arXiv论文分析报告

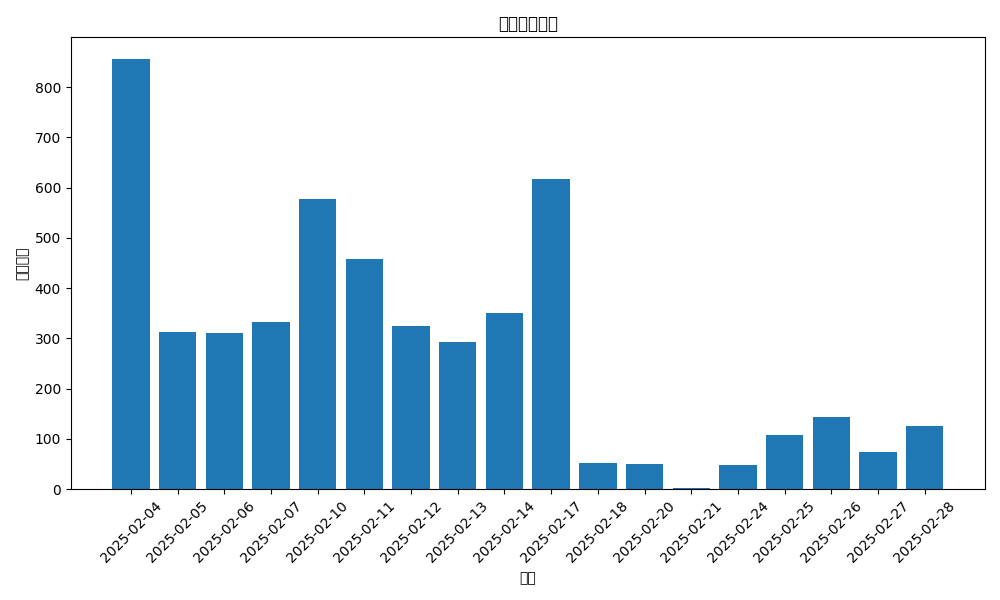
日期范围: 2025-02-01 至 2025-03-31

# 摘要

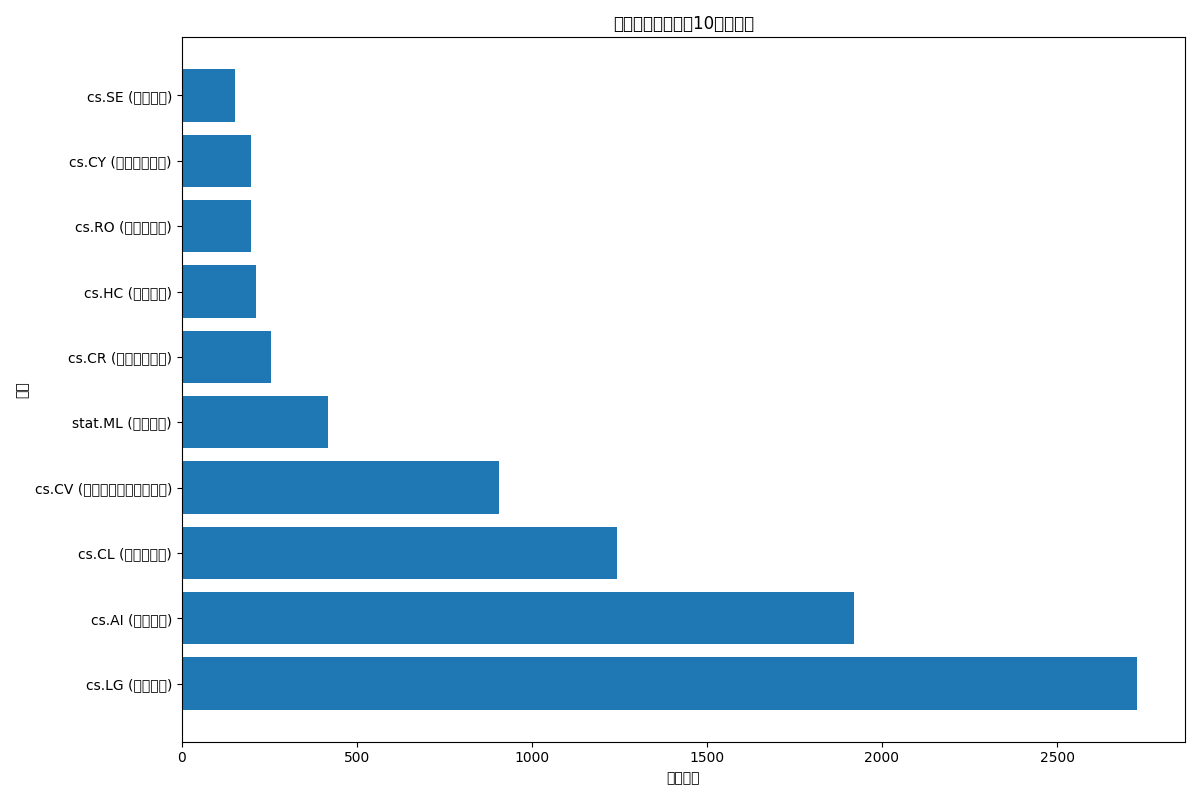
**本报告分析了arXiv上2025-02-01至2025-03-31期间发布的论文。**在此期间，共有5033篇符合条件的论文被收录。

# 数据可视化

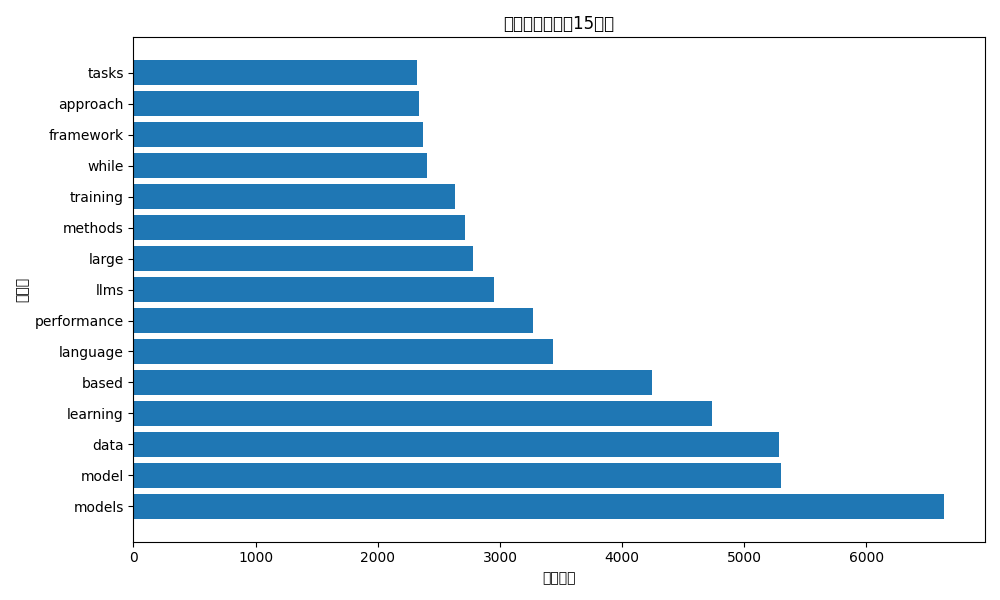
## 论文日期分布



## 论文分类分布



## 热门关键词



## 热门作者

|  |  |
| --- | --- |
| 作者 | 论文数量 |
| Yang Liu | 13 |
| Bo Li | 11 |
| Wei Wang | 11 |
| Hao Chen | 11 |
| Yu Wang | 10 |
| Jun Wang | 10 |
| Tong Zhang | 10 |
| Kun Wang | 10 |
| Shuo Wang | 9 |
| Wanli Ouyang | 9 |

# 论文阅读推荐

## 必读论文

**1. A Schema-Guided Reason-while-Retrieve framework for Reasoning on Scene Graphs with Large-Language-Models (LLMs)**  
作者: Yiye Chen,Harpreet Sawhney,Nicholas Gydé,Yanan Jian,Jack Saunders,Patricio Vela,Ben Lundell  
分类: cs.LG, cs.AI, cs.MA, cs.RO  
摘要: Scene graphs have emerged as a structured and serializable environment representation for grounded spatial reasoning with Large Language Models (LLMs). In this work, we propose SG-RwR, a Schema-Guided...  
URL: https://arxiv.org/abs/2502.03450

**2. A Probabilistic Inference Approach to Inference-Time Scaling of LLMs using Particle-Based Monte Carlo Methods**  
作者: Isha Puri,Shivchander Sudalairaj,Guangxuan Xu,Kai Xu,Akash Srivastava  
分类: cs.LG, cs.AI  
摘要: Large language models (LLMs) have achieved significant performance gains via scaling up model sizes and/or data. However, recent evidence suggests diminishing returns from such approaches, motivating ...  
URL: https://arxiv.org/abs/2502.01618

**3. A Hybrid Swarm Intelligence Approach for Optimizing Multimodal Large Language Models Deployment in Edge-Cloud-based Federated Learning Environments**  
作者: Gaith Rjouba,Hanae Elmekki,Saidul Islam,Jamal Bentahar,Rachida Dssouli  
分类: cs.NE, cs.AI, cs.LG  
摘要: The combination of Federated Learning (FL), Multimodal Large Language Models (MLLMs), and edge-cloud computing enables distributed and real-time data processing while preserving privacy across edge de...  
URL: https://arxiv.org/abs/2502.10419

**4. MMRAG: Multi-Mode Retrieval-Augmented Generation with Large Language Models for Biomedical In-Context Learning**  
作者: Zaifu Zhan,Jun Wang,Shuang Zhou,Jiawen Deng,Rui Zhang  
分类: cs.CL, cs.AI  
摘要: Objective: To optimize in-context learning in biomedical natural language processing by improving example selection. Methods: We introduce a novel multi-mode retrieval-augmented generation (MMRAG) fra...  
URL: https://arxiv.org/abs/2502.15954

**5. A Self-Supervised Reinforcement Learning Approach for Fine-Tuning Large Language Models Using Cross-Attention Signals**  
作者: Andrew Kiruluta,Andreas Lemos,Priscilla Burity  
分类: cs.AI  
摘要: We propose a novel reinforcement learning framework for post training large language models that does not rely on human in the loop feedback. Instead, our approach uses cross attention signals within ...  
URL: https://arxiv.org/abs/2502.10482

## 推荐阅读

**1. Large Language Models and Synthetic Data for Monitoring Dataset Mentions in Research Papers**  
作者: Aivin V. Solatorio,Rafael Macalaba,James Liounis  
分类: cs.CL, cs.AI, cs.CY, cs.DB, cs.LG  
URL: https://arxiv.org/abs/2502.10263

**2. Advancing Reasoning in Large Language Models: Promising Methods and Approaches**  
作者: Avinash Patil  
分类: cs.CL, cs.AI  
URL: https://arxiv.org/abs/2502.03671

**3. Predicting Large Language Model Capabilities on Closed-Book QA Tasks Using Only Information Available Prior to Training**  
作者: Changhao Jiang,Ming Zhang,Junjie Ye,Xiaoran Fan,Yifei Cao,Jiajun Sun,Zhiheng Xi,Shihan Dou,Yi Dong,Yujiong Shen,Jingqi Tong,Zhen Wang,Tao Liang,Zhihui Fei,Mingyang Wan,Guojun Ma,Qi Zhang,Tao Gui,Xuanjing Huang  
分类: cs.CL, cs.AI  
URL: https://arxiv.org/abs/2502.04066

**4. An Interactive Framework for Implementing Privacy-Preserving Federated Learning: Experiments on Large Language Models**  
作者: Kasra Ahmadi,Rouzbeh Behnia,Reza Ebrahimi,Mehran Mozaffari Kermani,Jeremiah Birrell,Jason Pacheco,Attila A Yavuz  
分类: cs.LG, cs.CR  
URL: https://arxiv.org/abs/2502.08008

**5. Scalable In-Context Learning on Tabular Data via Retrieval-Augmented Large Language Models**  
作者: Xumeng Wen,Shun Zheng,Zhen Xu,Yiming Sun,Jiang Bian  
分类: cs.CL, cs.AI  
URL: https://arxiv.org/abs/2502.03147

... 以及其他 5 篇推荐论文

## 学习路径推荐

**路径 1: cs.LG (机器学习)**

* **步骤 1:** A Schema-Guided Reason-while-Retrieve framework for Reasoning on Scene Graphs with Large-Language-Models (LLMs) (作者: Yiye Chen,Harpreet Sawhney,Nicholas Gydé,Yanan Jian,Jack Saunders,Patricio Vela,Ben Lundell)
* **步骤 2:** A Probabilistic Inference Approach to Inference-Time Scaling of LLMs using Particle-Based Monte Carlo Methods (作者: Isha Puri,Shivchander Sudalairaj,Guangxuan Xu,Kai Xu,Akash Srivastava)
* **步骤 3:** An Interactive Framework for Implementing Privacy-Preserving Federated Learning: Experiments on Large Language Models (作者: Kasra Ahmadi,Rouzbeh Behnia,Reza Ebrahimi,Mehran Mozaffari Kermani,Jeremiah Birrell,Jason Pacheco,Attila A Yavuz)

**路径 2: cs.CL (计算语言学)**

* **步骤 1:** MMRAG: Multi-Mode Retrieval-Augmented Generation with Large Language Models for Biomedical In-Context Learning (作者: Zaifu Zhan,Jun Wang,Shuang Zhou,Jiawen Deng,Rui Zhang)
* **步骤 2:** Large Language Models and Synthetic Data for Monitoring Dataset Mentions in Research Papers (作者: Aivin V. Solatorio,Rafael Macalaba,James Liounis)
* **步骤 3:** Advancing Reasoning in Large Language Models: Promising Methods and Approaches (作者: Avinash Patil)
* **步骤 4:** Predicting Large Language Model Capabilities on Closed-Book QA Tasks Using Only Information Available Prior to Training (作者: Changhao Jiang,Ming Zhang,Junjie Ye,Xiaoran Fan,Yifei Cao,Jiajun Sun,Zhiheng Xi,Shihan Dou,Yi Dong,Yujiong Shen,Jingqi Tong,Zhen Wang,Tao Liang,Zhihui Fei,Mingyang Wan,Guojun Ma,Qi Zhang,Tao Gui,Xuanjing Huang)
* **步骤 5:** Scalable In-Context Learning on Tabular Data via Retrieval-Augmented Large Language Models (作者: Xumeng Wen,Shun Zheng,Zhen Xu,Yiming Sun,Jiang Bian)

# 按分类的论文列表

## cs.SE (软件工程)

**1. LLMSecConfig: An LLM-Based Approach for Fixing Software Container Misconfigurations**  
作者: Ziyang Ye,Triet Huynh Minh Le,M. Ali Babar  
摘要: Security misconfigurations in Container Orchestrators (COs) can pose serious threats to software systems. While Static Analysis Tools (SATs) can effectively detect these security vulnerabilities, the ...  
URL: https://arxiv.org/abs/2502.02009

**2. SE Arena: Benchmarking Software Engineering Chatbots with Iterative Interactions**  
作者: Zhimin Zhao  
摘要: Foundation models (FMs), particularly large language models (LLMs), have shown significant promise in various software engineering (SE) tasks, including code generation, debugging, and requirement ref...  
URL: https://arxiv.org/abs/2502.01860

**3. Assessing Data Augmentation-Induced Bias in Training and Testing of Machine Learning Models**  
作者: Riddhi More,Jeremy S. Bradbury  
摘要: Data augmentation has become a standard practice in software engineering to address limited or imbalanced data sets, particularly in specialized domains like test classification and bug detection wher...  
URL: https://arxiv.org/abs/2502.01825

**4. Agentic Bug Reproduction for Effective Automated Program Repair at Google**  
作者: Runxiang Cheng,Michele Tufano,Jürgen Cito,José Cambronero,Pat Rondon,Renyao Wei,Aaron Sun,Satish Chandra  
摘要: Bug reports often lack sufficient detail for developers to reproduce and fix the underlying defects. Bug Reproduction Tests (BRTs), tests that fail when the bug is present and pass when it has been re...  
URL: https://arxiv.org/abs/2502.01821

**5. Toward Neurosymbolic Program Comprehension**  
作者: Alejandro Velasco,Aya Garryyeva,David N. Palacio,Antonio Mastropaolo,Denys Poshyvanyk  
摘要: Recent advancements in Large Language Models (LLMs) have paved the way for Large Code Models (LCMs), enabling automation in complex software engineering tasks, such as code generation, software testin...  
URL: https://arxiv.org/abs/2502.01806

**6. ACECODER: Acing Coder RL via Automated Test-Case Synthesis**  
作者: Huaye Zeng,Dongfu Jiang,Haozhe Wang,Ping Nie,Xiaotong Chen,Wenhu Chen  
摘要: Most progress in recent coder models has been driven by supervised fine-tuning (SFT), while the potential of reinforcement learning (RL) remains largely unexplored, primarily due to the lack of reliab...  
URL: https://arxiv.org/abs/2502.01718

**7. Process-Supervised Reinforcement Learning for Code Generation**  
作者: Yufan Ye,Ting Zhang,Wenbin Jiang,Hua Huang  
摘要: Existing reinforcement learning strategies based on outcome supervision have proven effective in enhancing the performance of large language models(LLMs) for code generation. While reinforcement learn...  
URL: https://arxiv.org/abs/2502.01715

**8. The AI Agent Index**  
作者: Stephen Casper,Luke Bailey,Rosco Hunter,Carson Ezell,Emma Cabalé,Michael Gerovitch,Stewart Slocum,Kevin Wei,Nikola Jurkovic,Ariba Khan,Phillip J. K. Christoffersen,A. Pinar Ozisik,Rakshit Trivedi,Dylan Hadfield-Menell,Noam Kolt  
摘要: Leading AI developers and startups are increasingly deploying agentic AI systems that can plan and execute complex tasks with limited human involvement. However, there is currently no structured frame...  
URL: https://arxiv.org/abs/2502.01635

**9. Learning to Generate Unit Tests for Automated Debugging**  
作者: Archiki Prasad,Elias Stengel-Eskin,Justin Chih-Yao Chen,Zaid Khan,Mohit Bansal  
摘要: Unit tests (UTs) play an instrumental role in assessing code correctness as well as providing feedback to large language models (LLMs), motivating automated test generation. However, we uncover a trad...  
URL: https://arxiv.org/abs/2502.01619

**10. Next Steps in LLM-Supported Java Verification**  
作者: Samuel Teuber,Bernhard Beckert  
摘要: Recent work has shown that Large Language Models (LLMs) are not only a suitable tool for code generation but also capable of generating annotation-based code specifications. Scaling these methodologie...  
URL: https://arxiv.org/abs/2502.01573

... 以及其他 108 篇论文

## cs.CL (计算语言学)

**1. Reasoning Bias of Next Token Prediction Training**  
作者: Pengxiao Lin,Zhongwang Zhang,Zhi-Qin John Xu  
摘要: Since the inception of Large Language Models (LLMs), the quest to efficiently train them for superior reasoning capabilities has been a pivotal challenge. The dominant training paradigm for LLMs is ba...  
URL: https://arxiv.org/abs/2502.02007

**2. Wavelet-based Positional Representation for Long Context**  
作者: Yui Oka,Taku Hasegawa,Kyosuke Nishida,Kuniko Saito  
摘要: In the realm of large-scale language models, a significant challenge arises when extrapolating sequences beyond the maximum allowable length. This is because the model's position embedding mechanisms ...  
URL: https://arxiv.org/abs/2502.02004

**3. Can LLMs Assist Annotators in Identifying Morality Frames? -- Case Study on Vaccination Debate on Social Media**  
作者: Tunazzina Islam,Dan Goldwasser  
摘要: Nowadays, social media is pivotal in shaping public discourse, especially on polarizing issues like vaccination, where diverse moral perspectives influence individual opinions. In NLP, data scarcity a...  
URL: https://arxiv.org/abs/2502.01991

**4. Gradient-Regularized Latent Space Modulation in Large Language Models for Structured Contextual Synthesis**  
作者: Derek Yotheringhay,Beatrix Nightingale,Maximilian Featherstone,Edmund Worthington,Hugo Ashdown  
摘要: Generating structured textual content requires mechanisms that enforce coherence, stability, and adherence to predefined constraints while maintaining semantic fidelity. Conventional approaches often ...  
URL: https://arxiv.org/abs/2502.01979

**5. CITER: Collaborative Inference for Efficient Large Language Model Decoding with Token-Level Routing**  
作者: Wenhao Zheng,Yixiao Chen,Weitong Zhang,Souvik Kundu,Yun Li,Zhengzhong Liu,Eric P. Xing,Hongyi Wang,Huaxiu Yao  
摘要: Large language models have achieved remarkable success in various tasks but suffer from high computational costs during inference, limiting their deployment in resource-constrained applications. To ad...  
URL: https://arxiv.org/abs/2502.01976

**6. Token Cleaning: Fine-Grained Data Selection for LLM Supervised Fine-Tuning**  
作者: Jinlong Pang,Na Di,Zhaowei Zhu,Jiaheng Wei,Hao Cheng,Chen Qian,Yang Liu  
摘要: Recent studies show that in supervised fine-tuning (SFT) of large language models (LLMs), data quality matters more than quantity. While most data cleaning methods concentrate on filtering entire samp...  
URL: https://arxiv.org/abs/2502.01968

**7. Boundary-Driven Table-Filling with Cross-Granularity Contrastive Learning for Aspect Sentiment Triplet Extraction**  
作者: Qingling Li,Wushao Wen,Jinghui Qin  
摘要: The Aspect Sentiment Triplet Extraction (ASTE) task aims to extract aspect terms, opinion terms, and their corresponding sentiment polarity from a given sentence. It remains one of the most prominent ...  
URL: https://arxiv.org/abs/2502.01942

**8. Can LLMs Maintain Fundamental Abilities under KV Cache Compression?**  
作者: Xiang Liu,Zhenheng Tang,Hong Chen,Peijie Dong,Zeyu Li,Xiuze Zhou,Bo Li,Xuming Hu,Xiaowen Chu  
摘要: This paper investigates an under-explored challenge in large language models (LLMs): the impact of KV cache compression methods on LLMs' fundamental capabilities. While existing methods achieve impres...  
URL: https://arxiv.org/abs/2502.01941

**9. PANDAS: Improving Many-shot Jailbreaking via Positive Affirmation, Negative Demonstration, and Adaptive Sampling**  
作者: Avery Ma,Yangchen Pan,Amir-massoud Farahmand  
摘要: Many-shot jailbreaking circumvents the safety alignment of large language models by exploiting their ability to process long input sequences. To achieve this, the malicious target prompt is prefixed w...  
URL: https://arxiv.org/abs/2502.01925

**10. Conceptual Metaphor Theory as a Prompting Paradigm for Large Language Models**  
作者: Oliver Kramer  
摘要: We introduce Conceptual Metaphor Theory (CMT) as a framework for enhancing large language models (LLMs) through cognitive prompting in complex reasoning tasks. CMT leverages metaphorical mappings to s...  
URL: https://arxiv.org/abs/2502.01901

... 以及其他 894 篇论文

## math.OC (优化与控制)

**1. The Ball-Proximal (="Broximal") Point Method: a New Algorithm, Convergence Theory, and Applications**  
作者: Kaja Gruntkowska,Hanmin Li,Aadi Rane,Peter Richtárik  
摘要: Non-smooth and non-convex global optimization poses significant challenges across various applications, where standard gradient-based methods often struggle. We propose the Ball-Proximal Point Method,...  
URL: https://arxiv.org/abs/2502.02002

**2. High-Dimensional Bayesian Optimization Using Both Random and Supervised Embeddings**  
作者: Rémy Priem,Youssef Diouane,Nathalie Bartoli,Sylvain Dubreuil,Paul Saves  
摘要: Bayesian optimization (BO) is one of the most powerful strategies to solve computationally expensive-to-evaluate blackbox optimization problems. However, BO methods are conventionally used for optimiz...  
URL: https://arxiv.org/abs/2502.00854

**3. Mirror Descent Under Generalized Smoothness**  
作者: Dingzhi Yu,Wei Jiang,Yuanyu Wan,Lijun Zhang  
摘要: Smoothness is crucial for attaining fast rates in first-order optimization. However, many optimization problems in modern machine learning involve non-smooth objectives. Recent studies relax the smoot...  
URL: https://arxiv.org/abs/2502.00753

**4. Uniform-in-time weak propagation of chaos for consensus-based optimization**  
作者: Erhan Bayraktar,Ibrahim Ekren,Hongyi Zhou  
摘要: We study the uniform-in-time weak propagation of chaos for the consensus-based optimization (CBO) method on a bounded searching domain. We apply the methodology for studying long-time behaviors of int...  
URL: https://arxiv.org/abs/2502.00582

**5. Distributed Primal-Dual Algorithms: Unification, Connections, and Insights**  
作者: Runxiong Wu,Dong Liu,Xueqin Wang,Andi Wang  
摘要: We study primal-dual algorithms for general empirical risk minimization problems in distributed settings, focusing on two prominent classes of algorithms. The first class is the communication-efficien...  
URL: https://arxiv.org/abs/2502.00470

**6. Provably-Stable Neural Network-Based Control of Nonlinear Systems**  
作者: Anran Li,John P. Swensen,Mehdi Hosseinzadeh  
摘要: In recent years, Neural Networks (NNs) have been employed to control nonlinear systems due to their potential capability in dealing with situations that might be difficult for conventional nonlinear c...  
URL: https://arxiv.org/abs/2502.00248

**7. Coreset-Based Task Selection for Sample-Efficient Meta-Reinforcement Learning**  
作者: Donglin Zhan,Leonardo F. Toso,James Anderson  
摘要: We study task selection to enhance sample efficiency in model-agnostic meta-reinforcement learning (MAML-RL). Traditional meta-RL typically assumes that all available tasks are equally important, whic...  
URL: https://arxiv.org/abs/2502.02332

**8. First-ish Order Methods: Hessian-aware Scalings of Gradient Descent**  
作者: Oscar Smee,Fred Roosta,Stephen J. Wright  
摘要: Gradient descent is the primary workhorse for optimizing large-scale problems in machine learning. However, its performance is highly sensitive to the choice of the learning rate. A key limitation of ...  
URL: https://arxiv.org/abs/2502.03701

**9. An analysis of optimization problems involving ReLU neural networks**  
作者: Christoph Plate,Mirko Hahn,Alexander Klimek,Caroline Ganzer,Kai Sundmacher,Sebastian Sager  
摘要: Solving mixed-integer optimization problems with embedded neural networks with ReLU activation functions is challenging. Big-M coefficients that arise in relaxing binary decisions related to these fun...  
URL: https://arxiv.org/abs/2502.03016

**10. Blackwell's Approachability with Approximation Algorithms**  
作者: Dan Garber,Mhna Massalha  
摘要: We revisit Blackwell's celebrated approachability problem which considers a repeated vector-valued game between a player and an adversary. Motivated by settings in which the action set of the player o...  
URL: https://arxiv.org/abs/2502.03919

... 以及其他 16 篇论文

## stat.ML (机器学习)

**1. Theoretical and Practical Analysis of Fréchet Regression via Comparison Geometry**  
作者: Masanari Kimura,Howard Bondell  
摘要: Fréchet regression extends classical regression methods to non-Euclidean metric spaces, enabling the analysis of data relationships on complex structures such as manifolds and graphs. This work establ...  
URL: https://arxiv.org/abs/2502.01995

**2. Local minima of the empirical risk in high dimension: General theorems and convex examples**  
作者: Kiana Asgari,Andrea Montanari,Basil Saeed  
摘要: We consider a general model for high-dimensional empirical risk minimization whereby the data $\mathbf{x}\_i$ are $d$-dimensional isotropic Gaussian vectors, the model is parametrized by $\mathbfΘ\in\m...  
URL: https://arxiv.org/abs/2502.01953

**3. Poisson Hierarchical Indian Buffet Processes for Within and Across Group Sharing of Latent Features-With Indications for Microbiome Species Sampling Models**  
作者: Lancelot F. James,Juho Lee,Abhinav Pandey  
摘要: In this work, we present a comprehensive Bayesian posterior analysis of what we term Poisson Hierarchical Indian Buffet Processes, designed for complex random sparse count species sampling models that...  
URL: https://arxiv.org/abs/2502.01919

**4. Graph Canonical Correlation Analysis**  
作者: Hongju Park,Shuyang Bai,Zhenyao Ye,Hwiyoung Lee,Tianzhou Ma,Shuo Chen  
摘要: Canonical correlation analysis (CCA) is a widely used technique for estimating associations between two sets of multi-dimensional variables. Recent advancements in CCA methods have expanded their appl...  
URL: https://arxiv.org/abs/2502.01780

