Science and Technology, Macau, China

Academic Publication (selected)

1.   F.L. Sun, **Z.C. Cai**, A Family of Generalized Cardinal Polishing Splines, IEEE Transactions on Image Processing, 33: 1952-1964 (2024)

2.   F.L. Sun, **Z.C. Cai**, Cubic Polishing Spline-Based Algorithms for Industrial Image Processing, IEEE Transactions on Industrial Informatics, 20(1): 314-326 (2024)

3.   Y.Y. Chen, J.Y. Yuan, **Z.C. Cai**, ACCE: An Adaptive Color Compensation and Enhancement Algorithm for Underwater Image, IEEE Transactions on Geoscience and Remote Sensing, 62: 1-13 (2024)

4.   Y. Guo, H. Wu, S.J. Yang, **Z.C. Cai**, Crater-DETR: A Novel Transformer Network for Crater Detection Based on Dense Supervision and Multiscale Fusion, IEEE Transactions on Geoscience and Remote Sensing, 62: 1-12 (2024)

5.   J.Y. Yuan, **Z.C. Cai**, S.Y. Wang, X.X. Kong, A Multitype Feature Perception and Refined Network for Spaceborne Infrared Ship Detection, IEEE Transactions on Geoscience and Remote Sensing, 62: 1-11 (2024)

6.   P.L. Lyu, J.Z. Liu, Y.H. Zhang, Y. Ben, T. Lan, L.P. Bai, **Z.C. Cai**, Z.H. Jiang, A Novel Feature Fusion Framework for Industrial Automation Single-Multiple Object Detection, IEEE Transactions on Industrial Informatics, 20(5): 7686-7697 (2024)

7.   Y.H. Wang, B. Ye, **Z.C. Cai**, Dynamic Template Updating Using Spatial-temporal Information in Siamese Trackers, IEEE Transactions on Multimedia, 26: 2006-2015 (2024)

8.   S.J. Yang, **Z.C. Cai**, Cross Domain Lifelong Learning Based on Task Similarity, IEEE Transactions on Pattern Analysis and Machine Intelligence, 45(10): 11612-11623 (2023)

9.   R.Z. Chen, **Z.C. Cai**, UIESC: An Underwater Image Enhancement Framework via Self-attention and Contrastive Learning, IEEE Transactions on Industrial Informatics, 19(12): 11701-11711 (2023)

10.   Y.L. Zhang, **Z.C. Cai**, CE-RetinaNet: A Channel Enhancement Method for Infrared Wildlife Detection in UAV Images, IEEE Transactions on Geoscience and Remote Sensing, 61(99):1-12(2023)

11.   S.Y. Wang, **Z.C. Cai**, J.Y Yuan, Automatic SAR Ship Detection Based on Multifeature Fusion Network in Spatial and Frequency Domains, IEEE Transactions on Geoscience and Remote Sensing, 61: 1-11 (2023)

12.   H.Q. Huang, **Z.C. Cai**, Duple Color Image Encryption System Based on 3-D Nonequilateral Arnold Transform for IIoT, IEEE Transactions on Industrial Informatics, 19(7): 8285-8294 (2023)

13.   R.Z. Chen, **Z.C. Cai**, W. Cao, MFFN: An Underwater Sensing Scene Image Enhancement Method Based on Multiscale Feature Fusion Network, IEEE Transactions on Geoscience and Remote Sensing, 60: 1-12 (2022)

14.   S.J. Yang, **Z.C. Cai**, High-Resolution Feature Pyramid Network for Automatic Crater Detection on Mars, IEEE Transactions on Geoscience and Remote Sensing, 60: 1-12 (2022)

15.   S.J. Yang, **Z.C. Cai**, Progressive Domain Adaptive Network for Crater Detection, IEEE Transactions on Geoscience and Remote Sensing, 60: 1-12 (2022)

16.   B. Ye, **Z.C. Cai**, T. Lan, W. Cao, Modeling of Crater Group Representation Based on V-System, IEEE Transactions on Geoscience and Remote Sensing, 60: 1-12 (2022)

17.   J.Y. Yuan, **Z.C. Cai**, W. Cao, TEBCF: Real-World Underwater Image Texture Enhancement Model Based on Blurriness and Color Fusion, IEEE Transactions on Geoscience and Remote Sensing, 60: 1-15 (2022)

18.   X.X. Yuan, **Z.C. Cai**, ICHV: A New Compression Approach for Industrial Images, IEEE Transactions on Industrial Informatics, 18(7): 4427-4435 (2022)

19.   Y.M. Zhang, **Z.C. Cai**, B. Ye, An Image Importance Partition-Based Compression Method for COVID-19 Computed Tomography Scan, IEEE Transactions on Industrial Informatics, 18(7): 4596-4607 (2022)

20.   T. Lan, **Z.C. Cai**, B. Ye, A Novel Spline Algorithm Applied to COVID-19 Computed Tomography Image Reconstruction, IEEE Transactions on Industrial Informatics, 18(11): 7804-7813 (2022)

