Yang Zhongyu

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Research Interests

Fields: Computer Vision, Computer Graphics, Image Analysis, Economics
Topics: 2D/3D AIGC, 3D Motion Modeling, Digital Human ,Energy Economics
Objective: My long-term research goal is to develop intelligent machines that can actively perceive, analyze, and interpret human states, behaviors, and underlying motivations in dynamic scenes.

Education

- **Lanzhou University (Project 985)** *Sept. 2021 - June.2025 (Expected)*
  B.S. in Mathematics(the Basic Theory Class)(Main major) and Administrative Management (Minor) Lanzhou, China
  - Relevant courses: Mathematical Analysis, Advanced Algebra, C++ Programming, Probability Theory, Ordinary Differential Equations, Numerical Analysis, Microeconomics, Differential Geometry, Functional Analysis, etc.
- **The Chinese University of Hongkong, Shenzhen** *April. 2024 - Nov. 2024*
  Research Assistant in Laboratory for Intelligent Autonomous Systems (LIAS) at School of Data Science Shenzhen, China
  - Advisor: Zhang Ruimao
- **King Abdullah University of Science and Technology** *Dec. 2024 - Present*
  Remote Research Intern in Vision-CAIR Group Saudi Arabia
  - Advisor: Jun Chen and Mohamed Elhoseiny

Patents And Publications

J=Journal, P=Patent, S=Software Copyright, R=Under Review ∗ Indicates Corresponding Author

[J.1] **Zhongyu Yang**, Ziyue Xue **Analysis and Forecast of GDP of Gansu Province based on ARIMA Model**. *Chinese Market (IF=0.6)*, Vol.2023-06, March 2023, Pages 1-4

[J.2] Mengying Su, **Zhongyu Yang***, Shujaat Abbas, et al**Toward Enhancing Environment Quality in OECD Countries: Role of Municipal Waste, Renewable Energy, Environment Innovation and Environmental Policy**. *Renewable energy (SCI Q1Top, IF=9.0)*, Vol.211, July 2023, Pages 975-984

[J.3] Zhichao Yu, **Zhongyu Yang***, et al.**Green Effect of Energy Transition Policy: A quasi-natural Experiment Based on New Energy Demonstration Cities** *Finance Research Letters (SSCI Q1Top, IF=10.4)*,Vol.66, Aug. 2024, 105669

[P.1] **Zhongyu Yang**.**A mathematics teaching system based on virtual reality**. (CN116312091A)

[S.1] **Zhongyu Yang**. **Green and Low-carbon Integrated Monitoring Software**.(2023SR1355487)

[S.2] **Zhongyu Yang**. **Fully automatic spatial sound field environment perception system**. (2024SR0538446)

[R.1] **Zhongyu Yang**, Zuhao Yang ,Yifang Yuan, et al. **ReChar: Revitalising Characters with Structure-Preserved and User-Specified Aesthetic Enhancements**. Manuscript was under reviewed for publication in *CVPR 2025*.

Projects

- **Web-Scale Retrieval-Augmented Generation Systems for Augmenting Vision-Based Reasoning** *Dec. 2024 - Present*
  Supervisor:Vision-CAIR Group, KAUST
  - **Purpose**: To advance the development of RAG systems by integrating real-time web data with multimodal models, with a focus on enhancing video comprehension and visual reasoning through external knowledge exploration.
  - **Methods**: Investigating novel strategies for leveraging web search techniques to retrieve external knowledge relevant to video content and visual prompts, facilitating more accurate and context-aware augmentation of visual understanding, and improving reasoning capabilities for large-scale visual datasets.
- **A Generative Model for Revitalising Characters with Decoupled Content and Style Injection** *May. 2023 - Nov. 2024*
  Supervisor:Yifan Yuan, Heriot-Watt University,UK
  - **Purpose**: To innovate a framework inspired by pictogram Chinese characters for generating artworks that integrate customizable elements and styles into the characters.
  - **Methods**: Integrates user-defined styles and elements into Chinese characters, harnessing advanced computation for a harmonious synthesis of tradition and innovation in character art.
- **Global Urban Sustainable Development Strategies and Empirical Research** *May. 2022 - June.2024*
  Ural Federal University Program of Development within the Priority-2030 Program(Supervisor: Prof.Zhang Guoxing)
  - **Purpose**: To analyze factors of urban green development and their impact on policy mechanisms.

◦ **Methods**: Applying machine learning and data mining for pattern recognition and predictive analysis to discern both the long-term equilibrium and short-term dynamics of urban green policies.