**5. Doubly Robust Monte Carlo Tree Search**  
作者: Manqing Liu,Andrew L. Beam  
摘要: We present Doubly Robust Monte Carlo Tree Search (DR-MCTS), a novel algorithm that integrates Doubly Robust (DR) off-policy estimation into Monte Carlo Tree Search (MCTS) to enhance sample efficiency ...  
URL: https://arxiv.org/abs/2502.01672

**6. Re-examining Double Descent and Scaling Laws under Norm-based Capacity via Deterministic Equivalence**  
作者: Yichen Wang,Yudong Chen,Lorenzo Rosasco,Fanghui Liu  
摘要: We investigate double descent and scaling laws in terms of weights rather than the number of parameters. Specifically, we analyze linear and random features models using the deterministic equivalence ...  
URL: https://arxiv.org/abs/2502.01585

**7. Spectral Estimators for Multi-Index Models: Precise Asymptotics and Optimal Weak Recovery**  
作者: Filip Kovačević,Yihan Zhang,Marco Mondelli  
摘要: Multi-index models provide a popular framework to investigate the learnability of functions with low-dimensional structure and, also due to their connections with neural networks, they have been objec...  
URL: https://arxiv.org/abs/2502.01583

**8. Heterogeneous Treatment Effect in Time-to-Event Outcomes: Harnessing Censored Data with Recursively Imputed Trees**  
作者: Tomer Meir,Uri Shalit,Malka Gorfine  
摘要: Tailoring treatments to individual needs is a central goal in fields such as medicine. A key step toward this goal is estimating Heterogeneous Treatment Effects (HTE) - the way treatments impact diffe...  
URL: https://arxiv.org/abs/2502.01575

**9. Fine-Tuning Discrete Diffusion Models with Policy Gradient Methods**  
作者: Oussama Zekri,Nicolas Boullé  
摘要: Discrete diffusion models have recently gained significant attention due to their ability to process complex discrete structures for language modeling. However, fine-tuning these models with policy gr...  
URL: https://arxiv.org/abs/2502.01384

**10. Spurious Correlations in High Dimensional Regression: The Roles of Regularization, Simplicity Bias and Over-Parameterization**  
作者: Simone Bombari,Marco Mondelli  
摘要: Learning models have been shown to rely on spurious correlations between non-predictive features and the associated labels in the training data, with negative implications on robustness, bias and fair...  
URL: https://arxiv.org/abs/2502.01347

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## cs.CV (计算机视觉和模式识别)

**1. One Diffusion Step to Real-World Super-Resolution via Flow Trajectory Distillation**  
作者: Jianze Li,Jiezhang Cao,Yong Guo,Wenbo Li,Yulun Zhang  
摘要: Diffusion models (DMs) have significantly advanced the development of real-world image super-resolution (Real-ISR), but the computational cost of multi-step diffusion models limits their application. ...  
URL: https://arxiv.org/abs/2502.01993

**2. DCT-Mamba3D: Spectral Decorrelation and Spatial-Spectral Feature Extraction for Hyperspectral Image Classification**  
作者: Weijia Cao,Xiaofei Yang,Yicong Zhou,Zheng Zhang  
摘要: Hyperspectral image classification presents challenges due to spectral redundancy and complex spatial-spectral dependencies. This paper proposes a novel framework, DCT-Mamba3D, for hyperspectral image...  
URL: https://arxiv.org/abs/2502.01986

**3. AutoGUI: Scaling GUI Grounding with Automatic Functionality Annotations from LLMs**  
作者: Hongxin Li,Jingfan Chen,Jingran Su,Yuntao Chen,Qing Li,Zhaoxiang Zhang  
摘要: User interface understanding with vision-language models has received much attention due to its potential for enabling next-generation software automation. However, existing UI datasets either only pr...  
URL: https://arxiv.org/abs/2502.01977

**4. Mitigating Object Hallucinations in Large Vision-Language Models via Attention Calibration**  
作者: Younan Zhu,Linwei Tao,Minjing Dong,Chang Xu  
摘要: Large Vision-Language Models (LVLMs) exhibit impressive multimodal reasoning capabilities but remain highly susceptible to object hallucination, where models generate responses that are not factually ...  
URL: https://arxiv.org/abs/2502.01969

**5. Memory Efficient Transformer Adapter for Dense Predictions**  
作者: Dong Zhang,Rui Yan,Pingcheng Dong,Kwang-Ting Cheng  
摘要: While current Vision Transformer (ViT) adapter methods have shown promising accuracy, their inference speed is implicitly hindered by inefficient memory access operations, e.g., standard normalization...  
URL: https://arxiv.org/abs/2502.01962

**6. Hierarchical Consensus Network for Multiview Feature Learning**  
作者: Chengwei Xia,Chaoxi Niu,Kun Zhan  
摘要: Multiview feature learning aims to learn discriminative features by integrating the distinct information in each view. However, most existing methods still face significant challenges in learning view...  
URL: https://arxiv.org/abs/2502.01961

**7. MATCNN: Infrared and Visible Image Fusion Method Based on Multi-scale CNN with Attention Transformer**  
作者: Jingjing Liu,Li Zhang,Xiaoyang Zeng,Wanquan Liu,Jianhua Zhang  
摘要: While attention-based approaches have shown considerable progress in enhancing image fusion and addressing the challenges posed by long-range feature dependencies, their efficacy in capturing local fe...  
URL: https://arxiv.org/abs/2502.01959

**8. DAMA: Data- and Model-aware Alignment of Multi-modal LLMs**  
作者: Jinda Lu,Junkang Wu,Jinghan Li,Xiaojun Jia,Shuo Wang,YiFan Zhang,Junfeng Fang,Xiang Wang,Xiangnan He  
摘要: Direct Preference Optimization (DPO) has shown effectiveness in aligning multi-modal large language models (MLLM) with human preferences. However, existing methods exhibit an imbalanced responsiveness...  
URL: https://arxiv.org/abs/2502.01943

**9. Toward a Low-Cost Perception System in Autonomous Vehicles: A Spectrum Learning Approach**  
作者: Mohammed Alsakabi,Aidan Erickson,John M. Dolan,Ozan K. Tonguz  
摘要: We present a cost-effective new approach for generating denser depth maps for Autonomous Driving (AD) and Autonomous Vehicles (AVs) by integrating the images obtained from deep neural network (DNN) 4D...  
URL: https://arxiv.org/abs/2502.01940

**10. PATCH: a deep learning method to assess heterogeneity of artistic practice in historical paintings**  
作者: Andrew Van Horn,Lauryn Smith,Mahamad Mahmoud,Michael McMaster,Clara Pinchbeck,Ina Martin,Andrew Lininger,Anthony Ingrisano,Adam Lowe,Carlos Bayod,Elizabeth Bolman,Kenneth Singer,Michael Hinczewski  
摘要: The history of art has seen significant shifts in the manner in which artworks are created, making understanding of creative processes a central question in technical art history. In the Renaissance a...  
URL: https://arxiv.org/abs/2502.01912

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## q-fin.TR (交易和市场微观结构)

**1. FinRLlama: A Solution to LLM-Engineered Signals Challenge at FinRL Contest 2024**  
作者: Arnav Grover  
摘要: In response to Task II of the FinRL Challenge at ACM ICAIF 2024, this study proposes a novel prompt framework for fine-tuning large language models (LLM) with Reinforcement Learning from Market Feedba...  
URL: https://arxiv.org/abs/2502.01992

**2. TRADES: Generating Realistic Market Simulations with Diffusion Models**  
作者: Leonardo Berti,Bardh Prenkaj,Paola Velardi  
摘要: Financial markets are complex systems characterized by high statistical noise, nonlinearity, and constant evolution. Thus, modeling them is extremely hard. We address the task of generating realistic ...  
URL: https://arxiv.org/abs/2502.07071

## cs.LG (机器学习)

**1. Rethinking Timesteps Samplers and Prediction Types**  
作者: Bin Xie,Gady Agam  
摘要: Diffusion models suffer from the huge consumption of time and resources to train. For example, diffusion models need hundreds of GPUs to train for several weeks for a high-resolution generative task t...  
URL: https://arxiv.org/abs/2502.01990

**2. T-SCEND: Test-time Scalable MCTS-enhanced Diffusion Model**  
作者: Tao Zhang,Jia-Shu Pan,Ruiqi Feng,Tailin Wu  
摘要: We introduce Test-time Scalable MCTS-enhanced Diffusion Model (T-SCEND), a novel framework that significantly improves diffusion model's reasoning capabilities with better energy-based training and sc...  
URL: https://arxiv.org/abs/2502.01989

**3. Ilargi: a GPU Compatible Factorized ML Model Training Framework**  
作者: Wenbo Sun,Rihan Hai  
摘要: The machine learning (ML) training over disparate data sources traditionally involves materialization, which can impose substantial time and space overhead due to data movement and replication. Factor...  
URL: https://arxiv.org/abs/2502.01985

**4. Generative Data Mining with Longtail-Guided Diffusion**  
作者: David S. Hayden,Mao Ye,Timur Garipov,Gregory P. Meyer,Carl Vondrick,Zhao Chen,Yuning Chai,Eric Wolff,Siddhartha S. Srinivasa  
摘要: It is difficult to anticipate the myriad challenges that a predictive model will encounter once deployed. Common practice entails a reactive, cyclical approach: model deployment, data mining, and retr...  
URL: https://arxiv.org/abs/2502.01980

**5. MPIC: Position-Independent Multimodal Context Caching System for Efficient MLLM Serving**  
作者: Shiju Zhao,Junhao Hu,Rongxiao Huang,Jiaqi Zheng,Guihai Chen  
摘要: The context caching technique is employed to accelerate the Multimodal Large Language Model (MLLM) inference by prevailing serving platforms currently. However, this approach merely reuses the Key-Val...  
URL: https://arxiv.org/abs/2502.01960

**6. Constrained belief updates explain geometric structures in transformer representations**  
作者: Mateusz Piotrowski,Paul M. Riechers,Daniel Filan,Adam S. Shai  
摘要: What computational structures emerge in transformers trained on next-token prediction? In this work, we provide evidence that transformers implement constrained Bayesian belief updating -- a paralleli...  
URL: https://arxiv.org/abs/2502.01954

**7. On the Emergence of Position Bias in Transformers**  
作者: Xinyi Wu,Yifei Wang,Stefanie Jegelka,Ali Jadbabaie  
摘要: Recent studies have revealed various manifestations of position bias in transformer architectures, from the "lost-in-the-middle" phenomenon to attention sinks, yet a comprehensive theoretical understa...  
URL: https://arxiv.org/abs/2502.01951

**8. Query-Based and Unnoticeable Graph Injection Attack from Neighborhood Perspective**  
作者: Chang Liu,Hai Huang,Yujie Xing,Xingquan Zuo  
摘要: The robustness of Graph Neural Networks (GNNs) has become an increasingly important topic due to their expanding range of applications. Various attack methods have been proposed to explore the vulnera...  
URL: https://arxiv.org/abs/2502.01936

**9. Distributionally Robust Direct Preference Optimization**  
作者: Zaiyan Xu,Sushil Vemuri,Kishan Panaganti,Dileep Kalathil,Rahul Jain,Deepak Ramachandran  
摘要: A major challenge in aligning large language models (LLMs) with human preferences is the issue of distribution shift. LLM alignment algorithms rely on static preference datasets, assuming that they ac...  
URL: https://arxiv.org/abs/2502.01930

**10. LAST SToP For Modeling Asynchronous Time Series**  
作者: Shubham Gupta,Thibaut Durand,Graham Taylor,Lilian W. Białokozowicz  
摘要: We present a novel prompt design for Large Language Models (LLMs) tailored to Asynchronous Time Series. Unlike regular time series, which assume values at evenly spaced time points, asynchronous time ...  
URL: https://arxiv.org/abs/2502.01922

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## eess.IV (图像和视频处理)

**1. ReMiDi: Reconstruction of Microstructure Using a Differentiable Diffusion MRI Simulator**  
作者: Prathamesh Pradeep Khole,Zahra Kais Petiwala,Shri Prathaa Magesh,Ehsan Mirafzali,Utkarsh Gupta,Jing-Rebecca Li,Andrada Ianus,Razvan Marinescu  
摘要: We propose ReMiDi, a novel method for inferring neuronal microstructure as arbitrary 3D meshes using a differentiable diffusion Magnetic Resonance Imaging (dMRI) simulator. We first implemented in PyT...  
URL: https://arxiv.org/abs/2502.01988

**2. Layer Separation: Adjustable Joint Space Width Images Synthesis in Conventional Radiography**  
作者: Haolin Wang,Yafei Ou,Prasoon Ambalathankandy,Gen Ota,Pengyu Dai,Masayuki Ikebe,Kenji Suzuki,Tamotsu Kamishima  
摘要: Rheumatoid arthritis (RA) is a chronic autoimmune disease characterized by joint inflammation and progressive structural damage. Joint space width (JSW) is a critical indicator in conventional radiogr...  
URL: https://arxiv.org/abs/2502.01972

**3. Efficient Brain Tumor Classification with Lightweight CNN Architecture: A Novel Approach**  
作者: Priyam Ganguly,Akhilbaran Ghosh  
摘要: Brain tumor classification using MRI images is critical in medical diagnostics, where early and accurate detection significantly impacts patient outcomes. While recent advancements in deep learning (D...  
URL: https://arxiv.org/abs/2502.01674

**4. Assessing the use of Diffusion models for motion artifact correction in brain MRI**  
作者: Paolo Angella,Vito Paolo Pastore,Matteo Santacesaria  
摘要: Magnetic Resonance Imaging generally requires long exposure times, while being sensitive to patient motion, resulting in artifacts in the acquired images, which may hinder their diagnostic relevance. ...  
URL: https://arxiv.org/abs/2502.01418

**5. Towards Robust and Generalizable Lensless Imaging with Modular Learned Reconstruction**  
作者: Eric Bezzam,Yohann Perron,Martin Vetterli  
摘要: Lensless cameras disregard the conventional design that imaging should mimic the human eye. This is done by replacing the lens with a thin mask, and moving image formation to the digital post-processi...  
URL: https://arxiv.org/abs/2502.01102

**6. FetDTIAlign: A Deep Learning Framework for Affine and Deformable Registration of Fetal Brain dMRI**  
作者: Bo Li,Qi Zeng,Simon K. Warfield,Davood Karimi  
摘要: Diffusion MRI (dMRI) provides unique insights into fetal brain microstructure in utero. Longitudinal and cross-sectional fetal dMRI studies can reveal crucial neurodevelopmental changes but require pr...  
URL: https://arxiv.org/abs/2502.01057

**7. A Study on the Performance of U-Net Modifications in Retroperitoneal Tumor Segmentation**  
作者: Moein Heidari,Ehsan Khodapanah Aghdam,Alexander Manzella,Daniel Hsu,Rebecca Scalabrino,Wenjin Chen,David J. Foran,Ilker Hacihaliloglu  
摘要: The retroperitoneum hosts a variety of tumors, including rare benign and malignant types, which pose diagnostic and treatment challenges due to their infrequency and proximity to vital structures. Est...  
URL: https://arxiv.org/abs/2502.00314

**8. Patch Triplet Similarity Purification for Guided Real-World Low-Dose CT Image Denoising**  
作者: Junhao Long,Fengwei Yang,Juncheng Yan,Baoping Zhang,Chao Jin,Jian Yang,Changliang Zou,Jun Xu  
摘要: Image denoising of low-dose computed tomography (LDCT) is an important problem for clinical diagnosis with reduced radiation exposure. Previous methods are mostly trained with pairs of synthetic or mi...  
URL: https://arxiv.org/abs/2502.00253

**9. Multimodal MRI-Ultrasound AI for Prostate Cancer Detection Outperforms Radiologist MRI Interpretation: A Multi-Center Study**  
作者: Hassan Jahanandish,Shengtian Sang,Cynthia Xinran Li,Sulaiman Vesal,Indrani Bhattacharya,Jeong Hoon Lee,Richard Fan,Geoffrey A. Sonna,Mirabela Rusu  
摘要: Pre-biopsy magnetic resonance imaging (MRI) is increasingly used to target suspicious prostate lesions. This has led to artificial intelligence (AI) applications improving MRI-based detection of clini...  
URL: https://arxiv.org/abs/2502.00146

**10. Advanced Assessment of Stroke in Retinal Fundus Imaging with Deep Multi-view Learning**  
作者: Aysen Degerli,Mika Hilvo,Juha Pajula,Petri Huhtinen,Pekka Jäkälä  
摘要: Stroke is globally a major cause of mortality and morbidity, and hence accurate and rapid diagnosis of stroke is valuable. Retinal fundus imaging reveals the known markers of elevated stroke risk in t...  
URL: https://arxiv.org/abs/2502.00079

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## cs.CR (密码学和安全)

**1. Optimizing Spot Instance Reliability and Security Using Cloud-Native Data and Tools**  
作者: Shubham Malhotra  
摘要: This paper represents "Cloudlab", a comprehensive, cloud - native laboratory designed to support network security research and training. Built on Google Cloud and adhering to GitOps methodologies, Clo...  
URL: https://arxiv.org/abs/2502.01966

**2. Security and Quality in LLM-Generated Code: A Multi-Language, Multi-Model Analysis**  
作者: Mohammed Kharma,Soohyeon Choi,Mohammed AlKhanafseh,David Mohaisen  
摘要: Artificial Intelligence (AI)-driven code generation tools are increasingly used throughout the software development lifecycle to accelerate coding tasks. However, the security of AI-generated code usi...  
URL: https://arxiv.org/abs/2502.01853

**3. Efficient Denial of Service Attack Detection in IoT using Kolmogorov-Arnold Networks**  
作者: Oleksandr Kuznetsov  
摘要: The proliferation of Internet of Things (IoT) devices has created a pressing need for efficient security solutions, particularly against Denial of Service (DoS) attacks. While existing detection appro...  
URL: https://arxiv.org/abs/2502.01835

**4. Firewalls to Secure Dynamic LLM Agentic Networks**  
作者: Sahar Abdelnabi,Amr Gomaa,Eugene Bagdasarian,Per Ola Kristensson,Reza Shokri  
摘要: Future LLM agents are likely to communicate on behalf of users with other entity-representing agents on tasks that entail long-horizon plans with interdependent goals. Current work does not focus on s...  
URL: https://arxiv.org/abs/2502.01822

**5. Harmful Terms and Where to Find Them: Measuring and Modeling Unfavorable Financial Terms and Conditions in Shopping Websites at Scale**  
作者: Elisa Tsai,Neal Mangaokar,Boyuan Zheng,Haizhong Zheng,Atul Prakash  
摘要: Terms and conditions for online shopping websites often contain terms that can have significant financial consequences for customers. Despite their impact, there is currently no comprehensive understa...  
URL: https://arxiv.org/abs/2502.01798

**6. Spectral Entanglement Fingerprinting: A Novel Framework for Ransomware Detection Using Cross-Frequency Anomalous Waveform Signatures**  
作者: Dominica Ayanara,Atticus Hillingworth,Jonathan Casselbury,Dominic Montague  
摘要: Malicious encryption techniques continue to evolve, bypassing conventional detection mechanisms that rely on static signatures or predefined behavioral rules. Spectral analysis presents an alternative...  
URL: https://arxiv.org/abs/2502.01275

**7. Peering Behind the Shield: Guardrail Identification in Large Language Models**  
作者: Ziqing Yang,Yixin Wu,Rui Wen,Michael Backes,Yang Zhang  
摘要: Human-AI conversations have gained increasing attention since the era of large language models. Consequently, more techniques, such as input/output guardrails and safety alignment, are proposed to pre...  
URL: https://arxiv.org/abs/2502.01241

**8. The dark deep side of DeepSeek: Fine-tuning attacks against the safety alignment of CoT-enabled models**  
作者: Zhiyuan Xu,Joseph Gardiner,Sana Belguith  
摘要: Large language models are typically trained on vast amounts of data during the pre-training phase, which may include some potentially harmful information. Fine-tuning attacks can exploit this by promp...  
URL: https://arxiv.org/abs/2502.01225

**9. DH-TRNG: A Dynamic Hybrid TRNG with Ultra-High Throughput and Area-Energy Efficiency**  
作者: Yuan Zhang,Kuncai Zhong,Jiliang Zhang  
摘要: As a vital security primitive, the true random number generator (TRNG) is a mandatory component to build roots of trust for any encryption system. However, existing TRNGs suffer from bottlenecks of lo...  
URL: https://arxiv.org/abs/2502.01066

**10. Encrypted Large Model Inference: The Equivariant Encryption Paradigm**  
作者: James Buban,Hongyang Zhang,Claudio Angione,Harry Yang,Ahmad Farhan,Seyfal Sultanov,Michael Du,Xuran Ma,Zihao Wang,Yue Zhao,Arria Owlia,Fielding Johnston,Patrick Colangelo  
摘要: Large scale deep learning model, such as modern language models and diffusion architectures, have revolutionized applications ranging from natural language processing to computer vision. However, thei...  
URL: https://arxiv.org/abs/2502.01013

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## cs.RO (机器人技术)

**1. DHP: Discrete Hierarchical Planning for Hierarchical Reinforcement Learning Agents**  
作者: Shashank Sharma,Janina Hoffmann,Vinay Namboodiri  
摘要: In this paper, we address the challenge of long-horizon visual planning tasks using Hierarchical Reinforcement Learning (HRL). Our key contribution is a Discrete Hierarchical Planning (DHP) method, an...  
URL: https://arxiv.org/abs/2502.01956

**2. VolleyBots: A Testbed for Multi-Drone Volleyball Game Combining Motion Control and Strategic Play**  
作者: Zelai Xu,Chao Yu,Ruize Zhang,Huining Yuan,Xiangmin Yi,Shilong Ji,Chuqi Wang,Wenhao Tang,Yu Wang  
摘要: Multi-agent reinforcement learning (MARL) has made significant progress, largely fueled by the development of specialized testbeds that enable systematic evaluation of algorithms in controlled yet cha...  
URL: https://arxiv.org/abs/2502.01932

**3. Wake-Informed 3D Path Planning for Autonomous Underwater Vehicles Using A\* and Neural Network Approximations**  
作者: Zachary Cooper-Baldock,Stephen Turnock,Karl Sammut  
摘要: Autonomous Underwater Vehicles (AUVs) encounter significant energy, control and navigation challenges in complex underwater environments, particularly during close-proximity operations, such as launch...  
URL: https://arxiv.org/abs/2502.01918

**4. Generalizable and Fast Surrogates: Model Predictive Control of Articulated Soft Robots using Physics-Informed Neural Networks**  
作者: Tim-Lukas Habich,Aran Mohammad,Simon F. G. Ehlers,Martin Bensch,Thomas Seel,Moritz Schappler  
摘要: Soft robots can revolutionize several applications with high demands on dexterity and safety. When operating these systems, real-time estimation and control require fast and accurate models. However, ...  
URL: https://arxiv.org/abs/2502.01916

**5. Composite Gaussian Processes Flows for Learning Discontinuous Multimodal Policies**  
作者: Shu-yuan Wang,Hikaru Sasaki,Takamitsu Matsubara  
摘要: Learning control policies for real-world robotic tasks often involve challenges such as multimodality, local discontinuities, and the need for computational efficiency. These challenges arise from the...  
URL: https://arxiv.org/abs/2502.01913

**6. From Foresight to Forethought: VLM-In-the-Loop Policy Steering via Latent Alignment**  
作者: Yilin Wu,Ran Tian,Gokul Swamy,Andrea Bajcsy  
摘要: While generative robot policies have demonstrated significant potential in learning complex, multimodal behaviors from demonstrations, they still exhibit diverse failures at deployment-time. Policy st...  
URL: https://arxiv.org/abs/2502.01828

**7. Flow-based Domain Randomization for Learning and Sequencing Robotic Skills**  
作者: Aidan Curtis,Eric Li,Michael Noseworthy,Nishad Gothoskar,Sachin Chitta,Hui Li,Leslie Pack Kaelbling,Nicole Carey  
摘要: Domain randomization in reinforcement learning is an established technique for increasing the robustness of control policies trained in simulation. By randomizing environment properties during trainin...  
URL: https://arxiv.org/abs/2502.01800

**8. VILP: Imitation Learning with Latent Video Planning**  
作者: Zhengtong Xu,Qiang Qiu,Yu She  
摘要: In the era of generative AI, integrating video generation models into robotics opens new possibilities for the general-purpose robot agent. This paper introduces imitation learning with latent video p...  
URL: https://arxiv.org/abs/2502.01784

**9. Coarse-to-Fine 3D Keyframe Transporter**  
作者: Xupeng Zhu,David Klee,Dian Wang,Boce Hu,Haojie Huang,Arsh Tangri,Robin Walters,Robert Platt  
摘要: Recent advances in Keyframe Imitation Learning (IL) have enabled learning-based agents to solve a diverse range of manipulation tasks. However, most approaches ignore the rich symmetries in the proble...  
URL: https://arxiv.org/abs/2502.01773

**10. Dynamic object goal pushing with mobile manipulators through model-free constrained reinforcement learning**  
作者: Ioannis Dadiotis,Mayank Mittal,Nikos Tsagarakis,Marco Hutter  
摘要: Non-prehensile pushing to move and reorient objects to a goal is a versatile loco-manipulation skill. In the real world, the object's physical properties and friction with the floor contain significan...  
URL: https://arxiv.org/abs/2502.01546

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## cs.CY (计算机与社会)

**1. Fairness through Difference Awareness: Measuring Desired Group Discrimination in LLMs**  
作者: Angelina Wang,Michelle Phan,Daniel E. Ho,Sanmi Koyejo  
摘要: Algorithmic fairness has conventionally adopted a perspective of racial color-blindness (i.e., difference unaware treatment). We contend that in a range of important settings, group difference awarene...  
URL: https://arxiv.org/abs/2502.01926

**2. Auditing a Dutch Public Sector Risk Profiling Algorithm Using an Unsupervised Bias Detection Tool**  
作者: Floris Holstege,Mackenzie Jorgensen,Kirtan Padh,Jurriaan Parie,Joel Persson,Krsto Prorokovic,Lukas Snoek  
摘要: Algorithms are increasingly used to automate or aid human decisions, yet recent research shows that these algorithms may exhibit bias across legally protected demographic groups. However, data on thes...  
URL: https://arxiv.org/abs/2502.01713

**3. LIBRA: Measuring Bias of Large Language Model from a Local Context**  
作者: Bo Pang,Tingrui Qiao,Caroline Walker,Chris Cunningham,Yun Sing Koh  
摘要: Large Language Models (LLMs) have significantly advanced natural language processing applications, yet their widespread use raises concerns regarding inherent biases that may reduce utility or harm fo...  
URL: https://arxiv.org/abs/2502.01679

**4. Meursault as a Data Point**  
作者: Abhinav Pratap,Amit Pathak  
摘要: In an era dominated by datafication, the reduction of human experiences to quantifiable metrics raises profound philosophical and ethical questions. This paper explores these issues through the lens o...  
URL: https://arxiv.org/abs/2502.01364

**5. Generative AI for Analyzing Participatory Rural Appraisal Data: An Exploratory Case Study in Gender Research**  
作者: Srividya Sheshadri,Unnikrishnan Radhakrishnan,Aswathi Padmavilochanan,Christopher Coley,Rao R. Bhavani  
摘要: This study explores the novel application of Generative Artificial Intelligence (GenAI) in analyzing unstructured visual data generated through Participatory Rural Appraisal (PRA), specifically focusi...  
URL: https://arxiv.org/abs/2502.00763

**6. Patterns and Purposes: A Cross-Journal Analysis of AI Tool Usage in Academic Writing**  
作者: Ziyang Xu  
摘要: This study investigates the use of AI tools in academic writing through analysis of AI usage declarations in journals. Using a mixed-methods approach combining content analysis, statistical analysis, ...  
URL: https://arxiv.org/abs/2502.00632

**7. Engineering Educators' Perspectives on the Impact of Generative AI in Higher Education**  
作者: Umama Dewan,Ashish Hingle,Nora McDonald,Aditya Johri  
摘要: The introduction of generative artificial intelligence (GenAI) has been met with a mix of reactions by higher education institutions, ranging from consternation and resistance to wholehearted acceptan...  
URL: https://arxiv.org/abs/2502.00569