21.   X.X. Kong, **Z.C. Cai**, An Information Security Method Based on Optimized High-Fidelity Reversible Data Hiding, IEEE Transactions on Industrial Informatics, 18(12): 8529-8539 (2022)

22.   T. Lan, **Z.C. Cai**, B. Ye, Modeling of Lunar Digital Terrain Entropy and Terrain Entropy Distribution Model, IEEE Transactions on Geoscience and Remote Sensing, 59(2): 1052-1066 (2021)

23.   J.Y Yuan, W. Cao, **Z.C. Cai**, B.H. Su, An Underwater Image Vision Enhancement Algorithm Based on Contour Bougie Morphology, IEEE Transactions on Geoscience and Remote Sensing, 59(10): 8117-8128 (2021)

24. T. Lan, **Z.C. Cai**, Efficient Reconstruction of Industrial Images Using Optimized HMK Splines, IEEE Transactions on Industrial Informatics, 17(7): 4657-4668 (2021)

25. B. Ye, X.X. Yuan, **Z.C. Cai**, T. Lan, Severity Assessment of COVID-19 Based on Feature Extraction and V-Descriptors, IEEE Transactions on Industrial Informatics, 17(11): 7456-7467 (2021)

26. W.G. He, **Z.C. Cai**, Reversible Data Hiding Based on Dual Pairwise Prediction-Error Expansion, IEEE Transactions on Image Processing,30:5045-5055(2021).

27. W.G. He, **Z.C. Cai**, and Y.M. Wang, High-fidelity Reversible Image Watermarking Based on Effective Prediction Error-Pairs Modification, IEEE Transactions on Multimedia, 23: 52-63 (2021)

28. Y.M. Zhang, **Z.C. Cai**, and G.Q.Xiong, A New Image Compression Algorithm Based on Non-uniform Partition and U-System, IEEE Transactions on Multimedia, 23: 1069-1082 (2021)

29. T. Lan, **Z.C. Cai**, A Novel Image Representation Method Under a Non-Standard Positional Numeral System, IEEE Transactions on Multimedia,23: 1301-1315 (2021)

30. Y.M. Wang, **Z.C. Cai**,W.G. He, High-Capacity Reversible Data Hiding in Encrypted Image Based on Intra-block Lossless Compression, IEEE Transactions on Multimedia, 23: 1466-1473 (2021)

31. Y.Q. Xiao, **Z.C. Cai**, X.X. Yuan, YuvConv: Multi-Scale Non-Uniform Convolution Structure Based on YUV Color Model, IEEE Transactions on Multimedia, 23: 2533-2544 (2021)

32. Q.Y. Huang, **Z.C. Cai**, T. Lan, A New Approach for Character Recognition of Multi-Style Vehicle License Plates, IEEE Transactions on Multimedia, 23: 3768-3777 (2021)

33. X.X. Yuan, **Z.C. Cai**, A Generalized Walsh System and Its Fast Algorithm, IEEE Transactions on Signal Processing, 69: 5222-5233 (2021)

34. W.G.He , **Z.C. Cai**, An Insight Into Pixel Value Ordering Prediction-Based Prediction-Error Expansion, IEEE Transactions on Information Forensics and Security,15:3859-3871(2020)

35. J.J. Chen, **Z. C. Cai**, A New Class of Explicit Interpolatory Splines and Related Measurement Estimation, IEEE Transactions on Signal Processing, 68:2799-2813(2020)

36. X.X. Yuan, **Z.C. Cai**, An Adaptive Triangular Partition Algorithm for Digital Images, IEEE Transactions on Multimedia, 21(6): 1372-1383(2019)

37. W. Cao, **Z.C. Cai**, B. Ye, Measuring Multiresolution Surface Roughness Using V-System, IEEE Transactions on Geoscience and Remote Sensing, 56(3): 1497-1506 (2018)

38. T. Lan, **Z.C. Cai**, Lunar Brightness Temperature Map and TB Distribution Model, IEEE Transactions on Geoscience and Remote Sensing, 56(12): 7310-7323 (2018)

39. **Z.C. Cai**, T. Lan, Lunar Brightness Temperature Model Based on the Microwave Radiometer Data of Chang'e-2, IEEE Transactions on Geoscience and Remote Sensing, 55(10): 5944-5955(2017)

40. **Z.C. Cai**, T. Lan, C.M. Zheng, Hierarchical MK Splines: Algorithm and Applications to Data Fitting, IEEE Transactions on Multimedia, 19(5): 921-934(2017)

Books

Z.C. Cai, Fundamentals of Engineering Mathematics, Science Press, 2018, ISBN-13: 978-7030568632. (in Chinese)

J. Huang, Z.C. Cai, K.Y. U, Y.Y. Liang, Local Interpolation Explicit Algorithm and Its Application, Science Press, 2016, ISBN-13: 978-7030462947. (in Chinese)

Patents

Z.C. Cai and T. Lan, Methods and Apparatus for Encrypting Multimedia Information, US patent, Grant No. 10635786 B2, April 2020.