- **FPGA-Based AI Doctor: Deep Learning-Based Clinical Target Delineation for Cervical Cancer** *Mar. 2024 - Present*
  National College Student Innovation and Entrepreneurship Training Program(Supervisor: Prof.Wang XingHua)
  ◦ **Purpose**: To enhance the capability of identifying subtle features in medical images.
  ◦ **Methods**: Accomplished by refining the traditional U-Net architecture and exploiting the parallel processing capabilities of FPGA, resulting in significant improvements in feature detection.

- **UNet-Centric MambaMorph: A Comprehensive Visual Mamba Framework Enhanced with Cross-Scan and Semi-Supervised Learning for Medical Segmentation** *Jan. 2024 - Present*
  Fundamental Research Funds for Central Universities Research Capacity Improvement Project(Supervisor: Prof.Zhang Wenting)
  ◦ **Purpose**: To improve medical image segmentation by enhancing global context understanding.
  ◦ **Methods**: The integration of UNet and Mamba architectures is employed, complemented by a novel Cross-Scan module, to optimize segmentation accuracy.

- **Tropical Linear Representation ofInvolute Chinese Monoids** *Mar. 2023 - May. 2024*
  National College Student Innovation and Entrepreneurship Training Program(Supervisor: Prof.Zhang Wenting)
  ◦ **Purpose**: To introduce and define the tropical linear representation within Chinese monoids of involution.
  ◦ **Methods**: The approach encompasses the theoretical establishment of free monoids and rewriting systems, followed by the definition of their tropical linear representations for involution in Chinese monoids.

Honors And Awards

◦ Best Wiki Nominees & Winners in International Directed Evolution Competition (IDEC) (2024) **(Top 5%)**
◦ Silver Medal in International Genetically Engineered Machine Competition (IGEM) (2024)**(Top 15%)**
◦ International College Mathematical Modeling Competition Meritorious Winner (2023) **(Top 6%)**
◦ Honorable Award of the American Collegiate Mathematical Contest in Modeling (MCM) (2023) **(Top 25%)**
◦ Provincial-level Gold Medal in China College Students' 'Internet+' Innovation and Entrepreneurship Competition (2023) **(Top 1%)**
◦ Best hardware Winner, Best Target Molecule Nominees & Winner, Best Genome Evolutionary Outcomes Nominees & Winner in International Directed Evolution Competition (IDEC 2023) (2023) **(TOP 1%)**
◦ National First Prize in 2022 National College Student Data Analysis Competition (2022) **(Top 3%)**
◦ National First Prize in the National 2022 Second China University Big Data Challenge (2022) **(Top 8%)**
◦ Second-level Scholarship of Lanzhou University(2022,2024) **(Top 15%)**
◦ Outstanding Student Pacesetter of Lanzhou University(2022) **(Top 15%)**

Experience

- **Xi'an Jiyun Technology Co., Ltd.** *Jan. 2024 - Present*
  Co-founder Xi'an, China
  ◦ Research on computer science implements the latest research results into products and complete conference and journal papers.

- **King Abdullah University of Science and Technology** *Dec. 2024 - Present*
  Remote Research Intern in Vision-CAIR Group Saudi Arabia
  ◦ Research on developing and optimizing web-scale Retrieval-Augmented Generation (RAG) systems tailored for understanding up-to-date vision knowledge, and complete conference and journal papers.

- **The Chinese University of Hongkong, Shenzhen** *April. 2024 - Nov. 2024*
  Research Assistant in Laboratory for Intelligent Autonomous Systems (LIAS) at School of Data Science Shenzhen, China
  ◦ Research on Image Detection and Human Motion Generation Model, implement the latest research results into products, and complete conference and journal papers.

- **Heriot-Watt University** *March. 2024 - Sep. 2024*
  Remote Research Intern in School of Mathematical and Computer Sciences Edinburgh, UK
  ◦ Research on Multimodal Image Generation Models, Revitalizing Characters with Decoupled Content and Style Injection, and complete conference and journal paper.

- **iFLYTEK Co., Ltd.** *June 2023 - Aug. 2023*
  Data Analysis Assistant in Intern of Smart Home Department Lanzhou, China
  ◦ Leveraging historical user behavior data to construct precise user profiles and predictive models, analysing to optimize marketing strategies and deliver personalized recommendations.

Skills And Services

- **Programming Languages:** Python, R, Stata, Latex
- **Languages:** Mandarin(Native), Cantonese(Native), English(Fluent)
- **Operation System:** Windows (advanced), Linux(advanced)
- **Journal Reviewer:** EMFT(Q1), ESPR(Q1), IJER(Q2), EEMJ(Q3), AEL(Q3)
- **Conference Reviewer:** CVPR(2025), ICLR(2025)