**8. Position: Evaluating Generative AI Systems is a Social Science Measurement Challenge**  
作者: Hanna Wallach,Meera Desai,A. Feder Cooper,Angelina Wang,Chad Atalla,Solon Barocas,Su Lin Blodgett,Alexandra Chouldechova,Emily Corvi,P. Alex Dow,Jean Garcia-Gathright,Alexandra Olteanu,Nicholas Pangakis,Stefanie Reed,Emily Sheng,Dan Vann,Jennifer Wortman Vaughan,Matthew Vogel,Hannah Washington,Abigail Z. Jacobs  
摘要: The measurement tasks involved in evaluating generative AI (GenAI) systems are especially difficult, leading to what has been described as "a tangle of sloppy tests [and] apples-to-oranges comparisons...  
URL: https://arxiv.org/abs/2502.00561

**9. Looking into the Future of Health-Care Services: Can Life-Like Agents Change the Future of Health-Care Services?**  
作者: Mohammad Saleh Torkestani,Robert Davis,Abdolhossein Sarrafzadeh  
摘要: Time constraints on doctor patient interaction and restricted access to specialists under the managed care system led to increasingly referring to computers as a medical information source and a self-...  
URL: https://arxiv.org/abs/2502.00495

**10. The Societal Response to Potentially Sentient AI**  
作者: Lucius Caviola  
摘要: We may soon develop highly human-like AIs that appear-or perhaps even are-sentient, capable of subjective experiences such as happiness and suffering. Regardless of whether AI can achieve true sentien...  
URL: https://arxiv.org/abs/2502.00388

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## cs.NE (神经和进化计算)

**1. TESS: A Scalable Temporally and Spatially Local Learning Rule for Spiking Neural Networks**  
作者: Marco Paul E. Apolinario,Kaushik Roy,Charlotte Frenkel  
摘要: The demand for low-power inference and training of deep neural networks (DNNs) on edge devices has intensified the need for algorithms that are both scalable and energy-efficient. While spiking neural...  
URL: https://arxiv.org/abs/2502.01837

**2. Hybrid Firefly Algorithm and Sperm Swarm Optimization Algorithm using Newton-Raphson Method (HFASSON) and its application in CR-VANET**  
作者: Rehannara Beegum T,Mohd Yamani Idna Idris,Mohamad Nizam Bin Ayub,Hisham A Shehadeh,Usman Ali  
摘要: This paper proposes a new hybrid algorithm, combining FA, SSO, and the N-R method to accelerate convergence towards global optima, named the Hybrid Firefly Algorithm and Sperm Swarm Optimization with ...  
URL: https://arxiv.org/abs/2502.01053

**3. Dominated Novelty Search: Rethinking Local Competition in Quality-Diversity**  
作者: Ryan Bahlous-Boldi,Maxence Faldor,Luca Grillotti,Hannah Janmohamed,Lisa Coiffard,Lee Spector,Antoine Cully  
摘要: Quality-Diversity is a family of evolutionary algorithms that generate diverse, high-performing solutions through local competition principles inspired by natural evolution. While research has focused...  
URL: https://arxiv.org/abs/2502.00593

**4. Discovering Quality-Diversity Algorithms via Meta-Black-Box Optimization**  
作者: Maxence Faldor,Robert Tjarko Lange,Antoine Cully  
摘要: Quality-Diversity has emerged as a powerful family of evolutionary algorithms that generate diverse populations of high-performing solutions by implementing local competition principles inspired by bi...  
URL: https://arxiv.org/abs/2502.02190

**5. STEMS: Spatial-Temporal Mapping Tool For Spiking Neural Networks**  
作者: Sherif Eissa,Sander Stuijk,Floran De Putter,Andrea Nardi-Dei,Federico Corradi,Henk Corporaal  
摘要: Spiking Neural Networks (SNNs) are promising bio-inspired third-generation neural networks. Recent research has trained deep SNN models with accuracy on par with Artificial Neural Networks (ANNs). Alt...  
URL: https://arxiv.org/abs/2502.03287

**6. Kozax: Flexible and Scalable Genetic Programming in JAX**  
作者: Sigur de Vries,Sander W. Keemink,Marcel A. J. van Gerven  
摘要: Genetic programming is an optimization algorithm inspired by natural selection which automatically evolves the structure of computer programs. The resulting computer programs are interpretable and eff...  
URL: https://arxiv.org/abs/2502.03047

**7. Aerial Reliable Collaborative Communications for Terrestrial Mobile Users via Evolutionary Multi-Objective Deep Reinforcement Learning**  
作者: Geng Sun,Jian Xiao,Jiahui Li,Jiacheng Wang,Jiawen Kang,Dusit Niyato,Shiwen Mao  
摘要: Unmanned aerial vehicles (UAVs) have emerged as the potential aerial base stations (BSs) to improve terrestrial communications. However, the limited onboard energy and antenna power of a UAV restrict ...  
URL: https://arxiv.org/abs/2502.05824

**8. Neuromorphic Digital-Twin-based Controller for Indoor Multi-UAV Systems Deployment**  
作者: Reza Ahmadvand,Sarah Safura Sharif,Yaser Mike Banad  
摘要: Presented study introduces a novel distributed cloud-edge framework for autonomous multi-UAV systems that combines the computational efficiency of neuromorphic computing with nature-inspired control s...  
URL: https://arxiv.org/abs/2502.08115

**9. UAV-assisted Joint Mobile Edge Computing and Data Collection via Matching-enabled Deep Reinforcement Learning**  
作者: Boxiong Wang,Hui Kang,Jiahui Li,Geng Sun,Zemin Sun,Jiacheng Wang,Dusit Niyato  
摘要: Unmanned aerial vehicle (UAV)-assisted mobile edge computing (MEC) and data collection (DC) have been popular research issues. Different from existing works that consider MEC and DC scenarios separate...  
URL: https://arxiv.org/abs/2502.07388

**10. Brain in the Dark: Design Principles for Neuromimetic Inference under the Free Energy Principle**  
作者: Mehran H. Bazargani,Szymon Urbas,Karl Friston  
摘要: Deep learning has revolutionised artificial intelligence (AI) by enabling automatic feature extraction and function approximation from raw data. However, it faces challenges such as a lack of out-of-d...  
URL: https://arxiv.org/abs/2502.08860

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## cs.DB (数据库)

**1. LeaFi: Data Series Indexes on Steroids with Learned Filters**  
作者: Qitong Wang,Ioana Ileana,Themis Palpanas  
摘要: The ever-growing collections of data series create a pressing need for efficient similarity search, which serves as the backbone for various analytics pipelines. Recent studies have shown that tree-ba...  
URL: https://arxiv.org/abs/2502.01836

**2. Imperfect Knowledge Management -- A Case Study in a Chilean Manufacturing Company**  
作者: Leoncio Jimenez  
摘要: To conceptualize living systems based on the processes that create them, rather than their interactions with the environment, as in systems theory. Maturana and Varela (1969) at the University of Chil...  
URL: https://arxiv.org/abs/2502.01656

**3. Common Foundations for SHACL, ShEx, and PG-Schema**  
作者: S. Ahmetaj,I. Boneva,J. Hidders,K. Hose,M. Jakubowski,J. E. Labra-Gayo,W. Martens,F. Mogavero,F. Murlak,C. Okulmus,A. Polleres,O. Savkovic,M. Simkus,D. Tomaszuk  
摘要: Graphs have emerged as an important foundation for a variety of applications, including capturing and reasoning over factual knowledge, semantic data integration, social networks, and providing factua...  
URL: https://arxiv.org/abs/2502.01295

**4. How Good are Learned Cost Models, Really? Insights from Query Optimization Tasks**  
作者: Roman Heinrich,Manisha Luthra,Johannes Wehrstein,Harald Kornmayer,Carsten Binnig  
摘要: Traditionally, query optimizers rely on cost models to choose the best execution plan from several candidates, making precise cost estimates critical for efficient query execution. In recent years, co...  
URL: https://arxiv.org/abs/2502.01229

**5. AutoDDG: Automated Dataset Description Generation using Large Language Models**  
作者: Haoxiang Zhang,Yurong Liu,Wei-Lun,Hung,Aécio Santos,Juliana Freire  
摘要: The proliferation of datasets across open data portals and enterprise data lakes presents an opportunity for deriving data-driven insights. However, widely-used dataset search systems rely on keyword ...  
URL: https://arxiv.org/abs/2502.01050

**6. TxnSails: Achieving Serializable Transaction Scheduling with Self-Adaptive Isolation Level Selection**  
作者: Qiyu Zhuang,Wei Lu,Shuang Liu,Yuxing Chen,Xinyue Shi,Zhanhao Zhao,Yipeng Sun,Anqun Pan,Xiaoyong Du  
摘要: Achieving the serializable isolation level, regarded as the gold standard for transaction processing, is costly. Recent studies reveal that adjusting specific query patterns within a workload can stil...  
URL: https://arxiv.org/abs/2502.00991

**7. Graph Data Management and Graph Machine Learning: Synergies and Opportunities**  
作者: Arijit Khan,Xiangyu Ke,Yinghui Wu  
摘要: The ubiquity of machine learning, particularly deep learning, applied to graphs is evident in applications ranging from cheminformatics (drug discovery) and bioinformatics (protein interaction predict...  
URL: https://arxiv.org/abs/2502.00529

**8. A Novel Approach to Translate Structural Aggregation Queries to MapReduce Code**  
作者: Ahmed M. Abdelmoniem,Sameh Abdulah,Walid Atwa  
摘要: Data management applications are growing and require more attention, especially in the "big data" era. Thus, supporting such applications with novel and efficient algorithms that achieve higher perfor...  
URL: https://arxiv.org/abs/2502.00343

**9. CoddLLM: Empowering Large Language Models for Data Analytics**  
作者: Jiani Zhang,Hengrui Zhang,Rishav Chakravarti,Yiqun Hu,Patrick Ng,Asterios Katsifodimos,Huzefa Rangwala,George Karypis,Alon Halevy  
摘要: Large Language Models (LLMs) have the potential to revolutionize data analytics by simplifying tasks such as data discovery and SQL query synthesis through natural language interactions. This work ser...  
URL: https://arxiv.org/abs/2502.00329

**10. Querying Databases with Function Calling**  
作者: Connor Shorten,Charles Pierse,Thomas Benjamin Smith,Karel D'Oosterlinck,Tuana Celik,Erika Cardenas,Leonie Monigatti,Mohd Shukri Hasan,Edward Schmuhl,Daniel Williams,Aravind Kesiraju,Bob van Luijt  
摘要: The capabilities of Large Language Models (LLMs) are rapidly accelerating largely thanks to their integration with external tools. Querying databases is among the most effective of these integrations,...  
URL: https://arxiv.org/abs/2502.00032

... 以及其他 17 篇论文

## cs.HC (人机交互)

**1. Designing Technologies for Value-based Mental Healthcare: Centering Clinicians' Perspectives on Outcomes Data Specification, Collection, and Use**  
作者: Daniel A. Adler,Yuewen Yang,Thalia Viranda,Anna R. Van Meter,Emma Elizabeth McGinty,Tanzeem Choudhury  
摘要: Health information technologies are transforming how mental healthcare is paid for through value-based care programs, which tie payment to data quantifying care outcomes. But, it is unclear what outco...  
URL: https://arxiv.org/abs/2502.01829

**2. MemPal: Leveraging Multimodal AI and LLMs for Voice-Activated Object Retrieval in Homes of Older Adults**  
作者: Natasha Maniar,Samantha W. T. Chan,Wazeer Zulfikar,Scott Ren,Christine Xu,Pattie Maes  
摘要: Older adults have increasing difficulty with retrospective memory, hindering their abilities to perform daily activities and posing stress on caregivers to ensure their wellbeing. Recent developments ...  
URL: https://arxiv.org/abs/2502.01801

**3. Training Users Against Human and GPT-4 Generated Social Engineering Attacks**  
作者: Tyler Malloy,Maria Jose Ferreira,Fei Fang,Cleotilde Gonzalez  
摘要: In real-world decision making, outcomes are often delayed, meaning individuals must make multiple decisions before receiving any feedback. Moreover, feedback can be presented in different ways: it may...  
URL: https://arxiv.org/abs/2502.01764

**4. MeetMap: Real-Time Collaborative Dialogue Mapping with LLMs in Online Meetings**  
作者: Xinyue Chen,Nathan Yap,Xinyi Lu,Aylin Gunal,Xu Wang  
摘要: Video meeting platforms display conversations linearly through transcripts or summaries. However, ideas during a meeting do not emerge linearly. We leverage LLMs to create dialogue maps in real time t...  
URL: https://arxiv.org/abs/2502.01564

**5. The Human-AI Handshake Framework: A Bidirectional Approach to Human-AI Collaboration**  
作者: Aung Pyae  
摘要: Human-AI collaboration is evolving from a tool-based perspective to a partnership model where AI systems complement and enhance human capabilities. Traditional approaches often limit AI to a supportiv...  
URL: https://arxiv.org/abs/2502.01493

**6. Plan-Then-Execute: An Empirical Study of User Trust and Team Performance When Using LLM Agents As A Daily Assistant**  
作者: Gaole He,Gianluca Demartini,Ujwal Gadiraju  
摘要: Since the explosion in popularity of ChatGPT, large language models (LLMs) have continued to impact our everyday lives. Equipped with external tools that are designed for a specific purpose (e.g., for...  
URL: https://arxiv.org/abs/2502.01390

**7. The Homework Wars: Exploring Emotions, Behaviours, and Conflicts in Parent-Child Homework Interactions**  
作者: Nan Gao,Yibin Liu,Xin Tang,Yanyan Liu,Chun Yu,Yun Huang,Yuntao Wang,Flora D. Salim,Xuhai Orson Xu,Jun Wei,Yuanchun Shi  
摘要: Parental involvement in homework is a crucial aspect of family education, but it often leads to emotional strain and conflicts that can severely impact family well-being. This paper presents findings ...  
URL: https://arxiv.org/abs/2502.01325

**8. DietGlance: Dietary Monitoring and Personalized Analysis at a Glance with Knowledge-Empowered AI Assistant**  
作者: Zhihan Jiang,Running Zhao,Lin Lin,Yue Yu,Handi Chen,Xinchen Zhang,Xuhai Xu,Yifang Wang,Xiaojuan Ma,Edith C. H. Ngai  
摘要: Growing awareness of wellness has prompted people to consider whether their dietary patterns align with their health and fitness goals. In response, researchers have introduced various wearable dietar...  
URL: https://arxiv.org/abs/2502.01317

**9. Expert-Generated Privacy Q&A Dataset for Conversational AI and User Study Insights**  
作者: Anna Leschanowsky,Farnaz Salamatjoo,Zahra Kolagar,Birgit Popp  
摘要: Conversational assistants process personal data and must comply with data protection regulations that require providers to be transparent with users about how their data is handled. Transparency, in a...  
URL: https://arxiv.org/abs/2502.01306

**10. Guidance Source Matters: How Guidance from AI, Expert, or a Group of Analysts Impacts Visual Data Preparation and Analysis**  
作者: Arpit Narechania,Alex Endert,Atanu R Sinha  
摘要: The progress in generative AI has fueled AI-powered tools like co-pilots and assistants to provision better guidance, particularly during data analysis. However, research on guidance has not yet exami...  
URL: https://arxiv.org/abs/2502.00682

... 以及其他 125 篇论文

## cs.IT (信息论)

**1. Relatively-Secure LLM-Based Steganography via Constrained Markov Decision Processes**  
作者: Yu-Shin Huang,Chao Tian,Krishna Narayanan,Lizhong Zheng  
摘要: Linguistic steganography aims to conceal information within natural language text without being detected. An effective steganography approach should encode the secret message into a minimal number of ...  
URL: https://arxiv.org/abs/2502.01827

**2. On the impact of the parametrization of deep convolutional neural networks on post-training quantization**  
作者: Samy Houache,Jean François Aujol,Yann Traonmilin  
摘要: This paper introduces novel theoretical approximation bounds for the output of quantized neural networks, with a focus on convolutional neural networks (CNN). By considering layerwise parametrization ...  
URL: https://arxiv.org/abs/2502.01156

**3. The Query/Hit Model for Sequential Hypothesis Testing**  
作者: Mahshad Shariatnasab,Stefano Rini,Farhad Shirani,S. Sitharama Iyengar  
摘要: This work introduces the Query/Hit (Q/H) learning model. The setup consists of two agents. One agent, Alice, has access to a streaming source, while the other, Bob, does not have direct access to the ...  
URL: https://arxiv.org/abs/2502.00605

**4. Variations on the Expectation Due to Changes in the Probability Measure**  
作者: Samir M. Perlaza,Gaetan Bisson  
摘要: Closed-form expressions are presented for the variation of the expectation of a given function due to changes in the probability measure used for the expectation. They unveil interesting connections w...  
URL: https://arxiv.org/abs/2502.02887

**5. Covert Communications in Active-IOS Aided Uplink NOMA Systems With Full-Duplex Receiver**  
作者: Xueyu Kang,Nan Qi,Lu Lv,Alexandros-Apostolos A. Boulogeorgos,Theodoros A. Tsiftsis,Hongwu Liu  
摘要: In this paper, an active intelligent omni-surface (A-IOS) is deployed to aid uplink transmissions in a non-orthogonal multiple access (NOMA) system. In order to shelter the covert signal embedded in t...  
URL: https://arxiv.org/abs/2502.02813

**6. Achieving Hiding and Smart Anti-Jamming Communication: A Parallel DRL Approach against Moving Reactive Jammer**  
作者: Yangyang Li,Yuhua Xu,Wen Li,Guoxin Li,Zhibing Feng,Songyi Liu,Jiatao Du,Xinran Li  
摘要: This paper addresses the challenge of anti-jamming in moving reactive jamming scenarios. The moving reactive jammer initiates high-power tracking jamming upon detecting any transmission activity, and ...  
URL: https://arxiv.org/abs/2502.02385

**7. A Fast Decoding Algorithm for Generalized Reed-Solomon Codes and Alternant Codes**  
作者: Nianqi Tang,Yunghsiang S. Han,Danyang Pei,Chao Chen  
摘要: In this paper, it is shown that the syndromes of generalized Reed-Solomon (GRS) codes and alternant codes can be characterized in terms of inverse fast Fourier transform, regardless of code definition...  
URL: https://arxiv.org/abs/2502.02356

**8. Quantifying imperfect cognition via achieved information gain**  
作者: Torsten Enßlin  
摘要: Cognition, the process of information processing in form of inference, communication, and memorization, is the central activity of any intelligence. Its physical realization in a brain, computer, or i...  
URL: https://arxiv.org/abs/2502.04088

**9. Token-Domain Multiple Access: Exploiting Semantic Orthogonality for Collision Mitigation**  
作者: Li Qiao,Mahdi Boloursaz Mashhadi,Zhen Gao,Deniz Gündüz  
摘要: Token communications is an emerging generative semantic communication concept that reduces transmission rates by using context and transformer-based token processing, with tokens serving as universal ...  
URL: https://arxiv.org/abs/2502.06118

**10. Zak-Transform-Induced Optimal Sequences and Their Applications in OTFS**  
作者: Xiuping Peng,Congying Wu,Zilong Liu,Chunlei Li,Jianye Zhang,Pingzhi Fan  
摘要: This paper introduces a novel finite Zak transform (FZT)-aided framework for constructing multiple zero-correlation zone (ZCZ) sequence sets with optimal correlation properties. Specifically, each seq...  
URL: https://arxiv.org/abs/2502.05853

... 以及其他 18 篇论文

## cs.CE (计算工程、金融和科学)

**1. Physics-Informed Surrogates for Temperature Prediction of Multi-Tracks in Laser Powder Bed Fusion**  
作者: Hesameddin Safari,Henning Wessels  
摘要: Modeling plays a critical role in additive manufacturing (AM), enabling a deeper understanding of underlying processes. Parametric solutions for such models are of great importance, enabling the optim...  
URL: https://arxiv.org/abs/2502.01820

**2. TwinMarket: A Scalable Behavioral and Social Simulation for Financial Markets**  
作者: Yuzhe Yang,Yifei Zhang,Minghao Wu,Kaidi Zhang,Yunmiao Zhang,Honghai Yu,Yan Hu,Benyou Wang  
摘要: The study of social emergence has long been a central focus in social science. Traditional modeling approaches, such as rule-based Agent-Based Models (ABMs), struggle to capture the diversity and comp...  
URL: https://arxiv.org/abs/2502.01506

**3. Neural Preconditioning Operator for Efficient PDE Solves**  
作者: Zhihao Li,Di Xiao,Zhilu Lai,Wei Wang  
摘要: We introduce the Neural Preconditioning Operator (NPO), a novel approach designed to accelerate Krylov solvers in solving large, sparse linear systems derived from partial differential equations (PDEs...  
URL: https://arxiv.org/abs/2502.01337

**4. Data Fusion for Full-Range Response Reconstruction via Diffusion Models**  
作者: Wingho Feng,Quanwang Li,Chen Wang,Jian-sheng Fan  
摘要: Accurately capturing the full-range response of structures is crucial in structural health monitoring (SHM) for ensuring safety and operational integrity. However, limited sensor deployment due to cos...  
URL: https://arxiv.org/abs/2502.00795

**5. Assessment of ChatGPT for Engineering Statics Analysis**  
作者: Benjamin Hope,Jayden Bracey,Sahar Choukir,Derek Warner  
摘要: Large language models (LLMs) such as OpenAI's ChatGPT hold potential for automating engineering analysis, yet their reliability in solving multi-step statics problems remains uncertain. This study eva...  
URL: https://arxiv.org/abs/2502.00562

**6. Physically Interpretable Representation and Controlled Generation for Turbulence Data**  
作者: Tiffany Fan,Murray Cutforth,Marta D'Elia,Alexandre Cortiella,Alireza Doostan,Eric Darve  
摘要: Computational Fluid Dynamics (CFD) plays a pivotal role in fluid mechanics, enabling precise simulations of fluid behavior through partial differential equations (PDEs). However, traditional CFD metho...  
URL: https://arxiv.org/abs/2502.02605

**7. Offshore Wind Turbine Tower Design and Optimization: A Review and AI-Driven Future Directions**  
作者: João Alves Ribeiro,Bruno Alves Ribeiro,Francisco Pimenta,Sérgio M. O. Tavares,Jie Zhang,Faez Ahmed  
摘要: Offshore wind energy leverages the high intensity and consistency of oceanic winds, playing a key role in the transition to renewable energy. As energy demands grow, larger turbines are required to op...  
URL: https://arxiv.org/abs/2502.02594

**8. Reconstructing 3D Flow from 2D Data with Diffusion Transformer**  
作者: Fan Lei  
摘要: Fluid flow is a widely applied physical problem, crucial in various fields. Due to the highly nonlinear and chaotic nature of fluids, analyzing fluid-related problems is exceptionally challenging. Com...  
URL: https://arxiv.org/abs/2502.02593

**9. Orientation-aware interaction-based deep material network in polycrystalline materials modeling**  
作者: Ting-Ju Wei,Tung-Huan Su,Chuin-Shan Chen  
摘要: Multiscale simulations are indispensable for connecting microstructural features to the macroscopic behavior of polycrystalline materials, but their high computational demands limit their practicality...  
URL: https://arxiv.org/abs/2502.02457

**10. Using Large Language Models for Solving Thermodynamic Problems**  
作者: Rebecca Loubet,Pascal Zittlau,Luisa Vollmer,Marco Hoffmann,Sophie Fellenz,Fabian Jirasek,Heike Leitte,Hans Hasse  
摘要: Large Language Models (LLMs) have made significant progress in reasoning, demonstrating their capability to generate human-like responses. This study analyzes the problem-solving capabilities of LLMs ...  
URL: https://arxiv.org/abs/2502.05195

... 以及其他 7 篇论文

## cs.SI (社交和信息网络)

**1. Estimating Network Models using Neural Networks**  
作者: Angelo Mele  
摘要: Exponential random graph models (ERGMs) are very flexible for modeling network formation but pose difficult estimation challenges due to their intractable normalizing constant. Existing methods, such ...  
URL: https://arxiv.org/abs/2502.01810

**2. Simulating Rumor Spreading in Social Networks using LLM Agents**  
作者: Tianrui Hu,Dimitrios Liakopoulos,Xiwen Wei,Radu Marculescu,Neeraja J. Yadwadkar  
摘要: With the rise of social media, misinformation has become increasingly prevalent, fueled largely by the spread of rumors. This study explores the use of Large Language Model (LLM) agents within a novel...  
URL: https://arxiv.org/abs/2502.01450

**3. Team Size and Its Negative Impact on the Disruption Index**  
作者: Yiling Lin,Linzhuo Li,Lingfei Wu  
摘要: As science transitions from the age of lone geniuses to an era of collaborative teams, the question of whether large teams can sustain the creativity of individuals and continue driving innovation has...  
URL: https://arxiv.org/abs/2502.00219

**4. Israel-Hamas war through Telegram, Reddit and Twitter**  
作者: Despoina Antonakaki,Sotiris Ioannidis  
摘要: The Israeli-Palestinian conflict started on 7 October 2023, have resulted thus far to over 48,000 people killed including more than 17,000 children with a majority from Gaza, more than 30,000 people i...  
URL: https://arxiv.org/abs/2502.00060

**5. GitHub Stargazers | Building Graph- and Edge-level Prediction Algorithms for Developer Social Networks**  
作者: Karishma Thakrar,Aniket Chauhan  
摘要: Analyzing social networks formed by developers provides valuable insights for market segmentation, trend analysis, and community engagement. In this study, we explore the GitHub Stargazers dataset to ...  
URL: https://arxiv.org/abs/2502.00058

**6. Towards Recommender Systems LLMs Playground (RecSysLLMsP): Exploring Polarization and Engagement in Simulated Social Networks**  
作者: Ljubisa Bojic,Zorica Dodevska,Yashar Deldjoo,Nenad Pantelic  
摘要: Given the exponential advancement in AI technologies and the potential escalation of harmful effects from recommendation systems, it is crucial to simulate and evaluate these effects early on. Doing s...  
URL: https://arxiv.org/abs/2502.00055

**7. The Best Soules Basis for the Estimation of a Spectral Barycentre Network**  
作者: François G. Meyer  
摘要: The main contribution of this work is a fast algorithm to compute the barycentre of a set of networks based on a Laplacian spectral pseudo-distance. The core engine for the reconstruction of the baryc...  
URL: https://arxiv.org/abs/2502.00038

**8. GNN-based Anchor Embedding for Exact Subgraph Matching**  
作者: Bin Yang,Zhaonian Zou,Jianxiong Ye  
摘要: Subgraph matching query is a classic problem in graph data management and has a variety of real-world applications, such as discovering structures in biological or chemical networks, finding communiti...  
URL: https://arxiv.org/abs/2502.00031

**9. Hypergraph Link Prediction via Hyperedge Copying**  
作者: Xie He,Philip S. Chodrow,Peter J. Mucha  
摘要: We propose a generative model of temporally-evolving hypergraphs in which hyperedges form via noisy copying of previous hyperedges. Our proposed model reproduces several stylized facts from many empir...  
URL: https://arxiv.org/abs/2502.02386

**10. Multi-Domain Graph Foundation Models: Robust Knowledge Transfer via Topology Alignment**  
作者: Shuo Wang,Bokui Wang,Zhixiang Shen,Boyan Deng,Zhao Kang  
摘要: Recent advances in CV and NLP have inspired researchers to develop general-purpose graph foundation models through pre-training across diverse domains. However, a fundamental challenge arises from the...  
URL: https://arxiv.org/abs/2502.02017

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## cs.GT (计算机科学与博弈论)

**1. Policy Design for Two-sided Platforms with Participation Dynamics**  
作者: Haruka Kiyohara,Fan Yao,Sarah Dean  
摘要: In two-sided platforms (e.g., video streaming or e-commerce), viewers and providers engage in interactive dynamics, where an increased provider population results in higher viewer utility and the incr...  
URL: https://arxiv.org/abs/2502.01792

**2. Verbalized Bayesian Persuasion**  
作者: Wenhao Li,Yue Lin,Xiangfeng Wang,Bo Jin,Hongyuan Zha,Baoxiang Wang  
摘要: Information design (ID) explores how a sender influence the optimal behavior of receivers to achieve specific objectives. While ID originates from everyday human communication, existing game-theoretic...  
URL: https://arxiv.org/abs/2502.01587

**3. Distributive Fairness in Large Language Models: Evaluating Alignment with Human Values**  
作者: Hadi Hosseini,Samarth Khanna  
摘要: The growing interest in employing large language models (LLMs) for decision-making in social and economic contexts has raised questions about their potential to function as agents in these domains. A ...  
URL: https://arxiv.org/abs/2502.00313