Z.C. Cai and W. Cao, Method for Improving Calculations of Surface Roughness, US patent, Grant No. 10580150 B2, March 2020.

Z.C. Cai and T. Lan, Methods and Apparatus for Image Construction, US patent, Grant No. 10332279 B2, June 2019.

Z.C. Cai, Methods and Apparatus for Color Image Watermarking, US patent, Grant No. 10296999 B2, May 2019.

Z.C. Cai and W. Cao, Omnidirectional Roughness Algorithm for Topographic Signature Analysis of Lunar Craters,US patent, Grant No. 10354398 B2, July 2019.

Z.C. Cai, Lunar Brightness Temperature Modeling Based on the Microwave Radiometer Data, US patent, Grant No. 10346565 B2, July 2019.

Z.C. Cai, Computer System that Executes Hierarchical MK Splines Scheme for Scattered Data Interpolation, US patent, Grant No. 9990334 B2, June 2018.

Z.C. Cai, B. Ye, T. Lan, and Y.Q. Xiao, Systems and Methods for Reducing Computer Resources Consumption to Reconstruct Shape of Multi-Object Image, US patent, Grant No. 10062187 B1, August 2018.

Z.C. Cai and Z. Li, Image Stitching, US patent, Grant No. 9990753 B1, June 2018.

Z.C. Cai, Color Image Watermarking, US patent, Grant No. 10037587 B2, July 2018.

Z.C. Cai and T. Lan, Method for Coding Data, US patent, Grant No. 9755661 B1, September 2017.

Professional Certification and Awards

Second Prize of 2022 National Teaching Achievement Award,2023.

Advanced Individual Award, 20th National Post-Graduate Mathematical Contest in Modeling,2023

Excellent Supervisor of Contemporary Undergraduate Mathematical Contest in Modeling, CSIAM, 2022.

2020/2021 BOC Excellent Research Award, Macau University of Science and Technology, 2021.

Second Prize of the Teaching Achievement Award (Co-awarded), Macau University of Science and Technology, 2020.

Third Prize of Technological Invention Award of the Macau Science and Technology Awards (Co-awarded), 2018.

Excellent Supervisor of Contemporary Undergraduate Mathematical Contest in Modeling, CSIAM, 2017.

BOC Excellent Research Award, Macau University of Science and Technology, 2016.

Third Prize of Natural Science Award of the Macau Science and Technology Awards (Co-awarded), 2012.

Excellent Organization Worker of Contemporary Undergraduate Mathematical Contest in Modeling, CSIAM, 2011.

Student Awards

Postgraduate Award of the Macau Science and Technology Award, 2022

Postgraduate Award of the Macau Science and Technology Award, 2016

First Prize, "HUAWEI Cup" 20th National Post-Graduate Mathematical Contest in Modeling, 2023

First Prize, "HUAWEI Cup" 18th National Post-Graduate Mathematical Contest in Modeling, 2021

First Prize, "HUAWEI Cup" 17th National Post-Graduate Mathematical Contest in Modeling, 2020

Second Prize, "HUAWEI Cup" 16th National Post-Graduate Mathematical Contest in Modeling, 2019

Second Prize, "HUAWEI Cup" 15th National Post-Graduate Mathematical Contest in Modeling, 2018

First Prize, "HUAWEI Cup" 14th National Post-Graduate Mathematical Contest in Modeling,2017

Second Prize, "HUAWEI Cup" 13th National Post-Graduate Mathematical Contest in Modeling, 2016

Third Prize, "Zhongguancun Youth Cup" 12th National Post-Graduate Mathematical Contest in Modeling, 2015

Second Prize, "HUAWEI Cup" 11th National Post-Graduate Mathematical Contest in Modeling, 2014

Second Prize, "HUAWEI Cup" 10th National Post-Graduate Mathematical Contest in Modeling, 2013

Second Prize, "HUAWEI Cup" 10th National Post-Graduate Mathematical Contest in Modeling, 2011

Second Prize, CUMCM-2023

Second Prize, CUMCM-2022

Second Prize, CUMCM-2021

Second Prize, CUMCM-2020

Second Prize, CUMCM-2019

Second Prize, CUMCM-2018

Second Prize, CUMCM-2017

Second Prize, CUMCM-2016

Second Prize, CUMCM-2014

First Prize, CUMCM-2003

Silver Prize, China Pan-Pearl River Delta Region University IT Project Competition 2010

Gold Prize, China Pan-Pearl River Delta Region University IT Project Competition 2009

Professional Society Membership

Senior Member, Institute of Electrical and Electronics Engineers (IEEE).

Distinguished Member, China Computer Federation (CCF).

Member, Association for Computing Machinery (ACM).

Member, Asia Graphics Association (AG).

Committee Member ,Computer-Aided Design & Computer Graphics (TCCADCG), CCF

Committee Member, Geometric Design and Computing of China, CSIAM