**4. Fairshare Data Pricing for Large Language Models**  
作者: Luyang Zhang,Cathy Jiao,Beibei Li,Chenyan Xiong  
摘要: Training data is a pivotal resource for building large language models (LLMs), but unfair pricing in data markets poses a serious challenge for both data buyers (e.g., LLM builders) and sellers (e.g.,...  
URL: https://arxiv.org/abs/2502.00198

**5. Policy Abstraction and Nash Refinement in Tree-Exploiting PSRO**  
作者: Christine Konicki,Mithun Chakraborty,Michael P. Wellman  
摘要: Policy Space Response Oracles (PSRO) interleaves empirical game-theoretic analysis with deep reinforcement learning (DRL) to solve games too complex for traditional analytic methods. Tree-exploiting P...  
URL: https://arxiv.org/abs/2502.02901

**6. Online Bidding Algorithms with Strict Return on Spend (ROS) Constraint**  
作者: Rahul Vaze,Abhishek Sinha  
摘要: Auto-bidding problem under a strict return-on-spend constraint (ROSC) is considered, where an algorithm has to make decisions about how much to bid for an ad slot depending on the revealed value, and ...  
URL: https://arxiv.org/abs/2502.05599

**7. An Adaptable Budget Planner for Enhancing Budget-Constrained Auto-Bidding in Online Advertising**  
作者: Zhijian Duan,Yusen Huo,Tianyu Wang,Zhilin Zhang,Yeshu Li,Chuan Yu,Jian Xu,Bo Zheng,Xiaotie Deng  
摘要: In online advertising, advertisers commonly utilize auto-bidding services to bid for impression opportunities. A typical objective of the auto-bidder is to optimize the advertiser's cumulative value o...  
URL: https://arxiv.org/abs/2502.05187

**8. Shapley Value Approximation Based on k-Additive Games**  
作者: Guilherme Dean Pelegrina,Patrick Kolpaczki,Eyke Hüllermeier  
摘要: The Shapley value is the prevalent solution for fair division problems in which a payout is to be divided among multiple agents. By adopting a game-theoretic view, the idea of fair division and the Sh...  
URL: https://arxiv.org/abs/2502.04763

**9. Incentivizing Desirable Effort Profiles in Strategic Classification: The Role of Causality and Uncertainty**  
作者: Valia Efthymiou,Chara Podimata,Diptangshu Sen,Juba Ziani  
摘要: We study strategic classification in binary decision-making settings where agents can modify their features in order to improve their classification outcomes. Importantly, our work considers the causa...  
URL: https://arxiv.org/abs/2502.06749

**10. Multi-Agent Performative Prediction Beyond the Insensitivity Assumption: A Case Study for Mortgage Competition**  
作者: Guanghui Wang,Krishna Acharya,Lokranjan Lakshmikanthan,Vidya Muthukumar,Juba Ziani  
摘要: Performative prediction models account for feedback loops in decision-making processes where predictions influence future data distributions. While existing work largely assumes insensitivity of data ...  
URL: https://arxiv.org/abs/2502.08063

... 以及其他 6 篇论文

## cs.AI (人工智能)

**1. An Agentic AI Workflow for Detecting Cognitive Concerns in Real-world Data**  
作者: Jiazi Tian,Liqin Wang,Pedram Fard,Valdery Moura Junior,Deborah Blacker,Jennifer S. Haas,Chirag Patel,Shawn N. Murphy,Lidia M. V. R. Moura,Hossein Estiri  
摘要: Early identification of cognitive concerns is critical but often hindered by subtle symptom presentation. This study developed and validated a fully automated, multi-agent AI workflow using LLaMA 3 8B...  
URL: https://arxiv.org/abs/2502.01789

**2. Metastable Dynamics of Chain-of-Thought Reasoning: Provable Benefits of Search, RL and Distillation**  
作者: Juno Kim,Denny Wu,Jason Lee,Taiji Suzuki  
摘要: A key paradigm to improve the reasoning capabilities of large language models (LLMs) is to allocate more inference-time compute to search against a verifier or reward model. This process can then be u...  
URL: https://arxiv.org/abs/2502.01694

**3. TReMu: Towards Neuro-Symbolic Temporal Reasoning for LLM-Agents with Memory in Multi-Session Dialogues**  
作者: Yubin Ge,Salvatore Romeo,Jason Cai,Raphael Shu,Monica Sunkara,Yassine Benajiba,Yi Zhang  
摘要: Temporal reasoning in multi-session dialogues presents a significant challenge which has been under-studied in previous temporal reasoning benchmarks. To bridge this gap, we propose a new evaluation t...  
URL: https://arxiv.org/abs/2502.01630

**4. PhD Knowledge Not Required: A Reasoning Challenge for Large Language Models**  
作者: Carolyn Jane Anderson,Joydeep Biswas,Aleksander Boruch-Gruszecki,Federico Cassano,Molly Q Feldman,Arjun Guha,Francesca Lucchetti,Zixuan Wu  
摘要: Existing benchmarks for frontier models often test specialized, ``PhD-level'' knowledge that is difficult for non-experts to grasp. In contrast, we present a benchmark based on the NPR Sunday Puzzle C...  
URL: https://arxiv.org/abs/2502.01584

**5. Sea-cret Agents: Maritime Abduction for Region Generation to Expose Dark Vessel Trajectories**  
作者: Divyagna Bavikadi,Nathaniel Lee,Paulo Shakarian,Chad Parvis  
摘要: Bad actors in the maritime industry engage in illegal behaviors after disabling their vessel's automatic identification system (AIS) - which makes finding such vessels difficult for analysts. Machine ...  
URL: https://arxiv.org/abs/2502.01503

**6. Develop AI Agents for System Engineering in Factorio**  
作者: Neel Kant  
摘要: Continuing advances in frontier model research are paving the way for widespread deployment of AI agents. Meanwhile, global interest in building large, complex systems in software, manufacturing, ener...  
URL: https://arxiv.org/abs/2502.01492

**7. TeLL-Drive: Enhancing Autonomous Driving with Teacher LLM-Guided Deep Reinforcement Learning**  
作者: Chengkai Xu,Jiaqi Liu,Shiyu Fang,Yiming Cui,Dong Chen,Peng Hang,Jian Sun  
摘要: Although Deep Reinforcement Learning (DRL) and Large Language Models (LLMs) each show promise in addressing decision-making challenges in autonomous driving, DRL often suffers from high sample complex...  
URL: https://arxiv.org/abs/2502.01387

**8. PSSD: Making Large Language Models Self-denial via Human Psyche Structure**  
作者: Jinzhi Liao,Zenghua Liao,Xiang Zhao  
摘要: The enhance of accuracy in reasoning results of LLMs arouses the community's interests, wherein pioneering studies investigate post-hoc strategies to rectify potential mistakes. Despite extensive effo...  
URL: https://arxiv.org/abs/2502.01344

**9. Skewed Memorization in Large Language Models: Quantification and Decomposition**  
作者: Hao Li,Di Huang,Ziyu Wang,Amir M. Rahmani  
摘要: Memorization in Large Language Models (LLMs) poses privacy and security risks, as models may unintentionally reproduce sensitive or copyrighted data. Existing analyses focus on average-case scenarios,...  
URL: https://arxiv.org/abs/2502.01187

**10. Scalable Precise Computation of Shannon Entropy**  
作者: Yong Lai,Haolong Tong,Zhenghang Xu,Minghao Yin  
摘要: Quantitative information flow analyses (QIF) are a class of techniques for measuring the amount of confidential information leaked by a program to its public outputs. Shannon entropy is an important m...  
URL: https://arxiv.org/abs/2502.01160

... 以及其他 244 篇论文

## cs.MA (多代理系统)

**1. Position: Towards a Responsible LLM-empowered Multi-Agent Systems**  
作者: Jinwei Hu,Yi Dong,Shuang Ao,Zhuoyun Li,Boxuan Wang,Lokesh Singh,Guangliang Cheng,Sarvapali D. Ramchurn,Xiaowei Huang  
摘要: The rise of Agent AI and Large Language Model-powered Multi-Agent Systems (LLM-MAS) has underscored the need for responsible and dependable system operation. Tools like LangChain and Retrieval-Augment...  
URL: https://arxiv.org/abs/2502.01714

**2. Expected Return Symmetries**  
作者: Darius Muglich,Johannes Forkel,Elise van der Pol,Jakob Foerster  
摘要: Symmetry is an important inductive bias that can improve model robustness and generalization across many deep learning domains. In multi-agent settings, a priori known symmetries have been shown to ad...  
URL: https://arxiv.org/abs/2502.01711

**3. Asynchronous Cooperative Multi-Agent Reinforcement Learning with Limited Communication**  
作者: Sydney Dolan,Siddharth Nayak,Jasmine Jerry Aloor,Hamsa Balakrishnan  
摘要: We consider the problem setting in which multiple autonomous agents must cooperatively navigate and perform tasks in an unknown, communication-constrained environment. Traditional multi-agent reinforc...  
URL: https://arxiv.org/abs/2502.00558

**4. Musical Agent Systems: MACAT and MACataRT**  
作者: Keon Ju M. Lee,Philippe Pasquier  
摘要: Our research explores the development and application of musical agents, human-in-the-loop generative AI systems designed to support music performance and improvisation within co-creative spaces. We i...  
URL: https://arxiv.org/abs/2502.00023

**5. Dual Ensembled Multiagent Q-Learning with Hypernet Regularizer**  
作者: Yaodong Yang,Guangyong Chen,Hongyao Tang,Furui Liu,Danruo Deng,Pheng Ann Heng  
摘要: Overestimation in single-agent reinforcement learning has been extensively studied. In contrast, overestimation in the multiagent setting has received comparatively little attention although it increa...  
URL: https://arxiv.org/abs/2502.02018

**6. Speaking the Language of Teamwork: LLM-Guided Credit Assignment in Multi-Agent Reinforcement Learning**  
作者: Muhan Lin,Shuyang Shi,Yue Guo,Vaishnav Tadiparthi,Behdad Chalaki,Ehsan Moradi Pari,Simon Stepputtis,Woojun Kim,Joseph Campbell,Katia Sycara  
摘要: Credit assignment, the process of attributing credit or blame to individual agents for their contributions to a team's success or failure, remains a fundamental challenge in multi-agent reinforcement ...  
URL: https://arxiv.org/abs/2502.03723

**7. Optimistic ε-Greedy Exploration for Cooperative Multi-Agent Reinforcement Learning**  
作者: Ruoning Zhang,Siying Wang,Wenyu Chen,Yang Zhou,Zhitong Zhao,Zixuan Zhang,Ruijie Zhang  
摘要: The Centralized Training with Decentralized Execution (CTDE) paradigm is widely used in cooperative multi-agent reinforcement learning. However, due to the representational limitations of traditional ...  
URL: https://arxiv.org/abs/2502.03506

**8. Double Distillation Network for Multi-Agent Reinforcement Learning**  
作者: Yang Zhou,Siying Wang,Wenyu Chen,Ruoning Zhang,Zhitong Zhao,Zixuan Zhang  
摘要: Multi-agent reinforcement learning typically employs a centralized training-decentralized execution (CTDE) framework to alleviate the non-stationarity in environment. However, the partial observabilit...  
URL: https://arxiv.org/abs/2502.03125

**9. Position: Emergent Machina Sapiens Urge Rethinking Multi-Agent Paradigms**  
作者: Hepeng Li,Yuhong Liu,Jun Yan  
摘要: Artificially intelligent (AI) agents that are capable of autonomous learning and independent decision-making hold great promise for addressing complex challenges across domains like transportation, en...  
URL: https://arxiv.org/abs/2502.04388

**10. Fairness Aware Reinforcement Learning via Proximal Policy Optimization**  
作者: Gabriele La Malfa,Jie M. Zhang,Michael Luck,Elizabeth Black  
摘要: Fairness in multi-agent systems (MAS) focuses on equitable reward distribution among agents in scenarios involving sensitive attributes such as race, gender, or socioeconomic status. This paper introd...  
URL: https://arxiv.org/abs/2502.03953

... 以及其他 16 篇论文

## cs.SD (声音)

**1. Adapter-Based Multi-Agent AVSR Extension for Pre-Trained ASR Models**  
作者: Christopher Simic,Korbinian Riedhammer,Tobias Bocklet  
摘要: We present an approach to Audio-Visual Speech Recognition that builds on a pre-trained Whisper model. To infuse visual information into this audio-only model, we extend it with an AV fusion module and...  
URL: https://arxiv.org/abs/2502.01709

**2. Deep Active Speech Cancellation with Multi-Band Mamba Network**  
作者: Yehuda Mishaly,Lior Wolf,Eliya Nachmani  
摘要: We present a novel deep learning network for Active Speech Cancellation (ASC), advancing beyond Active Noise Cancellation (ANC) methods by effectively canceling both noise and speech signals. The prop...  
URL: https://arxiv.org/abs/2502.01185

**3. Gradient Norm-based Fine-Tuning for Backdoor Defense in Automatic Speech Recognition**  
作者: Nanjun Zhou,Weilin Lin,Li Liu  
摘要: Backdoor attacks have posed a significant threat to the security of deep neural networks (DNNs). Despite considerable strides in developing defenses against backdoor attacks in the visual domain, the ...  
URL: https://arxiv.org/abs/2502.01152

**4. Emotional Face-to-Speech**  
作者: Jiaxin Ye,Boyuan Cao,Hongming Shan  
摘要: How much can we infer about an emotional voice solely from an expressive face? This intriguing question holds great potential for applications such as virtual character dubbing and aiding individuals ...  
URL: https://arxiv.org/abs/2502.01046

**5. CycleGuardian: A Framework for Automatic RespiratorySound classification Based on Improved Deep clustering and Contrastive Learning**  
作者: Yun Chu,Qiuhao Wang,Enze Zhou,Ling Fu,Qian Liu,Gang Zheng  
摘要: Auscultation plays a pivotal role in early respiratory and pulmonary disease diagnosis. Despite the emergence of deep learning-based methods for automatic respiratory sound classification post-Covid-1...  
URL: https://arxiv.org/abs/2502.00734

**6. AudioGenX: Explainability on Text-to-Audio Generative Models**  
作者: Hyunju Kang,Geonhee Han,Yoonjae Jeong,Hogun Park  
摘要: Text-to-audio generation models (TAG) have achieved significant advances in generating audio conditioned on text descriptions. However, a critical challenge lies in the lack of transparency regarding ...  
URL: https://arxiv.org/abs/2502.00459

**7. Do Audio-Visual Segmentation Models Truly Segment Sounding Objects?**  
作者: Jia Li,Wenjie Zhao,Ziru Huang,Yunhui Guo,Yapeng Tian  
摘要: Unlike traditional visual segmentation, audio-visual segmentation (AVS) requires the model not only to identify and segment objects but also to determine whether they are sound sources. Recent AVS app...  
URL: https://arxiv.org/abs/2502.00358

**8. SigWavNet: Learning Multiresolution Signal Wavelet Network for Speech Emotion Recognition**  
作者: Alaa Nfissi,Wassim Bouachir,Nizar Bouguila,Brian Mishara  
摘要: In the field of human-computer interaction and psychological assessment, speech emotion recognition (SER) plays an important role in deciphering emotional states from speech signals. Despite advanceme...  
URL: https://arxiv.org/abs/2502.00310

**9. Streaming Speaker Change Detection and Gender Classification for Transducer-Based Multi-Talker Speech Translation**  
作者: Peidong Wang,Naoyuki Kanda,Jian Xue,Jinyu Li,Xiaofei Wang,Aswin Shanmugam Subramanian,Junkun Chen,Sunit Sivasankaran,Xiong Xiao,Yong Zhao  
摘要: Streaming multi-talker speech translation is a task that involves not only generating accurate and fluent translations with low latency but also recognizing when a speaker change occurs and what the s...  
URL: https://arxiv.org/abs/2502.02683

**10. Pruning-aware Loss Functions for STOI-Optimized Pruned Recurrent Autoencoders for the Compression of the Stimulation Patterns of Cochlear Implants at Zero Delay**  
作者: Reemt Hinrichs,Jörn Ostermann  
摘要: Cochlear implants (CIs) are surgically implanted hearing devices, which allow to restore a sense of hearing in people suffering from profound hearing loss. Wireless streaming of audio from external de...  
URL: https://arxiv.org/abs/2502.02424

... 以及其他 34 篇论文

## quant-ph (量子物理学)

**1. Adaptive Observation Cost Control for Variational Quantum Eigensolvers**  
作者: Christopher J. Anders,Kim A. Nicoli,Bingting Wu,Naima Elosegui,Samuele Pedrielli,Lena Funcke,Karl Jansen,Stefan Kühn,Shinichi Nakajima  
摘要: The objective to be minimized in the variational quantum eigensolver (VQE) has a restricted form, which allows a specialized sequential minimal optimization (SMO) that requires only a few observations...  
URL: https://arxiv.org/abs/2502.01704

**2. Quantum Quandaries: Unraveling Encoding Vulnerabilities in Quantum Neural Networks**  
作者: Suryansh Upadhyay,Swaroop Ghosh  
摘要: Quantum computing (QC) has the potential to revolutionize fields like machine learning, security, and healthcare. Quantum machine learning (QML) has emerged as a promising area, enhancing learning alg...  
URL: https://arxiv.org/abs/2502.01486

**3. Quantum Machine Learning: A Hands-on Tutorial for Machine Learning Practitioners and Researchers**  
作者: Yuxuan Du,Xinbiao Wang,Naixu Guo,Zhan Yu,Yang Qian,Kaining Zhang,Min-Hsiu Hsieh,Patrick Rebentrost,Dacheng Tao  
摘要: This tutorial intends to introduce readers with a background in AI to quantum machine learning (QML) -- a rapidly evolving field that seeks to leverage the power of quantum computers to reshape the la...  
URL: https://arxiv.org/abs/2502.01146

**4. Online Learning of Pure States is as Hard as Mixed States**  
作者: Maxime Meyer,Soumik Adhikary,Naixu Guo,Patrick Rebentrost  
摘要: Quantum state tomography, the task of learning an unknown quantum state, is a fundamental problem in quantum information. In standard settings, the complexity of this problem depends significantly on ...  
URL: https://arxiv.org/abs/2502.00823

**5. Super Quantum Mechanics**  
作者: Mikhail Gennadievich Belov,Victor Victorovich Dubov,Vadim Konstantinovich Ivanov,Alexander Yurievich Maslov,Olga Vladimirovna Proshina,Vladislav Gennadievich Malyshkin  
摘要: We introduce Super Quantum Mechanics (SQM) as a theory that considers states in Hilbert space subject to multiple quadratic constraints. Traditional quantum mechanics corresponds to a single quadratic...  
URL: https://arxiv.org/abs/2502.00037

**6. PALQA: A Novel Parameterized Position-Aware Lossy Quantum Autoencoder using LSB Control Qubit for Efficient Image Compression**  
作者: Ershadul Haque,Manoranjan Paul,Faranak Tohidi,Anwaar Ulhaq,Tanmoy Debnath  
摘要: With the growing interest in quantum computing, quantum image processing technology has become a vital research field due to its versatile applications and ability to outperform classical computing. A...  
URL: https://arxiv.org/abs/2502.02188

**7. Variational decision diagrams for quantum-inspired machine learning applications**  
作者: Santiago Acevedo-Mancera,Vladimir Vargas-Calderón,Herbert Vinck-Posada  
摘要: Decision diagrams (DDs) have emerged as an efficient tool for simulating quantum circuits due to their capacity to exploit data redundancies in quantum states and quantum operations, enabling the effi...  
URL: https://arxiv.org/abs/2502.04271

**8. Detection of Physiological Data Tampering Attacks with Quantum Machine Learning**  
作者: Md. Saif Hassan Onim,Himanshu Thapliyal  
摘要: The widespread use of cloud-based medical devices and wearable sensors has made physiological data susceptible to tampering. These attacks can compromise the reliability of healthcare systems which ca...  
URL: https://arxiv.org/abs/2502.05966

**9. Quantum automated learning with provable and explainable trainability**  
作者: Qi Ye,Shuangyue Geng,Zizhao Han,Weikang Li,L. -M. Duan,Dong-Ling Deng  
摘要: Machine learning is widely believed to be one of the most promising practical applications of quantum computing. Existing quantum machine learning schemes typically employ a quantum-classical hybrid a...  
URL: https://arxiv.org/abs/2502.05264

**10. Non-linear Quantum Monte Carlo**  
作者: Jose Blanchet,Yassine Hamoudi,Mario Szegedy,Guanyang Wang  
摘要: The mean of a random variable can be understood as a $\textit{linear}$ functional on the space of probability distributions. Quantum computing is known to provide a quadratic speedup over classical Mo...  
URL: https://arxiv.org/abs/2502.05094

... 以及其他 11 篇论文

## cs.AR (硬件架构)

**1. Life-Cycle Emissions of AI Hardware: A Cradle-To-Grave Approach and Generational Trends**  
作者: Ian Schneider,Hui Xu,Stephan Benecke,David Patterson,Keguo Huang,Parthasarathy Ranganathan,Cooper Elsworth  
摘要: Specialized hardware accelerators aid the rapid advancement of artificial intelligence (AI), and their efficiency impacts AI's environmental sustainability. This study presents the first publication o...  
URL: https://arxiv.org/abs/2502.01671

**2. A Hardware-Efficient Photonic Tensor Core: Accelerating Deep Neural Networks with Structured Compression**  
作者: Shupeng Ning,Hanqing Zhu,Chenghao Feng,Jiaqi Gu,David Z. Pan,Ray T. Chen  
摘要: Recent advancements in artificial intelligence (AI) and deep neural networks (DNNs) have revolutionized numerous fields, enabling complex tasks by extracting intricate features from large datasets. Ho...  
URL: https://arxiv.org/abs/2502.01670

**3. AI Load Dynamics--A Power Electronics Perspective**  
作者: Yuzhuo Li,Yunwei Li  
摘要: As AI-driven computing infrastructures rapidly scale, discussions around data center design often emphasize energy consumption, water and electricity usage, workload scheduling, and thermal management...  
URL: https://arxiv.org/abs/2502.01647

**4. A Flexible Precision Scaling Deep Neural Network Accelerator with Efficient Weight Combination**  
作者: Liang Zhao,Kunming Shao,Fengshi Tian,Tim Kwang-Ting Cheng,Chi-Ying Tsui,Yi Zou  
摘要: Deploying mixed-precision neural networks on edge devices is friendly to hardware resources and power consumption. To support fully mixed-precision neural network inference, it is necessary to design ...  
URL: https://arxiv.org/abs/2502.00687

**5. Late Breaking Results: Leveraging Approximate Computing for Carbon-Aware DNN Accelerators**  
作者: Aikaterini Maria Panteleaki,Konstantinos Balaskas,Georgios Zervakis,Hussam Amrouch,Iraklis Anagnostopoulos  
摘要: The rapid growth of Machine Learning (ML) has increased demand for DNN hardware accelerators, but their embodied carbon footprint poses significant environmental challenges. This paper leverages appro...  
URL: https://arxiv.org/abs/2502.00286

**6. VRank: Enhancing Verilog Code Generation from Large Language Models via Self-Consistency**  
作者: Zhuorui Zhao,Ruidi Qiu,Ing-Chao Lin,Grace Li Zhang,Bing Li,Ulf Schlichtmann  
摘要: Large Language Models (LLMs) have demonstrated promising capabilities in generating Verilog code from module specifications. To improve the quality of such generated Verilog codes, previous methods re...  
URL: https://arxiv.org/abs/2502.00028

**7. Analysis of a Memcapacitor-Based for Neural Network Accelerator Framework**  
作者: Ankur Singh,Dowon Kim,Byung-Geun Lee  
摘要: Data-intensive computing tasks, such as training neural networks, are crucial for artificial intelligence applications but often come with high energy demands. One promising solution is to develop spe...  
URL: https://arxiv.org/abs/2502.00027

**8. Pushing the Limits of BFP on Narrow Precision LLM Inference**  
作者: Hui Wang,Yuan Cheng,Xiaomeng Han,Zhengpeng Zhao,Dawei Yang,Zhe Jiang  
摘要: The substantial computational and memory demands of Large Language Models (LLMs) hinder their deployment. Block Floating Point (BFP) has proven effective in accelerating linear operations, a cornersto...  
URL: https://arxiv.org/abs/2502.00026

**9. Accelerating PageRank Algorithmic Tasks with a new Programmable Hardware Architecture**  
作者: Md Rownak Hossain Chowdhury,Mostafizur Rahman  
摘要: Addressing the growing demands of artificial intelligence (AI) and data analytics requires new computing approaches. In this paper, we propose a reconfigurable hardware accelerator designed specifical...  
URL: https://arxiv.org/abs/2502.00001

**10. LLM-USO: Large Language Model-based Universal Sizing Optimizer**  
作者: Karthik Somayaji N. S,Peng Li  
摘要: The design of analog circuits is a cornerstone of integrated circuit (IC) development, requiring the optimization of complex, interconnected sub-structures such as amplifiers, comparators, and buffers...  
URL: https://arxiv.org/abs/2502.02764

... 以及其他 24 篇论文

## eess.AS (音频和语音处理)

**1. Privacy-Preserving Edge Speech Understanding with Tiny Foundation Models**  
作者: Afsara Benazir,Felix Xiaozhu Lin  
摘要: Robust speech recognition systems rely on cloud service providers for inference. It needs to ensure that an untrustworthy provider cannot deduce the sensitive content in speech. Sanitization can be do...  
URL: https://arxiv.org/abs/2502.01649

**2. mWhisper-Flamingo for Multilingual Audio-Visual Noise-Robust Speech Recognition**  
作者: Andrew Rouditchenko,Samuel Thomas,Hilde Kuehne,Rogerio Feris,James Glass  
摘要: Audio-Visual Speech Recognition (AVSR) combines lip-based video with audio and can improve performance in noise, but most methods are trained only on English data. One limitation is the lack of large-...  
URL: https://arxiv.org/abs/2502.01547

**3. Do neonates hear what we measure? Assessing neonatal ward soundscapes at the neonates ears**  
作者: Bhan Lam,Peijin Esther Monica Fan,Yih Yann Tay,Woei Bing Poon,Zhen-Ting Ong,Kenneth Ooi,Woon-Seng Gan,Shin Yuh Ang  
摘要: Acoustic guidelines for neonatal intensive care units (NICUs) aim to protect vulnerable neonates from noise-induced physiological harm. However, the lack of recognised international standards for meas...  
URL: https://arxiv.org/abs/2502.00565

**4. SEAL: Speech Embedding Alignment Learning for Speech Large Language Model with Retrieval-Augmented Generation**  
作者: Chunyu Sun,Bingyu Liu,Zhichao Cui,Anbin Qi,Tian-hao Zhang,Dinghao Zhou,Lewei Lu  
摘要: Embedding-based retrieval models have made significant strides in retrieval-augmented generation (RAG) techniques for text and multimodal large language models (LLMs) applications. However, when it co...  
URL: https://arxiv.org/abs/2502.02603

**5. ComplexDec: A Domain-robust High-fidelity Neural Audio Codec with Complex Spectrum Modeling**  
作者: Yi-Chiao Wu,Dejan Marković,Steven Krenn,Israel D. Gebru,Alexander Richard  
摘要: Neural audio codecs have been widely adopted in audio-generative tasks because their compact and discrete representations are suitable for both large-language-model-style and regression-based generati...  
URL: https://arxiv.org/abs/2502.02019

**6. Comprehensive Layer-wise Analysis of SSL Models for Audio Deepfake Detection**  
作者: Yassine El Kheir,Youness Samih,Suraj Maharjan,Tim Polzehl,Sebastian Möller  
摘要: This paper conducts a comprehensive layer-wise analysis of self-supervised learning (SSL) models for audio deepfake detection across diverse contexts, including multilingual datasets (English, Chinese...  
URL: https://arxiv.org/abs/2502.03559

**7. Dementia Classification Using Acoustic Speech and Feature Selection**  
作者: Marko Niemelä,Mikaela von Bonsdorff,Sami Äyrämö,Tommi Kärkkäinen  
摘要: Dementia is a general term for a group of syndromes that affect cognitive functions such as memory, thinking, reasoning, and the ability to perform daily tasks. The number of dementia patients is incr...  
URL: https://arxiv.org/abs/2502.03484

**8. Leveraging Broadcast Media Subtitle Transcripts for Automatic Speech Recognition and Subtitling**  
作者: Jakob Poncelet,Hugo Van hamme  
摘要: The recent advancement of speech recognition technology has been driven by large-scale datasets and attention-based architectures, but many challenges still remain, especially for low-resource languag...  
URL: https://arxiv.org/abs/2502.03212

**9. Fine-grained Preference Optimization Improves Zero-shot Text-to-Speech**  
作者: Jixun Yao,Yuguang Yang,Yu Pan,Yuan Feng,Ziqian Ning,Jianhao Ye,Hongbin Zhou,Lei Xie  
摘要: Integrating human feedback to align text-to-speech (TTS) system outputs with human preferences has proven to be an effective approach for enhancing the robustness of language model-based TTS systems. ...  
URL: https://arxiv.org/abs/2502.02950

**10. GenSE: Generative Speech Enhancement via Language Models using Hierarchical Modeling**  
作者: Jixun Yao,Hexin Liu,Chen Chen,Yuchen Hu,EngSiong Chng,Lei Xie  
摘要: Semantic information refers to the meaning conveyed through words, phrases, and contextual relationships within a given linguistic structure. Humans can leverage semantic information, such as familiar...  
URL: https://arxiv.org/abs/2502.02942

... 以及其他 20 篇论文

## astro-ph.IM (天体物理学仪器和方法)

**1. A Poisson Process AutoDecoder for X-ray Sources**  
作者: Yanke Song,Victoria Ashley Villar,Juan Rafael Martinez-Galarza,Steven Dillmann  
摘要: X-ray observing facilities, such as the Chandra X-ray Observatory and the eROSITA, have detected millions of astronomical sources associated with high-energy phenomena. The arrival of photons as a fun...  
URL: https://arxiv.org/abs/2502.01627

**2. Gamma/hadron separation in the TAIGA experiment with neural network methods**  
作者: E. O. Gres,A. P. Kryukov,P. A. Volchugov,J. J. Dubenskaya,D. P. Zhurov,S. P. Polyakov,E. B. Postnikov,A. A. Vlaskina  
摘要: In this work, the ability of rare VHE gamma ray selection with neural network methods is investigated in the case when cosmic radiation flux strongly prevails (ratio up to {10^4} over the gamma radiat...  
URL: https://arxiv.org/abs/2502.01500

**3. Astromer 2**  
作者: Cristobal Donoso-Oliva,Ignacio Becker,Pavlos Protopapas,Guillermo Cabrera-Vives,Martina Cádiz-Leyton,Daniel Moreno-Cartagena  
摘要: Foundational models have emerged as a powerful paradigm in deep learning field, leveraging their capacity to learn robust representations from large-scale datasets and effectively to diverse downstrea...  
URL: https://arxiv.org/abs/2502.02717

**4. Flat U-Net: An Efficient Ultralightweight Model for Solar Filament Segmentation in Full-disk H$α$ Images**  
作者: GaoFei Zhu,GangHua Lin,Xiao Yang,Cheng Zeng  
摘要: Solar filaments are one of the most prominent features observed on the Sun, and their evolutions are closely related to various solar activities, such as flares and coronal mass ejections. Real-time a...  
URL: https://arxiv.org/abs/2502.07259

**5. Image Pre-Processing Framework for Time-Domain Astronomy in the Artificial Intelligence Era**  
作者: Liang Cao,Peng Jia,Jiaxin Li,Yu Song,Chengkun Hou,Yushan Li  
摘要: The rapid advancement of image analysis methods in time-domain astronomy, particularly those leveraging AI algorithms, has highlighted efficient image pre-processing as a critical bottleneck affecting...  
URL: https://arxiv.org/abs/2502.10783

**6. Transfer Learning for Transient Classification: From Simulations to Real Data and ZTF to LSST**  
作者: Rithwik Gupta,Daniel Muthukrishna  
摘要: Machine learning has become essential for automated classification of astronomical transients, but current approaches face significant limitations: classifiers trained on simulations struggle with rea...  
URL: https://arxiv.org/abs/2502.18558

## cs.IR (信息检索)

**1. Query Brand Entity Linking in E-Commerce Search**  
作者: Dong Liu,Sreyashi Nag  
摘要: In this work, we address the brand entity linking problem for e-commerce search queries. The entity linking task is done by either i)a two-stage process consisting of entity mention detection followed...  
URL: https://arxiv.org/abs/2502.01555

**2. VideoRAG: Retrieval-Augmented Generation with Extreme Long-Context Videos**  
作者: Xubin Ren,Lingrui Xu,Long Xia,Shuaiqiang Wang,Dawei Yin,Chao Huang  
摘要: Retrieval-Augmented Generation (RAG) has demonstrated remarkable success in enhancing Large Language Models (LLMs) through external knowledge integration, yet its application has primarily focused on ...  
URL: https://arxiv.org/abs/2502.01549

**3. Augmented Knowledge Graph Querying leveraging LLMs**  
作者: Marco Arazzi,Davide Ligari,Serena Nicolazzo,Antonino Nocera  
摘要: Adopting Knowledge Graphs (KGs) as a structured, semantic-oriented, data representation model has significantly improved data integration, reasoning, and querying capabilities across different domains...  
URL: https://arxiv.org/abs/2502.01298

**4. GFM-RAG: Graph Foundation Model for Retrieval Augmented Generation**  
作者: Linhao Luo,Zicheng Zhao,Gholamreza Haffari,Dinh Phung,Chen Gong,Shirui Pan  
摘要: Retrieval-augmented generation (RAG) has proven effective in integrating knowledge into large language models (LLMs). However, conventional RAGs struggle to capture complex relationships between piece...  
URL: https://arxiv.org/abs/2502.01113

**5. RankFlow: A Multi-Role Collaborative Reranking Workflow Utilizing Large Language Models**  
作者: Can Jin,Hongwu Peng,Anxiang Zhang,Nuo Chen,Jiahui Zhao,Xi Xie,Kuangzheng Li,Shuya Feng,Kai Zhong,Caiwen Ding,Dimitris N. Metaxas  
摘要: In an Information Retrieval (IR) system, reranking plays a critical role by sorting candidate passages according to their relevance to a specific query. This process demands a nuanced understanding of...  
URL: https://arxiv.org/abs/2502.00709

**6. TD3: Tucker Decomposition Based Dataset Distillation Method for Sequential Recommendation**  
作者: Jiaqing Zhang,Mingjia Yin,Hao Wang,Yawen Li,Yuyang Ye,Xingyu Lou,Junping Du,Enhong Chen  
摘要: In the era of data-centric AI, the focus of recommender systems has shifted from model-centric innovations to data-centric approaches. The success of modern AI models is built on large-scale datasets,...  
URL: https://arxiv.org/abs/2502.02854

**7. Inducing Diversity in Differentiable Search Indexing**  
作者: Abhijeet Phatak,Jayant Sachdev,Sean D Rosario,Swati Kirti,Chittaranjan Tripathy  
摘要: Differentiable Search Indexing (DSI) is a recent paradigm for information retrieval which uses a transformer-based neural network architecture as the document index to simplify the retrieval process. ...  
URL: https://arxiv.org/abs/2502.02788

**8. Policy-Guided Causal State Representation for Offline Reinforcement Learning Recommendation**  
作者: Siyu Wang,Xiaocong Chen,Lina Yao  
摘要: In offline reinforcement learning-based recommender systems (RLRS), learning effective state representations is crucial for capturing user preferences that directly impact long-term rewards. However, ...  
URL: https://arxiv.org/abs/2502.02327

**9. Combinatorial Optimization Perspective based Framework for Multi-behavior Recommendation**  
作者: Chenhao Zhai,Chang Meng,Yu Yang,Kexin Zhang,Xuhao Zhao,Xiu Li  
摘要: In real-world recommendation scenarios, users engage with items through various types of behaviors. Leveraging diversified user behavior information for learning can enhance the recommendation of targ...  
URL: https://arxiv.org/abs/2502.02232

**10. Reason4Rec: Large Language Models for Recommendation with Deliberative User Preference Alignment**  
作者: Yi Fang,Wenjie Wang,Yang Zhang,Fengbin Zhu,Qifan Wang,Fuli Feng,Xiangnan He  
摘要: While recent advancements in aligning Large Language Models (LLMs) with recommendation tasks have shown great potential and promising performance overall, these aligned recommendation LLMs still face ...  
URL: https://arxiv.org/abs/2502.02061

... 以及其他 60 篇论文

## cs.GR (图形)

**1. Regularized interpolation in 4D neural fields enables optimization of 3D printed geometries**  
作者: Christos Margadji,Andi Kuswoyo,Sebastian W. Pattinson  
摘要: The ability to accurately produce geometries with specified properties is perhaps the most important characteristic of a manufacturing process. 3D printing is marked by exceptional design freedom and ...  
URL: https://arxiv.org/abs/2502.01517

**2. Lifting the Winding Number: Precise Representation of Complex Cuts in Subspace Physics Simulations**  
作者: Yue Chang,Mengfei Liu,Zhecheng Wang,Peter Yichen Chen,Eitan Grinspun  
摘要: Cutting thin-walled deformable structures is common in daily life, but poses significant challenges for simulation due to the introduced spatial discontinuities. Traditional methods rely on mesh-based...  
URL: https://arxiv.org/abs/2502.00626

**3. DeepMill: Neural Accessibility Learning for Subtractive Manufacturing**  
作者: Fanchao Zhong,Yang Wang,Peng-Shuai Wang,Lin Lu,Haisen Zhao  
摘要: Manufacturability is vital for product design and production, with accessibility being a key element, especially in subtractive manufacturing. Traditional methods for geometric accessibility analysis ...  
URL: https://arxiv.org/abs/2502.06093

**4. Make the Fastest Faster: Importance Mask for Interactive Volume Visualization using Reconstruction Neural Networks**  
作者: Jianxin Sun,David Lenz,Hongfeng Yu,Tom Peterka  
摘要: Visualizing a large-scale volumetric dataset with high resolution is challenging due to the high computational time and space complexity. Recent deep-learning-based image inpainting methods significan...  
URL: https://arxiv.org/abs/2502.06053

**5. PyPotteryInk: One-Step Diffusion Model for Sketch to Publication-ready Archaeological Drawings**  
作者: Lorenzo Cardarelli  
摘要: Archaeological pottery documentation traditionally requires a time-consuming manual process of converting pencil sketches into publication-ready inked drawings. I present PyPotteryInk, an open-source ...  
URL: https://arxiv.org/abs/2502.06897

**6. Machine Learning-Driven Volumetric Cloud Rendering: Procedural Shader Optimization and Dynamic Lighting in Unreal Engine for Realistic Atmospheric Simulation**  
作者: Shruti Singh,Shantanu Kumar  
摘要: This study advances real-time volumetric cloud rendering in Computer Graphics (CG) by developing a specialized shader in Unreal Engine (UE), focusing on realistic cloud modeling and lighting. By lever...  
URL: https://arxiv.org/abs/2502.08107

**7. MeshSplats: Mesh-Based Rendering with Gaussian Splatting Initialization**  
作者: Rafał Tobiasz,Grzegorz Wilczyński,Marcin Mazur,Sławomir Tadeja,Przemysław Spurek  
摘要: Gaussian Splatting (GS) is a recent and pivotal technique in 3D computer graphics. GS-based algorithms almost always bypass classical methods such as ray tracing, which offers numerous inherent advant...  
URL: https://arxiv.org/abs/2502.07754

**8. Corotational Hinge-based Thin Plates/Shells**  
作者: Qixin Liang  
摘要: We present six thin plate/shell models, derived from three distinct types of curvature operators formulated within the corotational frame, for simulating both rest-flat and rest-curved triangular mesh...  
URL: https://arxiv.org/abs/2502.10872

**9. ViRAC: A Vision-Reasoning Agent Head Movement Control Framework in Arbitrary Virtual Environments**  
作者: Juyeong Hwang,Seong-Eun Hong,Hyeongyeop Kang  
摘要: Creating lifelike virtual agents capable of interacting with their environments is a longstanding goal in computer graphics. This paper addresses the challenge of generating natural head rotations, a ...  
URL: https://arxiv.org/abs/2502.10046

**10. Generative AI Framework for 3D Object Generation in Augmented Reality**  
作者: Majid Behravan  
摘要: This thesis presents a framework that integrates state-of-the-art generative AI models for real-time creation of three-dimensional (3D) objects in augmented reality (AR) environments. The primary goal...  
URL: https://arxiv.org/abs/2502.15869

... 以及其他 1 篇论文

## stat.ME (方法论)

**1. Wrapped Gaussian on the manifold of Symmetric Positive Definite Matrices**  
作者: Thibault de Surrel,Fabien Lotte,Sylvain Chevallier,Florian Yger  
摘要: Circular and non-flat data distributions are prevalent across diverse domains of data science, yet their specific geometric structures often remain underutilized in machine learning frameworks. A prin...  
URL: https://arxiv.org/abs/2502.01512

**2. Learning to Partially Defer for Sequences**  
作者: Sahana Rayan,Ambuj Tewari  
摘要: In the Learning to Defer (L2D) framework, a prediction model can either make a prediction or defer it to an expert, as determined by a rejector. Current L2D methods train the rejector to decide whethe...  
URL: https://arxiv.org/abs/2502.01459

**3. Optimizing Feature Selection in Causal Inference: A Three-Stage Computational Framework for Unbiased Estimation**  
作者: Tianyu Yang,Md. Noor-E-Alam  
摘要: Feature selection is an important but challenging task in causal inference for obtaining unbiased estimates of causal quantities. Properly selected features in causal inference not only significantly ...  
URL: https://arxiv.org/abs/2502.00501

**4. Heteroscedastic Double Bayesian Elastic Net**  
作者: Masanari Kimura  
摘要: In many practical applications, regression models are employed to uncover relationships between predictors and a response variable, yet the common assumption of constant error variance is frequently v...  
URL: https://arxiv.org/abs/2502.02032

**5. Data denoising with self consistency, variance maximization, and the Kantorovich dominance**  
作者: Joshua Zoen-Git Hiew,Tongseok Lim,Brendan Pass,Marcelo Cruz de Souza  
摘要: We introduce a new framework for data denoising, partially inspired by martingale optimal transport. For a given noisy distribution (the data), our approach involves finding the closest distribution t...  
URL: https://arxiv.org/abs/2502.02925

**6. $t$-Testing the Waters: Empirically Validating Assumptions for Reliable A/B-Testing**  
作者: Olivier Jeunen  
摘要: A/B-tests are a cornerstone of experimental design on the web, with wide-ranging applications and use-cases. The statistical $t$-test comparing differences in means is the most commonly used method fo...  
URL: https://arxiv.org/abs/2502.04793

**7. Falsification of Unconfoundedness by Testing Independence of Causal Mechanisms**  
作者: Rickard K. A. Karlsson,Jesse H. Krijthe  
摘要: A major challenge in estimating treatment effects in observational studies is the reliance on untestable conditions such as the assumption of no unmeasured confounding. In this work, we propose an alg...  
URL: https://arxiv.org/abs/2502.06231

**8. Treatment response as a latent variable**  
作者: Christopher Tosh,Boyuan Zhang,Wesley Tansey  
摘要: Scientists often need to analyze the samples in a study that responded to treatment in order to refine their hypotheses and find potential causal drivers of response. Natural variation in outcomes mak...  
URL: https://arxiv.org/abs/2502.08776

**9. Transfer Learning of CATE with Kernel Ridge Regression**  
作者: Seok-Jin Kim,Hongjie Liu,Molei Liu,Kaizheng Wang  
摘要: The proliferation of data has sparked significant interest in leveraging findings from one study to estimate treatment effects in a different target population without direct outcome observations. How...  
URL: https://arxiv.org/abs/2502.11331

**10. Revisiting the Berkeley Admissions data: Statistical Tests for Causal Hypotheses**  
作者: Sourbh Bhadane,Joris M. Mooij,Philip Boeken,Onno Zoeter  
摘要: Reasoning about fairness through correlation-based notions is rife with pitfalls. The 1973 University of California, Berkeley graduate school admissions case from Bickel et. al. (1975) is a classic ex...  
URL: https://arxiv.org/abs/2502.10161

... 以及其他 1 篇论文

## astro-ph.EP (地球和行星天体物理学)

**1. Grid-based exoplanet atmospheric mass loss predictions through neural network**  
作者: Amit Reza,Daria Kubyshkina,Luca Fossati,Christiane Helling  
摘要: The fast and accurate estimation of planetary mass-loss rates is critical for planet population and evolution modelling. We use machine learning (ML) for fast interpolation across an existing large gr...  
URL: https://arxiv.org/abs/2502.01510

**2. Exoplanet Transit Candidate Identification in TESS Full-Frame Images via a Transformer-Based Algorithm**  
作者: Helem Salinas,Rafael Brahm,Greg Olmschenk,Richard K. Barry,Karim Pichara,Stela Ishitani Silva,Vladimir Araujo  
摘要: The Transiting Exoplanet Survey Satellite (TESS) is surveying a large fraction of the sky, generating a vast database of photometric time series data that requires thorough analysis to identify exopla...  
URL: https://arxiv.org/abs/2502.07542

**3. ExoMiner++ on TESS with Transfer Learning from Kepler: Transit Classification and Vetting Catalog for 2-min Data**  
作者: Hamed Valizadegan,Miguel J. S. Martinho,Jon M. Jenkins,Joseph D. Twicken,Douglas A. Caldwell,Patrick Maynard,Hongbo Wei,William Zhong,Charles Yates,Sam Donald,Karen A. Collins,David Latham,Khalid Barkaoui,Perry Berlind,Michael L. Calkins,Kylee Carden,Nikita Chazov,Gilbert A. Esquerdo,Tristan Guillot,Vadim Krushinsky,Grzegorz Nowak,Benjamin V. Rackham,Amaury Triaud,Richard P. Schwarz,Denise Stephens, et al. (4 additional authors not shown)  
摘要: We present ExoMiner++, an enhanced deep learning model that builds on the success of ExoMiner to improve transit signal classification in 2-minute TESS data. ExoMiner++ incorporates additional diagnos...  
URL: https://arxiv.org/abs/2502.09790

## cs.DL (数字图书馆)

**1. Originality in scientific titles and abstracts can predict citation count**  
作者: Jack H. Culbert,Yoed N. Kenett,Philipp Mayr  
摘要: In this research-in-progress paper, we apply a computational measure correlating with originality from creativity science: Divergent Semantic Integration (DSI), to a selection of 99,557 scientific abs...  
URL: https://arxiv.org/abs/2502.01417

**2. Paper Copilot: The Artificial Intelligence and Machine Learning Community Should Adopt a More Transparent and Regulated Peer Review Process**  
作者: Jing Yang  
摘要: The rapid growth of submissions to top-tier Artificial Intelligence (AI) and Machine Learning (ML) conferences has prompted many venues to transition from closed to open review platforms. Some have fu...  
URL: https://arxiv.org/abs/2502.00874

## physics.soc-ph (物理与社会)

**1. Human-Agent Interaction in Synthetic Social Networks: A Framework for Studying Online Polarization**  
作者: Tim Donkers,Jürgen Ziegler  
摘要: Online social networks have dramatically altered the landscape of public discourse, creating both opportunities for enhanced civic participation and risks of deepening social divisions. Prevalent appr...  
URL: https://arxiv.org/abs/2502.01340

**2. Interpretable Early Warnings using Machine Learning in an Online Game-experiment**  
作者: Guillaume Falmagne,Anna B. Stephenson,Simon A. Levin  
摘要: Stemming from physics and later applied to other fields such as ecology, the theory of critical transitions suggests that some regime shifts are preceded by statistical early warning signals. Reddit's...  
URL: https://arxiv.org/abs/2502.09880

**3. Quantifying interdisciplinary synergy in higher STEM education**  
作者: Gahyoun Gim,Jinhyuk Yun,Sang Hoon Lee  
摘要: We propose a framework to quantify and utilize interdisciplinarity in science and engineering curricula in the case of university-level higher education. We analyze interdisciplinary relations by stan...  
URL: https://arxiv.org/abs/2502.17841

## cs.DS (数据结构和算法)

**1. IBB: Fast Burrows-Wheeler Transform Construction for Length-Diverse DNA Data**  
作者: Enno Adler,Stefan Böttcher,Rita Hartel,Cederic Alexander Steininger  
摘要: The Burrows-Wheeler transform (BWT) is integral to the FM-index, which is used extensively in text compression, indexing, pattern search, and bioinformatic problems as de novo assembly and read alignm...  
URL: https://arxiv.org/abs/2502.01327

**2. A New Rejection Sampling Approach to $k$-$\mathtt{means}$++ With Improved Trade-Offs**  
作者: Poojan Shah,Shashwat Agrawal,Ragesh Jaiswal  
摘要: The $k$-$\mathtt{means}$++ seeding algorithm (Arthur & Vassilvitskii, 2007) is widely used in practice for the $k$-means clustering problem where the goal is to cluster a dataset $\mathcal{X} \subset ...  
URL: https://arxiv.org/abs/2502.02085

**3. Cascaded Learned Bloom Filter for Optimal Model-Filter Size Balance and Fast Rejection**  
作者: Atsuki Sato,Yusuke Matsui  
摘要: Recent studies have demonstrated that learned Bloom filters, which combine machine learning with the classical Bloom filter, can achieve superior memory efficiency. However, existing learned Bloom fil...  
URL: https://arxiv.org/abs/2502.03696

**4. Fast In-Spectrum Graph Watermarks**  
作者: Jade Garcia Bourrée,Anne-Marie Kermarrec,Erwan Le Merrer,Othmane Safsafi  
摘要: We address the problem of watermarking graph objects, which consists in hiding information within them, to prove their origin. The two existing methods to watermark graphs use subgraph matching or gra...  
URL: https://arxiv.org/abs/2502.04182

**5. Knowing When to Stop Matters: A Unified Algorithm for Online Conversion under Horizon Uncertainty**  
作者: Yanzhao Wang,Hasti Nourmohammadi Sigaroudi,Bo Sun,Omid Ardakanian,Xiaoqi Tan  
摘要: This paper investigates the online conversion problem, which involves sequentially trading a divisible resource (e.g., energy) under dynamically changing prices to maximize profit. A key challenge in ...  
URL: https://arxiv.org/abs/2502.03817

**6. Approximating the total variation distance between spin systems**  
作者: Weiming Feng,Hongyang Liu,Minji Yang  
摘要: Spin systems form an important class of undirected graphical models. For two Gibbs distributions $μ$ and $ν$ induced by two spin systems on the same graph $G = (V, E)$, we study the problem of approxi...  
URL: https://arxiv.org/abs/2502.05437

**7. LLM Query Scheduling with Prefix Reuse and Latency Constraints**  
作者: Gregory Dexter,Shao Tang,Ata Fatahi Baarzi,Qingquan Song,Tejas Dharamsi,Aman Gupta  
摘要: The efficient deployment of large language models (LLMs) in online settings requires optimizing inference performance under stringent latency constraints, particularly the time-to-first-token (TTFT) a...  
URL: https://arxiv.org/abs/2502.04677

**8. One-Shot Learning for k-SAT**  
作者: Andreas Galanis,Leslie Ann Goldberg,Xusheng Zhang  
摘要: Consider a $k$-SAT formula $Φ$ where every variable appears at most $d$ times, and let $σ$ be a satisfying assignment of $Φ$ sampled proportionally to $e^{βm(σ)}$ where $m(σ)$ is the number of variabl...  
URL: https://arxiv.org/abs/2502.07135

**9. Robust Scatter Matrix Estimation for Elliptical Distributions in Polynomial Time**  
作者: Gleb Novikov  
摘要: We study the problem of computationally efficient robust estimation of scatter matrices of elliptical distributions under the strong contamination model. We design polynomial time algorithms that achi...  
URL: https://arxiv.org/abs/2502.06564

**10. On the query complexity of sampling from non-log-concave distributions**  
作者: Yuchen He,Chihao Zhang  
摘要: We study the problem of sampling from a $d$-dimensional distribution with density $p(x)\propto e^{-f(x)}$, which does not necessarily satisfy good isoperimetric conditions. Specifically, we show that ...  
URL: https://arxiv.org/abs/2502.06200

... 以及其他 9 篇论文

## q-bio.NC (神经元和认知)

**1. Probabilistic adaptation of language comprehension for individual speakers: Evidence from neural oscillations**  
作者: Hanlin Wu,Xiaohui Rao,Zhenguang G. Cai  
摘要: Listeners adapt language comprehension based on their mental representations of speakers, but how these representations are dynamically updated remains unclear. We investigated whether listeners proba...  
URL: https://arxiv.org/abs/2502.01299

**2. Immersion for AI: Immersive Learning with Artificial Intelligence**  
作者: Leonel Morgado  
摘要: This work reflects upon what Immersion can mean from the perspective of an Artificial Intelligence (AI). Applying the lens of immersive learning theory, it seeks to understand whether this new perspec...  
URL: https://arxiv.org/abs/2502.03504

**3. SimSort: A Powerful Framework for Spike Sorting by Large-Scale Electrophysiology Simulation**  
作者: Yimu Zhang,Dongqi Han,Yansen Wang,Yu Gu,Dongsheng Li  
摘要: Spike sorting is an essential process in neural recording, which identifies and separates electrical signals from individual neurons recorded by electrodes in the brain, enabling researchers to study ...  
URL: https://arxiv.org/abs/2502.03198

**4. Shifting Attention to You: Personalized Brain-Inspired AI Models**  
作者: Stephen Chong Zhao,Yang Hu,Jason Lee,Andrew Bender,Trisha Mazumdar,Mark Wallace,David A. Tovar  
摘要: The integration of human and artificial intelligence represents a scientific opportunity to advance our understanding of information processing, as each system offers unique computational insights tha...  
URL: https://arxiv.org/abs/2502.04658

**5. Emergence of Self-Awareness in Artificial Systems: A Minimalist Three-Layer Approach to Artificial Consciousness**  
作者: Kurando Iida  
摘要: This paper proposes a minimalist three-layer model for artificial consciousness, focusing on the emergence of self-awareness. The model comprises a Cognitive Integration Layer, a Pattern Prediction La...  
URL: https://arxiv.org/abs/2502.06810

**6. Some things to know about achieving artificial general intelligence**  
作者: Herbert Roitblat  
摘要: Current and foreseeable GenAI models are not capable of achieving artificial general intelligence because they are burdened with anthropogenic debt. They depend heavily on human input to provide well-...  
URL: https://arxiv.org/abs/2502.07828

**7. neuro2voc: Decoding Vocalizations from Neural Activity**  
作者: Fei Gao  
摘要: Accurate decoding of neural spike trains and relating them to motor output is a challenging task due to the inherent sparsity and length in neural spikes and the complexity of brain circuits. This mas...  
URL: https://arxiv.org/abs/2502.07800

**8. Graceful forgetting: Memory as a process**  
作者: Alain de Cheveigné  
摘要: A rational theory of memory is proposed to explain how we can accommodate unbounded sensory input within bounded storage space. Memory is stored as statistics, organized into complex structures that a...  
URL: https://arxiv.org/abs/2502.11105

**9. LaVCa: LLM-assisted Visual Cortex Captioning**  
作者: Takuya Matsuyama,Shinji Nishimoto,Yu Takagi  
摘要: Understanding the property of neural populations (or voxels) in the human brain can advance our comprehension of human perceptual and cognitive processing capabilities and contribute to developing bra...  
URL: https://arxiv.org/abs/2502.13606

**10. Naturalistic Computational Cognitive Science: Towards generalizable models and theories that capture the full range of natural behavior**  
作者: Wilka Carvalho,Andrew Lampinen  
摘要: Artificial Intelligence increasingly pursues large, complex models that perform many tasks within increasingly realistic domains. How, if at all, should these developments in AI influence cognitive sc...  
URL: https://arxiv.org/abs/2502.20349

## eess.SP (信号处理)

**1. DRL-based Dolph-Tschebyscheff Beamforming in Downlink Transmission for Mobile Users**  
作者: Nancy Nayak,Kin K. Leung,Lajos Hanzo  
摘要: With the emergence of AI technologies in next-generation communication systems, machine learning plays a pivotal role due to its ability to address high-dimensional, non-stationary optimization proble...  
URL: https://arxiv.org/abs/2502.01278

**2. Learned Bayesian Cramér-Rao Bound for Unknown Measurement Models Using Score Neural Networks**  
作者: Hai Victor Habi,Hagit Messer,Yoram Bresler  
摘要: The Bayesian Cramér-Rao bound (BCRB) is a crucial tool in signal processing for assessing the fundamental limitations of any estimation problem as well as benchmarking within a Bayesian frameworks. Ho...  
URL: https://arxiv.org/abs/2502.00724

**3. Deep learning model for ECG reconstruction reveals the information content of ECG leads**  
作者: Tomasz Gradowski,Teodor Buchner  
摘要: This study introduces a deep learning model based on the U-net architecture to reconstruct missing leads in electrocardiograms (ECGs). Using publicly available datasets, the model was trained to regen...  
URL: https://arxiv.org/abs/2502.00559

**4. Three-dimensional signal processing: a new approach in dynamical sampling via tensor products**  
作者: Yisen Wang,Hanqin Cai,Longxiu Huang  
摘要: The dynamical sampling problem is centered around reconstructing signals that evolve over time according to a dynamical process, from spatial-temporal samples that may be noisy. This topic has been th...  
URL: https://arxiv.org/abs/2502.02684

**5. Towards Smarter Sensing: 2D Clutter Mitigation in RL-Driven Cognitive MIMO Radar**  
作者: Adam Umra,Aya Mostafa Ahmed,Aydin Sezgin  
摘要: Motivated by the growing interest in integrated sensing and communication for 6th generation (6G) networks, this paper presents a cognitive Multiple-Input Multiple-Output (MIMO) radar system enhanced ...  
URL: https://arxiv.org/abs/2502.04967

**6. Explainable and externally validated machine learning for neuropsychiatric diagnosis via electrocardiograms**  
作者: Juan Miguel Lopez Alcaraz,Ebenezer Oloyede,David Taylor,Wilhelm Haverkamp,Nils Strodthoff  
摘要: Electrocardiogram (ECG) analysis has emerged as a promising tool for identifying physiological changes associated with neuropsychiatric conditions. The relationship between cardiovascular health and n...  
URL: https://arxiv.org/abs/2502.04918

**7. Estimation of Food Intake Quantity Using Inertial Signals from Smartwatches**  
作者: Ioannis Levi,Konstantinos Kyritsis,Vasileios Papapanagiotou,Georgios Tsakiridis,Anastasios Delopoulos  
摘要: Accurate monitoring of eating behavior is crucial for managing obesity and eating disorders such as bulimia nervosa. At the same time, existing methods rely on multiple and/or specialized sensors, gre...  
URL: https://arxiv.org/abs/2502.06649

**8. Compression of Site-Specific Deep Neural Networks for Massive MIMO Precoding**  
作者: Ghazal Kasalaee,Ali Hasanzadeh Karkan,Jean-François Frigon,François Leduc-Primeau  
摘要: The deployment of deep learning (DL) models for precoding in massive multiple-input multiple-output (mMIMO) systems is often constrained by high computational demands and energy consumption. In this p...  
URL: https://arxiv.org/abs/2502.08758

**9. A Low-Complexity Plug-and-Play Deep Learning Model for Massive MIMO Precoding Across Sites**  
作者: Ali Hasanzadeh Karkan,Ahmed Ibrahim,Jean-François Frigon,François Leduc-Primeau  
摘要: Massive multiple-input multiple-output (mMIMO) technology has transformed wireless communication by enhancing spectral efficiency and network capacity. This paper proposes a novel deep learning-based ...  
URL: https://arxiv.org/abs/2502.08757

**10. Joint Transmit and Pinching Beamforming for PASS: Optimization-Based or Learning-Based?**  
作者: Xiaoxia Xu,Xidong Mu,Yuanwei Liu,Arumugam Nallanathan  
摘要: A novel pinching antenna system (PASS)-enabled downlink multi-user multiple-input single-output (MISO) framework is proposed. PASS consists of multiple waveguides spanning over thousands of wavelength...  
URL: https://arxiv.org/abs/2502.08637

... 以及其他 6 篇论文

## cs.DC (分布式、并行和集群计算)

**1. OCTOPINF: Workload-Aware Inference Serving for Edge Video Analytics**  
作者: Thanh-Tung Nguyen,Lucas Liebe,Nhat-Quang Tau,Yuheng Wu,Jinghan Cheng,Dongman Lee  
摘要: Edge Video Analytics (EVA) has gained significant attention as a major application of pervasive computing, enabling real-time visual processing. EVA pipelines, composed of deep neural networks (DNNs),...  
URL: https://arxiv.org/abs/2502.01277

**2. Self-Organizing Interaction Spaces: A Framework for Engineering Pervasive Applications in Mobile and Distributed Environments**  
作者: Shubham Malhotra  
摘要: The rapid adoption of pervasive and mobile computing has led to an unprecedented rate of data production and consumption by mobile applications at the network edge. These applications often require in...  
URL: https://arxiv.org/abs/2502.01137

**3. Deep Reinforcement Learning for Dynamic Resource Allocation in Wireless Networks**  
作者: Shubham Malhotra  
摘要: This report investigates the application of deep reinforcement learning (DRL) algorithms for dynamic resource allocation in wireless communication systems. An environment that includes a base station,...  
URL: https://arxiv.org/abs/2502.01129

**4. Towards Efficient Large Multimodal Model Serving**  
作者: Haoran Qiu,Anish Biswas,Zihan Zhao,Jayashree Mohan,Alind Khare,Esha Choukse,Íñigo Goiri,Zeyu Zhang,Haiying Shen,Chetan Bansal,Ramachandran Ramjee,Rodrigo Fonseca  
摘要: Recent advances in generative AI have led to large multi-modal models (LMMs) capable of simultaneously processing inputs of various modalities such as text, images, video, and audio. While these model...  
URL: https://arxiv.org/abs/2502.00937

**5. Demystifying Cost-Efficiency in LLM Serving over Heterogeneous GPUs**  
作者: Youhe Jiang,Fangcheng Fu,Xiaozhe Yao,Guoliang He,Xupeng Miao,Ana Klimovic,Bin Cui,Binhang Yuan,Eiko Yoneki  
摘要: Recent advancements in Large Language Models (LLMs) have led to increasingly diverse requests, accompanied with varying resource (compute and memory) demands to serve them. However, this in turn degra...  
URL: https://arxiv.org/abs/2502.00722

**6. General Coded Computing in a Probabilistic Straggler Regime**  
作者: Parsa Moradi,Mohammad Ali Maddah-Ali  
摘要: Coded computing has demonstrated promising results in addressing straggler resiliency in distributed computing systems. However, most coded computing schemes are designed for exact computation, requir...  
URL: https://arxiv.org/abs/2502.00645

**7. GPU-Accelerated Modified Bessel Function of the Second Kind for Gaussian Processes**  
作者: Zipei Geng,Sameh Abdulah,Ying Sun,Hatem Ltaief,David E. Keyes,Marc G. Genton  
摘要: Modified Bessel functions of the second kind are widely used in physics, engineering, spatial statistics, and machine learning. Since contemporary scientific applications, including machine learning, ...  
URL: https://arxiv.org/abs/2502.00356

**8. Asynchronous Fault-Tolerant Language Decidability for Runtime Verification of Distributed Systems**  
作者: Armando Castañeda,Gilde Valeria Rodríguez  
摘要: In this paper, we offer a wider perspective of the general problem of distributed runtime verification of distributed systems, in fully asynchronous fault-tolerant environments. We study this problem ...  
URL: https://arxiv.org/abs/2502.00191

**9. HACK: Homomorphic Acceleration via Compression of the Key-Value Cache for Disaggregated LLM Inference**  
作者: Zeyu Zhang,Haiying Shen,Shay Vargaftik,Ran Ben Basat,Michael Mitzenmacher,Minlan Yu  
摘要: Disaggregated Large Language Model (LLM) inference has gained popularity as it separates the computation-intensive prefill stage from the memory-intensive decode stage, avoiding the prefill-decode int...  
URL: https://arxiv.org/abs/2502.03589

**10. FedOptimus: Optimizing Vertical Federated Learning for Scalability and Efficiency**  
作者: Nikita Shrivastava,Drishya Uniyal,Bapi Chatterjee  
摘要: Federated learning (FL) is a collaborative machine learning paradigm which ensures data privacy by training models across distributed datasets without centralizing sensitive information. Vertical Fede...  
URL: https://arxiv.org/abs/2502.04243

... 以及其他 23 篇论文

## cond-mat.str-el (强关联电子)

**1. Generalized Lanczos method for systematic optimization of neural-network quantum states**  
作者: Jia-Qi Wang,Rong-Qiang He,Zhong-Yi Lu  
摘要: Recently, artificial intelligence for science has made significant inroads into various fields of natural science research. In the field of quantum many-body computation, researchers have developed nu...  
URL: https://arxiv.org/abs/2502.01264

**2. Is attention all you need to solve the correlated electron problem?**  
作者: Max Geier,Khachatur Nazaryan,Timothy Zaklama,Liang Fu  
摘要: The attention mechanism has transformed artificial intelligence research by its ability to learn relations between objects. In this work, we explore how a many-body wavefunction ansatz constructed fro...  
URL: https://arxiv.org/abs/2502.05383

## cs.PF (表现)

**1. PerfSeer: An Efficient and Accurate Deep Learning Models Performance Predictor**  
作者: Xinlong Zhao,Jiande Sun,Jia Zhang,Sujuan Hou,Shuai Li,Tong Liu,Ke Liu  
摘要: Predicting the performance of deep learning (DL) models, such as execution time and resource utilization, is crucial for Neural Architecture Search (NAS), DL cluster schedulers, and other technologies...  
URL: https://arxiv.org/abs/2502.01206

**2. Memory Analysis on the Training Course of DeepSeek Models**  
作者: Ping Zhang,Lei Su  
摘要: We present a theoretical analysis of GPU memory consumption during the training of DeepSeek models such as DeepSeek-v2 and DeepSeek-v3. Our primary objective is to clarify the device-level memory requ...  
URL: https://arxiv.org/abs/2502.07846

**3. Modular Stochastic Rewritable Petri Nets**  
作者: Lorenzo Capra  
摘要: Petri Nets (PN) are widely used for modeling concurrent and distributed systems, but face challenges in modeling adaptive systems. To address this, we have formalized "rewritable" PT nets (RwPT) using...  
URL: https://arxiv.org/abs/2502.09217

**4. PixLift: Accelerating Web Browsing via AI Upscaling**  
作者: Yonas Atinafu,Sarthak Malla,HyunSeok Daniel Jang,Nouar Aldahoul,Matteo Varvello,Yasir Zaki  
摘要: Accessing the internet in regions with expensive data plans and limited connectivity poses significant challenges, restricting information access and economic growth. Images, as a major contributor to...  
URL: https://arxiv.org/abs/2502.08995

**5. Evaluating the Performance of the DeepSeek Model in Confidential Computing Environment**  
作者: Ben Dong,Qian Wang  
摘要: The increasing adoption of Large Language Models (LLMs) in cloud environments raises critical security concerns, particularly regarding model confidentiality and data privacy. Confidential computing, ...  
URL: https://arxiv.org/abs/2502.11347

## cs.NI (网络和互联网架构)

**1. Advanced Architectures Integrated with Agentic AI for Next-Generation Wireless Networks**  
作者: Kapal Dev,Sunder Ali Khowaja,Engin Zeydan,Merouane Debbah  
摘要: This paper investigates a range of cutting-edge technologies and architectural innovations aimed at simplifying network operations, reducing operational expenditure (OpEx), and enabling the deployment...  
URL: https://arxiv.org/abs/2502.01089

**2. Simulating Application Behavior for Network Monitoring and Security**  
作者: Murugaraj Odiathevar,Kim Chung Yup  
摘要: Existing network simulations often rely on simplistic models that send packets at random intervals, failing to capture the critical role of application-level behaviour. This paper presents a statistic...  
URL: https://arxiv.org/abs/2502.01049

**3. REAL: Reinforcement Learning-Enabled xApps for Experimental Closed-Loop Optimization in O-RAN with OSC RIC and srsRAN**  
作者: Ryan Barker,Alireza Ebrahimi Dorcheh,Tolunay Seyfi,Fatemeh Afghah  
摘要: Open Radio Access Network (O-RAN) offers an open, programmable architecture for next-generation wireless networks, enabling advanced control through AI-based applications on the near-Real-Time RAN Int...  
URL: https://arxiv.org/abs/2502.00715

**4. Open RAN Slicing with Quantum Optimization**  
作者: Patatchona Keyela,Soumaya Cherkaoui  
摘要: RAN slicing technology is a key aspect of the Open RAN paradigm, allowing simultaneous and independent provision of various services such as ultra-reliable low-latency communications (URLLC), enhanced...  
URL: https://arxiv.org/abs/2502.00142

**5. Advancements in Mobile Edge Computing and Open RAN: Leveraging Artificial Intelligence and Machine Learning for Wireless Systems**  
作者: Ryan Barker  
摘要: Mobile Edge Computing (MEC) and Open Radio Access Networks (ORAN) are transformative technologies in the development of next-generation wireless communication systems. MEC pushes computational resourc...  
URL: https://arxiv.org/abs/2502.02886

**6. Differentially-Private Multi-Tier Federated Learning: A Formal Analysis and Evaluation**  
作者: Evan Chen,Frank Po-Chen Lin,Dong-Jun Han,Christopher G. Brinton  
摘要: While federated learning (FL) eliminates the transmission of raw data over a network, it is still vulnerable to privacy breaches from the communicated model parameters. Differential privacy (DP) is of...  
URL: https://arxiv.org/abs/2502.02877

**7. Vertical Federated Learning for Failure-Cause Identification in Disaggregated Microwave Networks**  
作者: Fatih Temiz,Memedhe Ibrahimi,Francesco Musumeci,Claudio Passera,Massimo Tornatore  
摘要: Machine Learning (ML) has proven to be a promising solution to provide novel scalable and efficient fault management solutions in modern 5G-and-beyond communication networks. In the context of microwa...  
URL: https://arxiv.org/abs/2502.02874

**8. A Study on 5G Network Slice Isolation Based on Native Cloud and Edge Computing Tools**  
作者: Maiko Andrade,Juliano Araujo Wickboldt  
摘要: 5G networks support various advanced applications through network slicing, network function virtualization (NFV), and edge computing, ensuring low latency and service isolation. However, private 5G ne...  
URL: https://arxiv.org/abs/2502.02842

**9. Graph Neural Networks for O-RAN Mobility Management: A Link Prediction Approach**  
作者: Ana Gonzalez Bermudez,Miquel Farreras,Milan Groshev,José Antonio Trujillo,Isabel de la Bandera,Raquel Barco  
摘要: Mobility performance has been a key focus in cellular networks up to 5G. To enhance handover (HO) performance, 3GPP introduced Conditional Handover (CHO) and Layer 1/Layer 2 Triggered Mobility (LTM) m...  
URL: https://arxiv.org/abs/2502.02170

**10. NFV-Enabled Service Recovery in Space-Air-Ground Integrated Networks: A Matching Game Based Approach**  
作者: Ziye Jia,Yilu Cao,Lijun He,Guangxia Li,Fuhui Zhou,Qihui Wu,Zhu Han  
摘要: To achieve ubiquitous connectivity of the sixth generation communication, the space-air-ground integrated network (SAGIN) is a popular topic. However, the dynamic nodes in SAGIN such as satellites and...  
URL: https://arxiv.org/abs/2502.02141

... 以及其他 27 篇论文

## math.ST (统计理论)

**1. Minimax Optimality of Classical Scaling Under General Noise Conditions**  
作者: Siddharth Vishwanath,Ery Arias-Castro  
摘要: We establish the consistency of classical scaling under a broad class of noise models, encompassing many commonly studied cases in literature. Our approach requires only finite fourth moments of the n...  
URL: https://arxiv.org/abs/2502.00947

**2. Analysis of Diffusion Models for Manifold Data**  
作者: Anand Jerry George,Rodrigo Veiga,Nicolas Macris  
摘要: We analyze the time reversed dynamics of generative diffusion models. If the exact empirical score function is used in a regime of large dimension and exponentially large number of samples, these mode...  
URL: https://arxiv.org/abs/2502.04339

**3. Attainability of Two-Point Testing Rates for Finite-Sample Location Estimation**  
作者: Spencer Compton,Gregory Valiant  
摘要: LeCam's two-point testing method yields perhaps the simplest lower bound for estimating the mean of a distribution: roughly, if it is impossible to well-distinguish a distribution centered at $μ$ from...  
URL: https://arxiv.org/abs/2502.05730

**4. Information-Theoretic Guarantees for Recovering Low-Rank Tensors from Symmetric Rank-One Measurements**  
作者: Eren C. Kızıldağ  
摘要: In this paper, we investigate the sample complexity of recovering tensors with low symmetric rank from symmetric rank-one measurements. This setting is particularly motivated by the study of higher-or...  
URL: https://arxiv.org/abs/2502.05134

**5. Are all models wrong? Fundamental limits in distribution-free empirical model falsification**  
作者: Manuel M. Müller,Yuetian Luo,Rina Foygel Barber  
摘要: In statistics and machine learning, when we train a fitted model on available data, we typically want to ensure that we are searching within a model class that contains at least one accurate model -- ...  
URL: https://arxiv.org/abs/2502.06765

**6. Neumann eigenmaps for landmark embedding**  
作者: Shashank Sule,Wojciech Czaja  
摘要: We present Neumann eigenmaps (NeuMaps), a novel approach for enhancing the standard diffusion map embedding using landmarks, i.e distinguished samples within the dataset. By interpreting these landmar...  
URL: https://arxiv.org/abs/2502.06689

**7. A statistical theory of overfitting for imbalanced classification**  
作者: Jingyang Lyu,Kangjie Zhou,Yiqiao Zhong  
摘要: Classification with imbalanced data is a common challenge in data analysis, where certain classes (minority classes) account for a small fraction of the training data compared with other classes (majo...  
URL: https://arxiv.org/abs/2502.11323

**8. Learning sparse generalized linear models with binary outcomes via iterative hard thresholding**  
作者: Namiko Matsumoto,Arya Mazumdar  
摘要: In statistics, generalized linear models (GLMs) are widely used for modeling data and can expressively capture potential nonlinear dependence of the model's outcomes on its covariates. Within the broa...  
URL: https://arxiv.org/abs/2502.18393

## q-fin.PM (投资组合管理)

**1. Decision-informed Neural Networks with Large Language Model Integration for Portfolio Optimization**  
作者: Yoontae Hwang,Yaxuan Kong,Stefan Zohren,Yongjae Lee  
摘要: This paper addresses the critical disconnect between prediction and decision quality in portfolio optimization by integrating Large Language Models (LLMs) with decision-focused learning. We demonstrat...  
URL: https://arxiv.org/abs/2502.00828

**2. AlphaSharpe: LLM-Driven Discovery of Robust Risk-Adjusted Metrics**  
作者: Kamer Ali Yuksel,Hassan Sawaf  
摘要: Financial metrics like the Sharpe ratio are pivotal in evaluating investment performance by balancing risk and return. However, traditional metrics often struggle with robustness and generalization, p...  
URL: https://arxiv.org/abs/2502.00029

**3. Regret-Optimized Portfolio Enhancement through Deep Reinforcement Learning and Future Looking Rewards**  
作者: Daniil Karzanov,Rubén Garzón,Mikhail Terekhov,Caglar Gulcehre,Thomas Raffinot,Marcin Detyniecki  
摘要: This paper introduces a novel agent-based approach for enhancing existing portfolio strategies using Proximal Policy Optimization (PPO). Rather than focusing solely on traditional portfolio constructi...  
URL: https://arxiv.org/abs/2502.02619

## cond-mat.mtrl-sci (材料科学)

**1. Deep Neural Network for Phonon-Assisted Optical Spectra in Semiconductors**  
作者: Qiangqiang Gu,Shishir Kumar Pandey  
摘要: Phonon-assisted optical absorption in semiconductors is crucial for understanding and optimizing optoelectronic devices, yet its accurate simulation remains a significant challenge in computational ma...  
URL: https://arxiv.org/abs/2502.00798

**2. Energy & Force Regression on DFT Trajectories is Not Enough for Universal Machine Learning Interatomic Potentials**  
作者: Santiago Miret,Kin Long Kelvin Lee,Carmelo Gonzales,Sajid Mannan,N. M. Anoop Krishnan  
摘要: Universal Machine Learning Interactomic Potentials (MLIPs) enable accelerated simulations for materials discovery. However, current research efforts fail to impactfully utilize MLIPs due to: 1. Overre...  
URL: https://arxiv.org/abs/2502.03660

**3. SymmCD: Symmetry-Preserving Crystal Generation with Diffusion Models**  
作者: Daniel Levy,Siba Smarak Panigrahi,Sékou-Oumar Kaba,Qiang Zhu,Kin Long Kelvin Lee,Mikhail Galkin,Santiago Miret,Siamak Ravanbakhsh  
摘要: Generating novel crystalline materials has potential to lead to advancements in fields such as electronics, energy storage, and catalysis. The defining characteristic of crystals is their symmetry, wh...  
URL: https://arxiv.org/abs/2502.03638

**4. AI-driven materials design: a mini-review**  
作者: Mouyang Cheng,Chu-Liang Fu,Ryotaro Okabe,Abhijatmedhi Chotrattanapituk,Artittaya Boonkird,Nguyen Tuan Hung,Mingda Li  
摘要: Materials design is an important component of modern science and technology, yet traditional approaches rely heavily on trial-and-error and can be inefficient. Computational techniques, enhanced by mo...  
URL: https://arxiv.org/abs/2502.02905

**5. WyckoffDiff -- A Generative Diffusion Model for Crystal Symmetry**  
作者: Filip Ekström Kelvinius,Oskar B. Andersson,Abhijith S. Parackal,Dong Qian,Rickard Armiento,Fredrik Lindsten  
摘要: Crystalline materials often exhibit a high level of symmetry. However, most generative models do not account for symmetry, but rather model each atom without any constraints on its position or element...  
URL: https://arxiv.org/abs/2502.06485

**6. A physics-based data-driven model for CO$\_2$ gas diffusion electrodes to drive automated laboratories**  
作者: Ivan Grega,Félix Therrien,Abhishek Soni,Karry Ocean,Kevan Dettelbach,Ribwar Ahmadi,Mehrdad Mokhtari,Curtis P. Berlinguette,Yoshua Bengio  
摘要: The electrochemical reduction of atmospheric CO$\_2$ into high-energy molecules with renewable energy is a promising avenue for energy storage that can take advantage of existing infrastructure especia...  
URL: https://arxiv.org/abs/2502.06323

**7. Explainable Multimodal Machine Learning for Revealing Structure-Property Relationships in Carbon Nanotube Fibers**  
作者: Daisuke Kimura,Naoko Tajima,Toshiya Okazaki,Shun Muroga  
摘要: In this study, we propose Explainable Multimodal Machine Learning (EMML), which integrates the analysis of diverse data types (multimodal data) using factor analysis for feature extraction with Explai...  
URL: https://arxiv.org/abs/2502.07400

**8. PICTS: A Novel Deep Reinforcement Learning Approach for Dynamic P-I Control in Scanning Probe Microscopy**  
作者: Ziwei Wei,Shuming Wei,Qibin Zeng,Wanheng Lu,Huajun Liu,Kaiyang Zeng  
摘要: We have developed a Parallel Integrated Control and Training System, leveraging the deep reinforcement learning to dynamically adjust the control strategies in real time for scanning probe microscopy ...  
URL: https://arxiv.org/abs/2502.07326

**9. Global Universal Scaling and Ultra-Small Parameterization in Machine Learning Interatomic Potentials with Super-Linearity**  
作者: Yanxiao Hu,Ye Sheng,Jing Huang,Xiaoxin Xu,Yuyan Yang,Mingqiang Zhang,Yabei Wu,Caichao Ye,Jiong Yang,Wenqing Zhang  
摘要: Using machine learning (ML) to construct interatomic interactions and thus potential energy surface (PES) has become a common strategy for materials design and simulations. However, those current mode...  
URL: https://arxiv.org/abs/2502.07293

**10. Atom identification in bilayer moire materials with Gomb-Net**  
作者: Austin C. Houston,Sumner B. Harris,Hao Wang,Yu-Chuan Lin,David B. Geohegan,Kai Xiao,Gerd Duscher  
摘要: Moire patterns in van der Waals bilayer materials complicate the analysis of atomic-resolution images, hindering the atomic-scale insight typically attainable with scanning transmission electron micro...  
URL: https://arxiv.org/abs/2502.09791

... 以及其他 5 篇论文

## physics.geo-ph (地球物理学)

**1. Biogeochemistry-Informed Neural Network (BINN) for Improving Accuracy of Model Prediction and Scientific Understanding of Soil Organic Carbon**  
作者: Haodi Xu,Joshua Fan,Feng Tao,Lifen Jiang,Fengqi You,Benjamin Z. Houlton,Ying Sun,Carla P. Gomes,Yiqi Luo  
摘要: Big data and the rapid development of artificial intelligence (AI) provide unprecedented opportunities to enhance our understanding of the global carbon cycle and other biogeochemical processes. Howev...  
URL: https://arxiv.org/abs/2502.00672

**2. EFKAN: A KAN-Integrated Neural Operator For Efficient Magnetotelluric Forward Modeling**  
作者: Feng Wang,Hong Qiu,Yingying Huang,Xiaozhe Gu,Renfang Wang,Bo Yang  
摘要: Magnetotelluric (MT) forward modeling is fundamental for improving the accuracy and efficiency of MT inversion. Neural operators (NOs) have been effectively used for rapid MT forward modeling, demonst...  
URL: https://arxiv.org/abs/2502.02195

**3. Inversion of Magnetic Data using Learned Dictionaries and Scale Space**  
作者: Shadab Ahamed,Simon Ghyselincks,Pablo Chang Huang Arias,Julian Kloiber,Yasin Ranjbar,Jingrong Tang,Niloufar Zakariaei,Eldad Haber  
摘要: Magnetic data inversion is an important tool in geophysics, used to infer subsurface magnetic susceptibility distributions from surface magnetic field measurements. This inverse problem is inherently ...  
URL: https://arxiv.org/abs/2502.05451

**4. A finite element-based machine learning model for hydro-mechanical analysis of swelling behavior in clay-sulfate rocks**  
作者: Reza Taherdangkoo,Mostafa Mollaali,Matthias Ehrhardt,Thomas Nagel,Lyesse Laloui,Alessio Ferrari,Christoph Butscher  
摘要: The hydro-mechanical behavior of clay-sulfate rocks, especially their swelling properties, poses significant challenges in geotechnical engineering. This study presents a hybrid constrained machine le...  
URL: https://arxiv.org/abs/2502.05198

**5. Physics-Trained Neural Network as Inverse Problem Solver for Potential Fields: An Example of Downward Continuation between Arbitrary Surfaces**  
作者: Jing Sun,Lu Li,Liang Zhang  
摘要: Downward continuation is a critical task in potential field processing, including gravity and magnetic fields, which aims to transfer data from one observation surface to another that is closer to the...  
URL: https://arxiv.org/abs/2502.05190

**6. Physics-Driven Self-Supervised Deep Learning for Free-Surface Multiple Elimination**  
作者: Jing Sun,Tiexing Wang,Eric Verschuur,Ivan Vasconcelos  
摘要: In recent years, deep learning (DL) has emerged as a promising alternative approach for various seismic processing tasks, including primary estimation (or multiple elimination), a crucial step for acc...  
URL: https://arxiv.org/abs/2502.05189

**7. Theory-guided Pseudo-spectral Full Waveform Inversion via Deep Neural Networks**  
作者: Christopher Zerafa,Pauline Galea,Cristiana Sebu  
摘要: Full-Waveform Inversion seeks to achieve a high-resolution model of the subsurface through the application of multi-variate optimization to the seismic inverse problem. Although now a mature technolog...  
URL: https://arxiv.org/abs/2502.17624

**8. Data-Driven Pseudo-spectral Full Waveform Inversion via Deep Neural Networks**  
作者: Christopher Zerafa,Pauline Galea,Cristiana Sebu  
摘要: FWI seeks to achieve a high-resolution model of the subsurface through the application of multi-variate optimization to the seismic inverse problem. Although now a mature technology, FWI has limitatio...  
URL: https://arxiv.org/abs/2502.17608

**9. Synergizing Deep Learning and Full-Waveform Inversion: Bridging Data-Driven and Theory-Guided Approaches for Enhanced Seismic Imaging**  
作者: Christopher Zerafa,Pauline Galea,Cristiana Sebu  
摘要: This review explores the integration of deep learning (DL) with full-waveform inversion (FWI) for enhanced seismic imaging and subsurface characterization. It covers FWI and DL fundamentals, geophysic...  
URL: https://arxiv.org/abs/2502.17585

## cs.SC (符号计算)

**1. A Novel Approach to the Initial Value Problem with a complete validated algorithm**  
作者: Bingwei Zhang,Chee Yap  
摘要: The Initial Value Problem (IVP) is concerned with finding solutions to a system of autonomous ordinary differential equations (ODE) \begin{equation} \textbf{x}' = \textbf{f}(\textbf{x}) \end{equation}...  
URL: https://arxiv.org/abs/2502.00503

**2. Discovering Polynomial and Quadratic Structure in Nonlinear Ordinary Differential Equations**  
作者: Boris Kramer,Gleb Pogudin  
摘要: Dynamical systems with quadratic or polynomial drift exhibit complex dynamics, yet compared to nonlinear systems in general form, are often easier to analyze, simulate, control, and learn. Results goi...  
URL: https://arxiv.org/abs/2502.10005

## eess.SY (系统与控制)

**1. Model-Free Predictive Control: Introductory Algebraic Calculations, and a Comparison with HEOL and ANNs**  
作者: Cédric Join,Emmanuel Delaleau,Michel Fliess  
摘要: Model predictive control (MPC) is a popular control engineering practice, but requires a sound knowledge of the model. Model-free predictive control (MFPC), a burning issue today, also related to rein...  
URL: https://arxiv.org/abs/2502.00443

**2. Differentiable Projection-based Learn to Optimize in Wireless Network-Part I: Convex Constrained (Non-)Convex Programming**  
作者: Xiucheng Wang,Xuan Zhao,Nan Cheng  
摘要: This paper addresses a class of (non-)convex optimization problems subject to general convex constraints, which pose significant challenges for traditional methods due to their inherent non-convexity ...  
URL: https://arxiv.org/abs/2502.00053

**3. Identifying Large-Scale Linear Parameter Varying Systems with Dynamic Mode Decomposition Methods**  
作者: Jean Panaioti Jordanou,Eduardo Camponogara,Eduardo Gildin  
摘要: Linear Parameter Varying (LPV) Systems are a well-established class of nonlinear systems with a rich theory for stability analysis, control, and analytical response finding, among other aspects. Altho...  
URL: https://arxiv.org/abs/2502.02336

**4. Adaptive Resource Allocation Optimization Using Large Language Models in Dynamic Wireless Environments**  
作者: Hyeonho Noh,Byonghyo Shim,Hyun Jong Yang  
摘要: Deep learning (DL) has made notable progress in addressing complex radio access network control challenges that conventional analytic methods have struggled to solve. However, DL has shown limitations...  
URL: https://arxiv.org/abs/2502.02287

**5. Synthesis of Model Predictive Control and Reinforcement Learning: Survey and Classification**  
作者: Rudolf Reiter,Jasper Hoffmann,Dirk Reinhardt,Florian Messerer,Katrin Baumgärtner,Shamburaj Sawant,Joschka Boedecker,Moritz Diehl,Sebastien Gros  
摘要: The fields of MPC and RL consider two successful control techniques for Markov decision processes. Both approaches are derived from similar fundamental principles, and both are widely used in practica...  
URL: https://arxiv.org/abs/2502.02133

**6. Deep Reinforcement Learning-Based Optimization of Second-Life Battery Utilization in Electric Vehicles Charging Stations**  
作者: Rouzbeh Haghighi,Ali Hassan,Van-Hai Bui,Akhtar Hussain,Wencong Su  
摘要: The rapid rise in electric vehicle (EV) adoption presents significant challenges in managing the vast number of retired EV batteries. Research indicates that second-life batteries (SLBs) from EVs typi...  
URL: https://arxiv.org/abs/2502.03412

**7. Optimizing Electric Vehicles Charging using Large Language Models and Graph Neural Networks**  
作者: Stavros Orfanoudakis,Peter Palensky,Pedro P. Vergara  
摘要: Maintaining grid stability amid widespread electric vehicle (EV) adoption is vital for sustainable transportation. Traditional optimization methods and Reinforcement Learning (RL) approaches often str...  
URL: https://arxiv.org/abs/2502.03067

**8. End-to-End Learning Framework for Solving Non-Markovian Optimal Control**  
作者: Xiaole Zhang,Peiyu Zhang,Xiongye Xiao,Shixuan Li,Vasileios Tzoumas,Vijay Gupta,Paul Bogdan  
摘要: Integer-order calculus often falls short in capturing the long-range dependencies and memory effects found in many real-world processes. Fractional calculus addresses these gaps via fractional-order i...  
URL: https://arxiv.org/abs/2502.04649

**9. Reinforcement Learning Based Prediction of PID Controller Gains for Quadrotor UAVs**  
作者: Serhat Sönmez,Luca Montecchio,Simone Martini,Matthew J. Rutherford,Alessandro Rizzo,Margareta Stefanovic,Kimon P. Valavanis  
摘要: A reinforcement learning (RL) based methodology is proposed and implemented for online fine-tuning of PID controller gains, thus, improving quadrotor effective and accurate trajectory tracking. The RL...  
URL: https://arxiv.org/abs/2502.04552

**10. Work in Progress: AI-Powered Engineering-Bridging Theory and Practice**  
作者: Oz Levy,Ilya Dikman,Natan Levy,Michael Winokur  
摘要: This paper explores how generative AI can help automate and improve key steps in systems engineering. It examines AI's ability to analyze system requirements based on INCOSE's "good requirement" crite...  
URL: https://arxiv.org/abs/2502.04256

... 以及其他 5 篇论文

## cs.CC (计算复杂度)

**1. Compilation and Fast Model Counting beyond CNF**  
作者: Alexis de Colnet,Stefan Szeider,Tianwei Zhang  
摘要: Circuits in deterministic decomposable negation normal form (d-DNNF) are representations of Boolean functions that enable linear-time model counting. This paper strengthens our theoretical knowledge o...  
URL: https://arxiv.org/abs/2502.00434

**2. FeatPCA: A feature subspace based principal component analysis technique for enhancing clustering of single-cell RNA-seq data**  
作者: Md Romizul Islam,Swakkhar Shatabda  
摘要: Single-cell RNA sequencing (scRNA-seq) has revolutionized our ability to analyze gene expression at the cellular level. By providing data on gene expression for each individual cell, scRNA-seq generat...  
URL: https://arxiv.org/abs/2502.05647

**3. Oracle Separations for RPH**  
作者: Thekla Hamm,Lucas Meijer,Tillmann Miltzow,Subhasree Patro  
摘要: While theoretical computer science primarily works with discrete models of computation, like the Turing machine and the wordRAM, there are many scenarios in which introducing real computation models i...  
URL: https://arxiv.org/abs/2502.09279

**4. Membership and Conjugacy in Inverse Semigroups**  
作者: Lukas Fleischer,Florian Stober,Alexander Thumm,Armin Weiß  
摘要: The membership problem for an algebraic structure asks whether a given element is contained in some substructure, which is usually given by generators. In this work we study the membership problem, as...  
URL: https://arxiv.org/abs/2502.10103

## q-fin.CP (计算金融)

**1. MarketSenseAI 2.0: Enhancing Stock Analysis through LLM Agents**  
作者: George Fatouros,Kostas Metaxas,John Soldatos,Manos Karathanassis  
摘要: MarketSenseAI is a novel framework for holistic stock analysis which leverages Large Language Models (LLMs) to process financial news, historical prices, company fundamentals and the macroeconomic env...  
URL: https://arxiv.org/abs/2502.00415

**2. OrderFusion: Encoding Orderbook for Probabilistic Intraday Price Prediction**  
作者: Runyao Yu,Yuchen Tao,Fabian Leimgruber,Tara Esterl,Jochen L. Cremer  
摘要: Efficient and reliable probabilistic prediction of intraday electricity prices is essential to manage market uncertainties and support robust trading strategies. However, current methods often suffer ...  
URL: https://arxiv.org/abs/2502.06830

**3. Quantum Powered Credit Risk Assessment: A Novel Approach using hybrid Quantum-Classical Deep Neural Network for Row-Type Dependent Predictive Analysis**  
作者: Rath Minati,Date Hema  
摘要: The integration of Quantum Deep Learning (QDL) techniques into the landscape of financial risk analysis presents a promising avenue for innovation. This study introduces a framework for credit risk as...  
URL: https://arxiv.org/abs/2502.07806

**4. Transformer Based Time-Series Forecasting for Stock**  
作者: Shuozhe Li,Zachery B Schulwol,Risto Miikkulainen  
摘要: To the naked eye, stock prices are considered chaotic, dynamic, and unpredictable. Indeed, it is one of the most difficult forecasting tasks that hundreds of millions of retail traders and professiona...  
URL: https://arxiv.org/abs/2502.09625

## physics.med-ph (医学物理)

**1. Actor Critic with Experience Replay-based automatic treatment planning for prostate cancer intensity modulated radiotherapy**  
作者: Md Mainul Abrar,Parvat Sapkota,Damon Sprouts,Xun Jia,Yujie Chi  
摘要: Background: Real-time treatment planning in IMRT is challenging due to complex beam interactions. AI has improved automation, but existing models require large, high-quality datasets and lack universa...  
URL: https://arxiv.org/abs/2502.00346

**2. When are Diffusion Priors Helpful in Sparse Reconstruction? A Study with Sparse-view CT**  
作者: Matt Y. Cheung,Sophia Zorek,Tucker J. Netherton,Laurence E. Court,Sadeer Al-Kindi,Ashok Veeraraghavan,Guha Balakrishnan  
摘要: Diffusion models demonstrate state-of-the-art performance on image generation, and are gaining traction for sparse medical image reconstruction tasks. However, compared to classical reconstruction alg...  
URL: https://arxiv.org/abs/2502.02771

**3. LUND-PROBE -- LUND Prostate Radiotherapy Open Benchmarking and Evaluation dataset**  
作者: Viktor Rogowski,Lars E Olsson,Jonas Scherman,Emilia Persson,Mustafa Kadhim,Sacha af Wetterstedt,Adalsteinn Gunnlaugsson,Martin P. Nilsson,Nandor Vass,Mathieu Moreau,Maria Gebre Medhin,Sven Bäck,Per Munck af Rosenschöld,Silke Engelholm,Christian Jamtheim Gustafsson  
摘要: Radiotherapy treatment for prostate cancer relies on computed tomography (CT) and/or magnetic resonance imaging (MRI) for segmentation of target volumes and organs at risk (OARs). Manual segmentation ...  
URL: https://arxiv.org/abs/2502.04493

**4. Dynamic-Computed Tomography Angiography for Cerebral Vessel Templates and Segmentation**  
作者: Shrikanth Yadav,Jisoo Kim,Geoffrey Young,Lei Qin  
摘要: Background: Computed Tomography Angiography (CTA) is crucial for cerebrovascular disease diagnosis. Dynamic CTA is a type of imaging that captures temporal information about the We aim to develop and ...  
URL: https://arxiv.org/abs/2502.09893

**5. Exploiting network optimization stability for enhanced PET image denoising using deep image prior**  
作者: Fumio Hashimoto,Kibo Ote,Yuya Onishi,Hideaki Tashima,Go Akamatsu,Yuma Iwao,Miwako Takahashi,Taiga Yamaya  
摘要: PET is affected by statistical noise due to constraints on tracer dose and scan duration, impacting both diagnostic performance and quantitative accuracy. While deep learning (DL)-based PET denoising ...  
URL: https://arxiv.org/abs/2502.11259

**6. KNOWM Memristors in a Bridge Synapse delay-based Reservoir Computing system for detection of epileptic seizures**  
作者: Dawid Przyczyna,Grzegorz Hess,Konrad Szaciłowski  
摘要: Nanodevices that show the potential for non-linear transformation of electrical signals and various forms of memory can be successfully used in new computational paradigms, such as neuromorphic or res...  
URL: https://arxiv.org/abs/2502.20351

## econ.GN (普通经济学)

**1. A Comprehensive Review: Applicability of Deep Neural Networks in Business Decision Making and Market Prediction Investment**  
作者: Viet Trinh  
摘要: Big data, both in its structured and unstructured formats, have brought in unforeseen challenges in economics and business. How to organize, classify, and then analyze such data to obtain meaningful i...  
URL: https://arxiv.org/abs/2502.00151

**2. Cracking the Code: Enhancing Development finance understanding with artificial intelligence**  
作者: Pierre Beaucoral  
摘要: Analyzing development projects is crucial for understanding donors aid strategies, recipients priorities, and to assess development finance capacity to adress development issues by on-the-ground actio...  
URL: https://arxiv.org/abs/2502.09495

## q-bio.QM (定量方法)

**1. Blood Glucose Level Prediction in Type 1 Diabetes Using Machine Learning**  
作者: Soon Jynn Chu,Nalaka Amarasiri,Sandesh Giri,Priyata Kafle  
摘要: Type 1 Diabetes is a chronic autoimmune condition in which the immune system attacks and destroys insulin-producing beta cells in the pancreas, resulting in little to no insulin production. Insulin he...  
URL: https://arxiv.org/abs/2502.00065

**2. scBIT: Integrating Single-cell Transcriptomic Data into fMRI-based Prediction for Alzheimer's Disease Diagnosis**  
作者: Yu-An Huang,Yao Hu,Yue-Chao Li,Xiyue Cao,Xinyuan Li,Kay Chen Tan,Zhu-Hong You,Zhi-An Huang  
摘要: Functional MRI (fMRI) and single-cell transcriptomics are pivotal in Alzheimer's disease (AD) research, each providing unique insights into neural function and molecular mechanisms. However, integrati...  
URL: https://arxiv.org/abs/2502.02630

**3. SurvHive: a package to consistently access multiple survival-analysis packages**  
作者: Giovanni Birolo,Ivan Rossi,Flavio Sartori,Cesare Rollo,Tiziana Sanavia,Piero Fariselli  
摘要: Survival analysis, a foundational tool for modeling time-to-event data, has seen growing integration with machine learning (ML) approaches to handle the complexities of censored data and time-varying ...  
URL: https://arxiv.org/abs/2502.02223

**4. UniZyme: A Unified Protein Cleavage Site Predictor Enhanced with Enzyme Active-Site Knowledge**  
作者: Chenao Li,Shuo Yan,Enyan Dai  
摘要: Enzyme-catalyzed protein cleavage is essential for many biological functions. Accurate prediction of cleavage sites can facilitate various applications such as drug development, enzyme design, and a d...  
URL: https://arxiv.org/abs/2502.06914

**5. A Simple yet Effective DDG Predictor is An Unsupervised Antibody Optimizer and Explainer**  
作者: Lirong Wu,Yunfan Liu,Haitao Lin,Yufei Huang,Guojiang Zhao,Zhifeng Gao,Stan Z. Li  
摘要: The proteins that exist today have been optimized over billions of years of natural evolution, during which nature creates random mutations and selects them. The discovery of functionally promising mu...  
URL: https://arxiv.org/abs/2502.06913

**6. Advancing Precision Oncology Through Modeling of Longitudinal and Multimodal Data**  
作者: Luoting Zhuang,Stephen H. Park,Steven J. Skates,Ashley E. Prosper,Denise R. Aberle,William Hsu  
摘要: Cancer evolves continuously over time through a complex interplay of genetic, epigenetic, microenvironmental, and phenotypic changes. This dynamic behavior drives uncontrolled cell growth, metastasis,...  
URL: https://arxiv.org/abs/2502.07836

**7. Supervised contrastive learning for cell stage classification of animal embryos**  
作者: Yasmine Hachani,Patrick Bouthemy,Elisa Fromont,Sylvie Ruffini,Ludivine Laffont,Alline de Paula Reis  
摘要: Video microscopy, when combined with machine learning, offers a promising approach for studying the early development of in vitro produced (IVP) embryos. However, manually annotating developmental eve...  
URL: https://arxiv.org/abs/2502.07360

**8. CellFlow: Simulating Cellular Morphology Changes via Flow Matching**  
作者: Yuhui Zhang,Yuchang Su,Chenyu Wang,Tianhong Li,Zoe Wefers,Jeffrey Nirschl,James Burgess,Daisy Ding,Alejandro Lozano,Emma Lundberg,Serena Yeung-Levy  
摘要: Building a virtual cell capable of accurately simulating cellular behaviors in silico has long been a dream in computational biology. We introduce CellFlow, an image-generative model that simulates ce...  
URL: https://arxiv.org/abs/2502.09775

**9. Generalizable Cervical Cancer Screening via Large-scale Pretraining and Test-Time Adaptation**  
作者: Hao Jiang,Cheng Jin,Huangjing Lin,Yanning Zhou,Xi Wang,Jiabo Ma,Li Ding,Jun Hou,Runsheng Liu,Zhizhong Chai,Luyang Luo,Huijuan Shi,Yinling Qian,Qiong Wang,Changzhong Li,Anjia Han,Ronald Cheong Kin Chan,Hao Chen  
摘要: Cervical cancer is a leading malignancy in female reproductive system. While AI-assisted cytology offers a cost-effective and non-invasive screening solution, current systems struggle with generalizab...  
URL: https://arxiv.org/abs/2502.09662

**10. Non-Linear Flow Matching for Full-Atom Peptide Design**  
作者: Dengdeng Huang,Shikui Tu  
摘要: Peptide design plays a pivotal role in therapeutic applications, yet existing AI-assisted methods often struggle to generate stable peptides with high affinity due to their inability to accurately sim...  
URL: https://arxiv.org/abs/2502.15855

... 以及其他 1 篇论文

## q-fin.GN (一般财务)

**1. Retail Market Analysis**  
作者: Ke Yuan,Yaoxin Liu,Shriyesh Chandra,Rishav Roy  
摘要: This project focuses on analyzing retail market trends using historical sales data, search trends, and customer reviews. By identifying the patterns and trending products, the analysis provides action...  
URL: https://arxiv.org/abs/2502.00024

**2. Assessing Generative AI value in a public sector context: evidence from a field experiment**  
作者: Trevor Fitzpatrick,Seamus Kelly,Patrick Carey,David Walsh,Ruairi Nugent  
摘要: The emergence of Generative AI (Gen AI) has motivated an interest in understanding how it could be used to enhance productivity across various tasks. We add to research results for the performance imp...  
URL: https://arxiv.org/abs/2502.09479

**3. Position: Standard Benchmarks Fail -- LLM Agents Present Overlooked Risks for Financial Applications**  
作者: Zichen Chen,Jiaao Chen,Jianda Chen,Misha Sra  
摘要: Current financial LLM agent benchmarks are inadequate. They prioritize task performance while ignoring fundamental safety risks. Threats like hallucinations, temporal misalignment, and adversarial vul...  
URL: https://arxiv.org/abs/2502.15865

## q-bio.GN (基因组学)

**1. Graph Structure Learning for Tumor Microenvironment with Cell Type Annotation from non-spatial scRNA-seq data**  
作者: Yu-An Huang,Yue-Chao Li,Hai-Ru You,Jie Pan,Xiyue Cao,Xinyuan Li,Zhi-An Huang,Zhu-Hong You  
摘要: The exploration of cellular heterogeneity within the tumor microenvironment (TME) via single-cell RNA sequencing (scRNA-seq) is essential for understanding cancer progression and response to therapy. ...  
URL: https://arxiv.org/abs/2502.02629

**2. Omni-DNA: A Unified Genomic Foundation Model for Cross-Modal and Multi-Task Learning**  
作者: Zehui Li,Vallijah Subasri,Yifei Shen,Dongsheng Li,Yiren Zhao,Guy-Bart Stan,Caihua Shan  
摘要: Large Language Models (LLMs) demonstrate remarkable generalizability across diverse tasks, yet genomic foundation models (GFMs) still require separate finetuning for each downstream application, creat...  
URL: https://arxiv.org/abs/2502.03499

**3. Whole-Genome Phenotype Prediction with Machine Learning: Open Problems in Bacterial Genomics**  
作者: Tamsin James,Ben Williamson,Peter Tino,Nicole Wheeler  
摘要: How can we identify causal genetic mechanisms that govern bacterial traits? Initial efforts entrusting machine learning models to handle the task of predicting phenotype from genotype return high accu...  
URL: https://arxiv.org/abs/2502.07749

## hep-ex (高能物理-实验)

**1. Particle Trajectory Representation Learning with Masked Point Modeling**  
作者: Sam Young,Yeon-jae Jwa,Kazuhiro Terao  
摘要: Effective self-supervised learning (SSL) techniques have been key to unlocking large datasets for representation learning. While many promising methods have been developed using online corpora and cap...  
URL: https://arxiv.org/abs/2502.02558

**2. Comparative Analysis of FPGA and GPU Performance for Machine Learning-Based Track Reconstruction at LHCb**  
作者: Fotis I. Giasemis,Vladimir Lončar,Bertrand Granado,Vladimir Vava Gligorov  
摘要: In high-energy physics, the increasing luminosity and detector granularity at the Large Hadron Collider are driving the need for more efficient data processing solutions. Machine Learning has emerged ...  
URL: https://arxiv.org/abs/2502.02304

**3. Unsupervised Particle Tracking with Neuromorphic Computing**  
作者: Emanuele Coradin,Fabio Cufino,Muhammad Awais,Tommaso Dorigo,Enrico Lupi,Eleonora Porcu,Jinu Raj,Fredrik Sandin,Mia Tosi  
摘要: We study the application of a neural network architecture for identifying charged particle trajectories via unsupervised learning of delays and synaptic weights using a spike-time-dependent plasticity...  
URL: https://arxiv.org/abs/2502.06771

## cs.MM (多媒体)

**1. LLMER: Crafting Interactive Extended Reality Worlds with JSON Data Generated by Large Language Models**  
作者: Jiangong Chen,Xiaoyi Wu,Tian Lan,Bin Li  
摘要: The integration of Large Language Models (LLMs) like GPT-4 with Extended Reality (XR) technologies offers the potential to build truly immersive XR environments that interact with human users through ...  
URL: https://arxiv.org/abs/2502.02441

**2. EditIQ: Automated Cinematic Editing of Static Wide-Angle Videos via Dialogue Interpretation and Saliency Cues**  
作者: Rohit Girmaji,Bhav Beri,Ramanathan Subramanian,Vineet Gandhi  
摘要: We present EditIQ, a completely automated framework for cinematically editing scenes captured via a stationary, large field-of-view and high-resolution camera. From the static camera feed, EditIQ init...  
URL: https://arxiv.org/abs/2502.02172

**3. UniForm: A Unified Diffusion Transformer for Audio-Video Generation**  
作者: Lei Zhao,Linfeng Feng,Dongxu Ge,Fangqiu Yi,Chi Zhang,Xiao-Lei Zhang,Xuelong Li  
摘要: As a natural multimodal content, audible video delivers an immersive sensory experience. Consequently, audio-video generation systems have substantial potential. However, existing diffusion-based stud...  
URL: https://arxiv.org/abs/2502.03897

**4. Semantic-Aware Adaptive Video Streaming Using Latent Diffusion Models for Wireless Networks**  
作者: Zijiang Yan,Jianhua Pei,Hongda Wu,Hina Tabassum,Ping Wang  
摘要: This paper proposes a novel framework for real-time adaptive-bitrate video streaming by integrating latent diffusion models (LDMs) within the FFmpeg techniques. This solution addresses the challenges ...  
URL: https://arxiv.org/abs/2502.05695

**5. Towards Multimodal Empathetic Response Generation: A Rich Text-Speech-Vision Avatar-based Benchmark**  
作者: Han Zhang,Zixiang Meng,Meng Luo,Hong Han,Lizi Liao,Erik Cambria,Hao Fei  
摘要: Empathetic Response Generation (ERG) is one of the key tasks of the affective computing area, which aims to produce emotionally nuanced and compassionate responses to user's queries. However, existing...  
URL: https://arxiv.org/abs/2502.04976

**6. Visual-based spatial audio generation system for multi-speaker environments**  
作者: Xiaojing Liu,Ogulcan Gurelli,Yan Wang,Joshua Reiss  
摘要: In multimedia applications such as films and video games, spatial audio techniques are widely employed to enhance user experiences by simulating 3D sound: transforming mono audio into binaural formats...  
URL: https://arxiv.org/abs/2502.07538

**7. REAL: Realism Evaluation of Text-to-Image Generation Models for Effective Data Augmentation**  
作者: Ran Li,Xiaomeng Jin,Heng ji  
摘要: Recent advancements in text-to-image (T2I) generation models have transformed the field. However, challenges persist in generating images that reflect demanding textual descriptions, especially for fi...  
URL: https://arxiv.org/abs/2502.10663

**8. Deep-JGAC: End-to-End Deep Joint Geometry and Attribute Compression for Dense Colored Point Clouds**  
作者: Yun Zhang,Zixi Guo,Linwei Zhu,C. -C. Jay Kuo  
摘要: Colored point cloud becomes a fundamental representation in the realm of 3D vision. Effective Point Cloud Compression (PCC) is urgently needed due to huge amount of data. In this paper, we propose an ...  
URL: https://arxiv.org/abs/2502.17939

## math.DS (动力系统)

**1. Circular Microalgae-Based Carbon Control for Net Zero**  
作者: Federico Zocco,Joan García,Wassim M. Haddad  
摘要: The alteration of the climate in various areas of the world is of increasing concern since climate stability is a necessary condition for human survival as well as every living organism. The main reas...  
URL: https://arxiv.org/abs/2502.02382

**2. Invariant Measures for Data-Driven Dynamical System Identification: Analysis and Application**  
作者: Jonah Botvinick-Greenhouse  
摘要: We propose a novel approach for performing dynamical system identification, based upon the comparison of simulated and observed physical invariant measures. While standard methods adopt a Lagrangian p...  
URL: https://arxiv.org/abs/2502.05204

**3. Impilict Runge-Kutta based sparse identification of governing equations in biologically motivated systems**  
作者: Mehrdad Anvari,Hamidreza Marasi,Hossein Kheiri  
摘要: Identifying governing equations in physical and biological systems from datasets remains a long-standing challenge across various scientific disciplines, providing mechanistic insights into complex sy...  
URL: https://arxiv.org/abs/2502.20319

## q-bio.BM (生物分子)

**1. Accurate Pocket Identification for Binding-Site-Agnostic Docking**  
作者: Yaroslav Balytskyi,Inna Hubenko,Alina Balytska,Christopher V. Kelly  
摘要: Accurate identification of druggable pockets is essential for structure-based drug design. However, most pocket-identification algorithms prioritize their geometric properties over downstream docking ...  
URL: https://arxiv.org/abs/2502.02371

**2. ScaffoldGPT: A Scaffold-based Large Language Model for Drug Improvement**  
作者: Xuefeng Liu,Songhao Jiang,Rick Stevens  
摘要: Drug optimization has become increasingly crucial in light of fast-mutating virus strains and drug-resistant cancer cells. Nevertheless, it remains challenging as it necessitates retaining the benefic...  
URL: https://arxiv.org/abs/2502.06891

**3. Gradient GA: Gradient Genetic Algorithm for Drug Molecular Design**  
作者: Chris Zhuang,Debadyuti Mukherjee,Yingzhou Lu,Tianfan Fu,Ruqi Zhang  
摘要: Molecular discovery has brought great benefits to the chemical industry. Various molecule design techniques are developed to identify molecules with desirable properties. Traditional optimization meth...  
URL: https://arxiv.org/abs/2502.09860

**4. CL-MFAP: A Contrastive Learning-Based Multimodal Foundation Model for Molecular Property Prediction and Antibiotic Screening**  
作者: Gen Zhou,Sugitha Janarthanan,Yutong Lu,Pingzhao Hu  
摘要: Due to the rise in antimicrobial resistance, identifying novel compounds with antibiotic potential is crucial for combatting this global health issue. However, traditional drug development methods are...  
URL: https://arxiv.org/abs/2502.11001

**5. Agentic End-to-End De Novo Protein Design for Tailored Dynamics Using a Language Diffusion Model**  
作者: Bo Ni,Markus J. Buehler  
摘要: Proteins are dynamic molecular machines whose biological functions, spanning enzymatic catalysis, signal transduction, and structural adaptation, are intrinsically linked to their motions. Designing p...  
URL: https://arxiv.org/abs/2502.10173

**6. SE(3)-Equivariant Ternary Complex Prediction Towards Target Protein Degradation**  
作者: Fanglei Xue,Meihan Zhang,Shuqi Li,Xinyu Gao,James A. Wohlschlegel,Wenbing Huang,Yi Yang,Weixian Deng  
摘要: Targeted protein degradation (TPD) induced by small molecules has emerged as a rapidly evolving modality in drug discovery, targeting proteins traditionally considered "undruggable". Proteolysis-targe...  
URL: https://arxiv.org/abs/2502.18875

## physics.comp-ph (计算物理)

**1. Physically consistent predictive reduced-order modeling by enhancing Operator Inference with state constraints**  
作者: Hyeonghun Kim,Boris Kramer  
摘要: Numerical simulations of complex multiphysics systems, such as char combustion considered herein, yield numerous state variables that inherently exhibit physical constraints. This paper presents a new...  
URL: https://arxiv.org/abs/2502.03672

**2. Enhancing Robustness Of Digital Shadow For CO2 Storage Monitoring With Augmented Rock Physics Modeling**  
作者: Abhinav Prakash Gahlot,Felix J. Herrmann  
摘要: To meet climate targets, the IPCC underscores the necessity of technologies capable of removing gigatonnes of CO2 annually, with Geological Carbon Storage (GCS) playing a central role. GCS involves ca...  
URL: https://arxiv.org/abs/2502.07171

**3. Advancing Geological Carbon Storage Monitoring With 3d Digital Shadow Technology**  
作者: Abhinav Prakash Gahlot,Rafael Orozco,Felix J. Herrmann  
摘要: Geological Carbon Storage (GCS) is a key technology for achieving global climate goals by capturing and storing CO2 in deep geological formations. Its effectiveness and safety rely on accurate monitor...  
URL: https://arxiv.org/abs/2502.07169

**4. Effective Field Neural Network**  
作者: Xi Liu,Yujun Zhao,Chun Yu Wan,Yang Zhang,Junwei Liu  
摘要: In recent years, with the rapid development of machine learning, physicists have been exploring its new applications in solving or alleviating the curse of dimensionality in many-body problems. In ord...  
URL: https://arxiv.org/abs/2502.17665

**5. Learning atomic forces from uncertainty-calibrated adversarial attacks**  
作者: Henrique Musseli Cezar,Tilmann Bodenstein,Henrik Andersen Sveinsson,Morten Ledum,Simen Reine,Sigbjørn Løland Bore  
摘要: Adversarial approaches, which intentionally challenge machine learning models by generating difficult examples, are increasingly being adopted to improve machine learning interatomic potentials (MLIPs...  
URL: https://arxiv.org/abs/2502.18314

## cs.ET (新兴技术)

**1. Beyond Diagonal RIS: A New Frontier for 6G Internet of Things Networks**  
作者: Wali Ullah Khan,Chandan Kumar Sheemar,Eva Lagunas,Symeon Chatzinotas  
摘要: Reconfigurable intelligent surface (RIS) technology has emerged as a promising enabler for next-generation wireless networks, offering a paradigm shift from passive environments to programmable radio ...  
URL: https://arxiv.org/abs/2502.03637

**2. Implementing Large Quantum Boltzmann Machines as Generative AI Models for Dataset Balancing**  
作者: Salvatore Sinno,Markus Bertl,Arati Sahoo,Bhavika Bhalgamiya,Thomas Groß,Nicholas Chancellor  
摘要: This study explores the implementation of large Quantum Restricted Boltzmann Machines (QRBMs), a key advancement in Quantum Machine Learning (QML), as generative models on D-Wave's Pegasus quantum har...  
URL: https://arxiv.org/abs/2502.03086

**3. All-in-One Analog AI Accelerator: On-Chip Training and Inference with Conductive-Metal-Oxide/HfOx ReRAM Devices**  
作者: Donato Francesco Falcone,Victoria Clerico,Wooseok Choi,Tommaso Stecconi,Folkert Horst,Laura Begon-Lours,Matteo Galetta,Antonio La Porta,Nikhil Garg,Fabien Alibart,Bert Jan Offrein,Valeria Bragaglia  
摘要: Analog in-memory computing is an emerging paradigm designed to efficiently accelerate deep neural network workloads. Recent advancements have focused on either inference or training acceleration. Howe...  
URL: https://arxiv.org/abs/2502.04524

**4. Characterization and Mitigation of ADC Noise by Reference Tuning in RRAM-Based Compute-In-Memory**  
作者: Ying-Hao Wei,Zishen Wan,Brian Crafton,Samuel Spetalnick,Arijit Raychowdhury  
摘要: With the escalating demand for power-efficient neural network architectures, non-volatile compute-in-memory designs have garnered significant attention. However, owing to the nature of analog computat...  
URL: https://arxiv.org/abs/2502.05948

**5. Low-power Spike-based Wearable Analytics on RRAM Crossbars**  
作者: Abhiroop Bhattacharjee,Jinquan Shi,Wei-Chen Chen,Xinxin Wang,Priyadarshini Panda  
摘要: This work introduces a spike-based wearable analytics system utilizing Spiking Neural Networks (SNNs) deployed on an In-memory Computing engine based on RRAM crossbars, which are known for their compa...  
URL: https://arxiv.org/abs/2502.06736

**6. Scalable Thermodynamic Second-order Optimization**  
作者: Kaelan Donatella,Samuel Duffield,Denis Melanson,Maxwell Aifer,Phoebe Klett,Rajath Salegame,Zach Belateche,Gavin Crooks,Antonio J. Martinez,Patrick J. Coles  
摘要: Many hardware proposals have aimed to accelerate inference in AI workloads. Less attention has been paid to hardware acceleration of training, despite the enormous societal impact of rapid training of...  
URL: https://arxiv.org/abs/2502.08603

**7. Quantum Approaches for Dysphonia Assessment in Small Speech Datasets**  
作者: Ha Tran,Bipasha Kashyap,Pubudu N. Pathirana  
摘要: Dysphonia, a prevalent medical condition, leads to voice loss, hoarseness, or speech interruptions. To assess it, researchers have been investigating various machine learning techniques alongside trad...  
URL: https://arxiv.org/abs/2502.08968

**8. Implementing agile healthcare frame works in the context of low income countries: Proposed Framework and Review**  
作者: P K Dutta  
摘要: Agile healthcare frameworks, derived from methodologies in IT and manufacturing, offer transformative potential for low-income regions. This study explores Agile integration in resource-constrained en...  
URL: https://arxiv.org/abs/2502.10403

## stat.AP (应用领域)

**1. Foundation for unbiased cross-validation of spatio-temporal models for species distribution modeling**  
作者: Diana Koldasbayeva,Alexey Zaytsev  
摘要: Species Distribution Models (SDMs) often suffer from spatial autocorrelation (SAC), leading to biased performance estimates. We tested cross-validation (CV) strategies - random splits, spatial blockin...  
URL: https://arxiv.org/abs/2502.03480

**2. A Pseudo Markov-Chain Model and Time-Elapsed Measures of Mobility from Collective Data**  
作者: Alisha Foster,David A. Meyer,Asif Shakeel  
摘要: In this paper we develop a pseudo Markov-chain model to understand time-elapsed flows, over multiple intervals, from time and space aggregated collective inter-location trip data, given as a time-seri...  
URL: https://arxiv.org/abs/2502.04162

**3. A Framework for Supervised and Unsupervised Segmentation and Classification of Materials Microstructure Images**  
作者: Kungang Zhang,Daniel W. Apley,Wei Chen,Wing K. Liu,L. Catherine Brinson  
摘要: Microstructure of materials is often characterized through image analysis to understand processing-structure-properties linkages. We propose a largely automated framework that integrates unsupervised ...  
URL: https://arxiv.org/abs/2502.07107

**4. Forecasting the future development in quality and value of professional football players for applications in team management**  
作者: Koen W. van Arem,Floris Goes-Smit,Jakob Söhl  
摘要: Transfers in professional football (soccer) are risky investments because of the large transfer fees and high risks involved. Although data-driven models can be used to improve transfer decisions, exi...  
URL: https://arxiv.org/abs/2502.07528

**5. StatLLM: A Dataset for Evaluating the Performance of Large Language Models in Statistical Analysis**  
作者: Xinyi Song,Lina Lee,Kexin Xie,Xueying Liu,Xinwei Deng,Yili Hong  
摘要: The coding capabilities of large language models (LLMs) have opened up new opportunities for automatic statistical analysis in machine learning and data science. However, before their widespread adopt...  
URL: https://arxiv.org/abs/2502.17657

## cs.PL (编程语言)

**1. Tensor Evolution: A Framework for Fast Evaluation of Tensor Computations using Recurrences**  
作者: Javed Absar,Samarth Narang,Muthu Baskaran  
摘要: This paper introduces a new mathematical framework for analysis and optimization of tensor expressions within an enclosing loop. Tensors are multi-dimensional arrays of values. They are common in high...  
URL: https://arxiv.org/abs/2502.03402

**2. Oracular Programming: A Modular Foundation for Building LLM-Enabled Software**  
作者: Jonathan Laurent,André Platzer  
摘要: Large Language Models have proved surprisingly effective at solving a wide range of tasks from just a handful of examples. However, their lack of reliability and modularity limits their capacity to ta...  
URL: https://arxiv.org/abs/2502.05310

**3. A Prolog Program for Bottom-up Evaluation**  
作者: David S. Warren  
摘要: This short paper describes a simple and intuitive Prolog program, a metainterpreter, that computes the bottom up meaning of a simple positive Horn clause definition. It involves a simple transformatio...  
URL: https://arxiv.org/abs/2502.09223

**4. CRANE: Reasoning with constrained LLM generation**  
作者: Debangshu Banerjee,Tarun Suresh,Shubham Ugare,Sasa Misailovic,Gagandeep Singh  
摘要: Code generation, symbolic math reasoning, and other tasks require LLMs to produce outputs that are both syntactically and semantically correct. Constrained LLM generation is a promising direction to e...  
URL: https://arxiv.org/abs/2502.09061

**5. A Unified Framework for Initial Semantics**  
作者: Thomas Lamiaux,Benedikt Ahrens  
摘要: Initial semantics aims to capture inductive structures and their properties as initial objects in suitable categories. We focus on the initial semantics aiming to model the syntax and substitution str...  
URL: https://arxiv.org/abs/2502.10811

**6. Open-Source AI-Powered Optimization in Scalene: Advancing Python Performance Profiling with DeepSeek-R1 and LLaMA 3.2**  
作者: Saem Hasan,Sanju Basak  
摘要: Python's flexibility and ease of use come at the cost of performance inefficiencies, requiring developers to rely on profilers to optimize execution. SCALENE, a high-performance CPU, GPU, and memory p...  
URL: https://arxiv.org/abs/2502.10299

**7. ClassInvGen: Class Invariant Synthesis using Large Language Models**  
作者: Chuyue Sun,Viraj Agashe,Saikat Chakraborty,Jubi Taneja,Clark Barrett,David Dill,Xiaokang Qiu,Shuvendu K. Lahiri  
摘要: Formal program specifications in the form of preconditions, postconditions, and class invariants have several benefits for the construction and maintenance of programs. They not only aid in program un...  
URL: https://arxiv.org/abs/2502.18917

**8. Adaptive Shielding via Parametric Safety Proofs**  
作者: Yao Feng,Jun Zhu,André Platzer,Jonathan Laurent  
摘要: A major challenge to deploying cyber-physical systems with learning-enabled controllers is to ensure their safety, especially in the face of changing environments that necessitate runtime knowledge ac...  
URL: https://arxiv.org/abs/2502.18879

## cs.LO (计算机科学中的逻辑)

**1. Simplifying Formal Proof-Generating Models with ChatGPT and Basic Searching Techniques**  
作者: Sangjun Han,Taeil Hur,Youngmi Hur,Kathy Sangkyung Lee,Myungyoon Lee,Hyojae Lim  
摘要: The challenge of formal proof generation has a rich history, but with modern techniques, we may finally be at the stage of making actual progress in real-life mathematical problems. This paper explore...  
URL: https://arxiv.org/abs/2502.03321

**2. POPACheck: a Model Checker for probabilistic Pushdown Automata**  
作者: Francesco Pontiggia,Ezio Bartocci,Michele Chiari  
摘要: We present POPACheck, the first full-fledged model checking tool for pPDA. POPACheck provides a user-friendly probabilistic modeling language with recursion that automatically translates into pOPA. pO...  
URL: https://arxiv.org/abs/2502.03956

**3. Foundations of Digital Circuits: Denotation, Operational, and Algebraic Semantics**  
作者: George Kaye  
摘要: This thesis details a project to define a fully compositional theory of synchronous sequential circuits built from primitive components, motivated by applying techniques successfully used in programmi...  
URL: https://arxiv.org/abs/2502.08497

**4. Proceedings 40th International Conference on Logic Programming**  
作者: Pedro Cabalar,Francesco Fabiano,Martin Gebser,Gopal Gupta,Theresa Swift  
摘要: Since the first conference In Marseille in 1982, the International Conference on Logic Programming (ICLP) has been the premier international event for presenting research in logic programming. These p...  
URL: https://arxiv.org/abs/2502.08453

**5. Reliable Conversational Agents under ASP Control that Understand Natural Language**  
作者: Yankai Zeng  
摘要: Efforts have been made to make machines converse like humans in the past few decades. The recent techniques of Large Language Models (LLMs) make it possible to have human-like conversations with machi...  
URL: https://arxiv.org/abs/2502.09237

**6. Early Validation of High-level Requirements on Cyber-Physical Systems**  
作者: Ondřej Vašíček  
摘要: The overarching, broad topic of my research are advancements in the area of safety-critical, cyber-physical systems (CPS) development with emphasis on validation and verification. The particular focus...  
URL: https://arxiv.org/abs/2502.09236

**7. Logical foundations of Smart Contracts**  
作者: Kalonji Kalala  
摘要: Nowadays, sophisticated domains are emerging which require appropriate formalisms to be specified accurately in order to reason about them. One such domain is constituted of smart contracts that have ...  
URL: https://arxiv.org/abs/2502.09232

**8. Bridging Logic Programming and Deep Learning for Explainability through ILASP**  
作者: Talissa Dreossi  
摘要: My research explores integrating deep learning and logic programming to set the basis for a new generation of AI systems. By combining neural networks with Inductive Logic Programming (ILP), the goal ...  
URL: https://arxiv.org/abs/2502.09227

**9. Abduction of Domain Relationships from Data for VQA**  
作者: Al Mehdi Saadat Chowdhury,Paulo Shakarian,Gerardo I. Simari  
摘要: In this paper, we study the problem of visual question answering (VQA) where the image and query are represented by ASP programs that lack domain data. We provide an approach that is orthogonal and co...  
URL: https://arxiv.org/abs/2502.09219

**10. Data2Concept2Text: An Explainable Multilingual Framework for Data Analysis Narration**  
作者: Flavio Bertini,Alessandro Dal Palù,Federica Zaglio,Francesco Fabiano,Andrea Formisano  
摘要: This paper presents a complete explainable system that interprets a set of data, abstracts the underlying features and describes them in a natural language of choice. The system relies on two crucial ...  
URL: https://arxiv.org/abs/2502.09218

... 以及其他 2 篇论文

## cond-mat.dis-nn (无序系统和神经网络)

**1. From Kernels to Features: A Multi-Scale Adaptive Theory of Feature Learning**  
作者: Noa Rubin,Kirsten Fischer,Javed Lindner,David Dahmen,Inbar Seroussi,Zohar Ringel,Michael Krämer,Moritz Helias  
摘要: Theoretically describing feature learning in neural networks is crucial for understanding their expressive power and inductive biases, motivating various approaches. Some approaches describe network b...  
URL: https://arxiv.org/abs/2502.03210

**2. Two-Point Deterministic Equivalence for Stochastic Gradient Dynamics in Linear Models**  
作者: Alexander Atanasov,Blake Bordelon,Jacob A. Zavatone-Veth,Courtney Paquette,Cengiz Pehlevan  
摘要: We derive a novel deterministic equivalence for the two-point function of a random matrix resolvent. Using this result, we give a unified derivation of the performance of a wide variety of high-dimens...  
URL: https://arxiv.org/abs/2502.05074

## math.CA (经典分析和常微分方程)

**1. Signature Reconstruction from Randomized Signatures**  
作者: Mie Glückstad,Nicola Muca Cirone,Josef Teichmann  
摘要: Controlled ordinary differential equations driven by continuous bounded variation curves can be considered a continuous time analogue of recurrent neural networks for the construction of expressive fe...  
URL: https://arxiv.org/abs/2502.03163

**2. Reconstruction of frequency-localized functions from pointwise samples via least squares and deep learning**  
作者: A. Martina Neuman,Andres Felipe Lerma Pineda,Jason J. Bramburger,Simone Brugiapaglia  
摘要: Recovering frequency-localized functions from pointwise data is a fundamental task in signal processing. We examine this problem from an approximation-theoretic perspective, focusing on least squares ...  
URL: https://arxiv.org/abs/2502.09794

## astro-ph.CO (宇宙学和非银河系天体物理学)

**1. Fast Sampling of Cosmological Initial Conditions with Gaussian Neural Posterior Estimation**  
作者: Oleg Savchenko,Guillermo Franco Abellán,Florian List,Noemi Anau Montel,Christoph Weniger  
摘要: Knowledge of the primordial matter density field from which the large-scale structure of the Universe emerged over cosmic time is of fundamental importance for cosmology. However, reconstructing these...  
URL: https://arxiv.org/abs/2502.03139

**2. $Λ$CDM and early dark energy in latent space: a data-driven parametrization of the CMB temperature power spectrum**  
作者: Davide Piras,Laura Herold,Luisa Lucie-Smith,Eiichiro Komatsu  
摘要: Finding the best parametrization for cosmological models in the absence of first-principle theories is an open question. We propose a data-driven parametrization of cosmological models given by the di...  
URL: https://arxiv.org/abs/2502.09810

## physics.optics (光学)

**1. A Bayesian perspective on single-shot laser characterization**  
作者: J. Esslinger,N. Weisse,C. Eberle,J. Schroeder,S. Howard,P. Norreys,S. Karsch,A. Döpp  
摘要: We introduce a Bayesian framework for measuring spatio-temporal couplings (STCs) in ultra-intense lasers that reconceptualizes what constitutes a 'single-shot' measurement. Moving beyond traditional d...  
URL: https://arxiv.org/abs/2502.03100

## math.NA (数值分析)

**1. An Augmented Backward-Corrected Projector Splitting Integrator for Dynamical Low-Rank Training**  
作者: Jonas Kusch,Steffen Schotthöfer,Alexandra Walter  
摘要: Layer factorization has emerged as a widely used technique for training memory-efficient neural networks. However, layer factorization methods face several challenges, particularly a lack of robustnes...  
URL: https://arxiv.org/abs/2502.03006

**2. Electrical Impedance Tomography for Anisotropic Media: a Machine Learning Approach to Classify Inclusions**  
作者: Romina Gaburro,Patrick Healy,Shraddha Naidu,Clifford Nolan  
摘要: We consider the problem in Electrical Impedance Tomography (EIT) of identifying one or multiple inclusions in a background-conducting body $Ω\subset\mathbb{R}^2$, from the knowledge of a finite number...  
URL: https://arxiv.org/abs/2502.04273

**3. Learning Memory and Material Dependent Constitutive Laws**  
作者: Kaushik Bhattacharya,Lianghao Cao,George Stepaniants,Andrew Stuart,Margaret Trautner  
摘要: The theory of homogenization provides a systematic approach to the derivation of macroscale constitutive laws, obviating the need to repeatedly resolve complex microstructure. However, the unit cell p...  
URL: https://arxiv.org/abs/2502.05463

**4. Symbolic Regression of Data-Driven Reduced Order Model Closures for Under-Resolved, Convection-Dominated Flows**  
作者: Simone Manti,Ping-Hsuan Tsai,Alessandro Lucantonio,Traian Iliescu  
摘要: Data-driven closures correct the standard reduced order models (ROMs) to increase their accuracy in under-resolved, convection-dominated flows. There are two types of data-driven ROM closures in curre...  
URL: https://arxiv.org/abs/2502.04703

**5. Surrogate models for diffusion on graphs via sparse polynomials**  
作者: Giuseppe Alessio D'Inverno,Kylian Ajavon,Simone Brugiapaglia  
摘要: Diffusion kernels over graphs have been widely utilized as effective tools in various applications due to their ability to accurately model the flow of information through nodes and edges. However, th...  
URL: https://arxiv.org/abs/2502.06595

**6. What is a Sketch-and-Precondition Derivation for Low-Rank Approximation? Inverse Power Error or Inverse Power Estimation?**  
作者: Ruihan Xu,Yiping Lu  
摘要: Randomized sketching accelerates large-scale numerical linear algebra by reducing computational complexity. While the traditional sketch-and-solve approach reduces the problem size directly through sk...  
URL: https://arxiv.org/abs/2502.07993

**7. Numerical Schemes for Signature Kernels**  
作者: Thomas Cass,Francesco Piatti,Jeffrey Pei  
摘要: Signature kernels have emerged as a powerful tool within kernel methods for sequential data. In the paper "The Signature Kernel is the solution of a Goursat PDE", the authors identify a kernel trick t...  
URL: https://arxiv.org/abs/2502.08470

**8. Learning the Exact Time Integration Algorithm for Initial Value Problems by Randomized Neural Networks**  
作者: Suchuan Dong,Naxian Ni  
摘要: We present a method leveraging extreme learning machine (ELM) type randomized neural networks (NNs) for learning the exact time integration algorithm for initial value problems (IVPs). The exact time ...  
URL: https://arxiv.org/abs/2502.10949

**9. Scalable Signature Kernel Computations for Long Time Series via Local Neumann Series Expansions**  
作者: Matthew Tamayo-Rios,Alexander Schell,Rima Alaifari  
摘要: The signature kernel is a recent state-of-the-art tool for analyzing high-dimensional sequential data, valued for its theoretical guarantees and strong empirical performance. In this paper, we present...  
URL: https://arxiv.org/abs/2502.20392

**10. A Multiple Transferable Neural Network Method with Domain Decomposition for Elliptic Interface Problems**  
作者: Tianzheng Lu,Lili Ju,Liyong Zhu  
摘要: The transferable neural network (TransNet) is a two-layer shallow neural network with pre-determined and uniformly distributed neurons in the hidden layer, and the least-squares solvers can be particu...  
URL: https://arxiv.org/abs/2502.19893

## cs.MS (数学软件)

**1. Armadillo: An Efficient Framework for Numerical Linear Algebra**  
作者: Conrad Sanderson,Ryan Curtin  
摘要: A major challenge in the deployment of scientific software solutions is the adaptation of research prototypes to production-grade code. While high-level languages like MATLAB are useful for rapid prot...  
URL: https://arxiv.org/abs/2502.03000

## physics.chem-ph (化学物理)

**1. Retro-Rank-In: A Ranking-Based Approach for Inorganic Materials Synthesis Planning**  
作者: Thorben Prein,Elton Pan,Sami Haddouti,Marco Lorenz,Janik Jehkul,Tymoteusz Wilk,Cansu Moran,Menelaos Panagiotis Fotiadis,Artur P. Toshev,Elsa Olivetti,Jennifer L. M. Rupp  
摘要: Retrosynthesis strategically plans the synthesis of a chemical target compound from simpler, readily available precursor compounds. This process is critical for synthesizing novel inorganic materials,...  
URL: https://arxiv.org/abs/2502.04289

**2. Machine-Learning Interatomic Potentials for Long-Range Systems**  
作者: Yajie Ji,Jiuyang Liang,Zhenli Xu  
摘要: Machine-learning interatomic potentials have emerged as a revolutionary class of force-field models in molecular simulations, delivering quantum-mechanical accuracy at a fraction of the computational ...  
URL: https://arxiv.org/abs/2502.04668

## gr-qc (广义相对论和量子宇宙学)

**1. Weyl symmetry of the gradient-flow in information geometry**  
作者: Tatsuaki Wada,Sousuke Noda  
摘要: We have revisited the gradient-flow in information geometry from the perspective of Weyl symmetry. The gradient-flow equations are derived from the proposed action which is invariant under the Weyl's ...  
URL: https://arxiv.org/abs/2502.03866

## math.LO (逻辑)

**1. First-Order Intuitionistic Linear Logic and Hypergraph Languages**  
作者: Tikhon Pshenitsyn  
摘要: The Lambek calculus is a substructural logic known to be closely related to the formal language theory: on the one hand, it is used for generating formal languages by means of categorial grammars and,...  
URL: https://arxiv.org/abs/2502.05816

## stat.CO (计算)

**1. Predictive Coresets**  
作者: Bernardo Flores  
摘要: Modern data analysis often involves massive datasets with hundreds of thousands of observations, making traditional inference algorithms computationally prohibitive. Coresets are selection methods des...  
URL: https://arxiv.org/abs/2502.05725

**2. Case for a unified surrogate modelling framework in the age of AI**  
作者: Elizaveta Semenova  
摘要: Surrogate models are widely used in natural sciences, engineering, and machine learning to approximate complex systems and reduce computational costs. However, the current landscape lacks standardisat...  
URL: https://arxiv.org/abs/2502.06753

**3. Optimality in importance sampling: a gentle survey**  
作者: Fernando Llorente,Luca Martino  
摘要: The performance of the Monte Carlo sampling methods relies on the crucial choice of a proposal density. The notion of optimality is fundamental to design suitable adaptive procedures of the proposal d...  
URL: https://arxiv.org/abs/2502.07396

## hep-lat (高能物理-晶格)

**1. Physics-Conditioned Diffusion Models for Lattice Gauge Theory**  
作者: Qianteng Zhu,Gert Aarts,Wei Wang,Kai Zhou,Lingxiao Wang  
摘要: We develop diffusion models for simulating lattice gauge theories, where stochastic quantization is explicitly incorporated as a physical condition for sampling. We demonstrate the applicability of th...  
URL: https://arxiv.org/abs/2502.05504

## cs.OS (操作系统)

**1. XPUTimer: Anomaly Diagnostics for Divergent LLM Training in GPU Clusters of Thousand-Plus Scale**  
作者: Weihao Cui,Ji Zhang,Han Zhao,Chao Liu,Wenhao Zhang,Jian Sha,Quan Chen,Bingsheng He,Minyi Guo  
摘要: The rapid proliferation of large language models has driven the need for efficient GPU training clusters. However, ensuring high-performance training in these clusters is challenging due to the comple...  
URL: https://arxiv.org/abs/2502.05413

## astro-ph.SR (太阳和恒星天体物理学)

**1. Deep Generative model that uses physical quantities to generate and retrieve solar magnetic active regions**  
作者: Subhamoy Chatterjee,Andres Munoz-Jaramillo,Anna Malanushenko  
摘要: Deep generative models have shown immense potential in generating unseen data that has properties of real data. These models learn complex data-generating distributions starting from a smaller set of ...  
URL: https://arxiv.org/abs/2502.05351

**2. A Machine Learning-Ready Data Processing Tool for Near Real-Time Forecasting**  
作者: Maher A Dayeh,Michael J Starkey,Subhamoy Chatterjee,Heather Elliott,Samuel Hart,Kimberly Moreland  
摘要: Space weather forecasting is critical for mitigating radiation risks in space exploration and protecting Earth-based technologies from geomagnetic disturbances. This paper presents the development of ...  
URL: https://arxiv.org/abs/2502.08555

## q-fin.ST (统计金融)

**1. FactorGCL: A Hypergraph-Based Factor Model with Temporal Residual Contrastive Learning for Stock Returns Prediction**  
作者: Yitong Duan,Weiran Wang,Jian Li  
摘要: As a fundamental method in economics and finance, the factor model has been extensively utilized in quantitative investment. In recent years, there has been a paradigm shift from traditional linear mo...  
URL: https://arxiv.org/abs/2502.05218

**2. Regression and Forecasting of U.S. Stock Returns Based on LSTM**  
作者: Shicheng Zhou,Zizhou Zhang,Rong Zhang,Yuchen Yin,Chia Hong Chang,Qinyan Shen  
摘要: This paper analyses the investment returns of three stock sectors, Manuf, Hitec, and Other, in the U.S. stock market, based on the Fama-French three-factor model, the Carhart four-factor model, and th...  
URL: https://arxiv.org/abs/2502.05210

**3. Multimodal Stock Price Prediction**  
作者: Furkan Karadaş,Bahaeddin Eravcı,Ahmet Murat Özbayoğlu  
摘要: In an era where financial markets are heavily influenced by many static and dynamic factors, it has become increasingly critical to carefully integrate diverse data sources with machine learning for a...  
URL: https://arxiv.org/abs/2502.05186

**4. Quantifying Cryptocurrency Unpredictability: A Comprehensive Study of Complexity and Forecasting**  
作者: Francesco Puoti,Fabrizio Pittorino,Manuel Roveri  
摘要: This paper offers a thorough examination of the univariate predictability in cryptocurrency time-series. By exploiting a combination of complexity measure and model predictions we explore the cryptocu...  
URL: https://arxiv.org/abs/2502.09079

**5. Deep Learning for VWAP Execution in Crypto Markets: Beyond the Volume Curve**  
作者: Remi Genet  
摘要: Volume-Weighted Average Price (VWAP) is arguably the most prevalent benchmark for trade execution as it provides an unbiased standard for comparing performance across market participants. However, ach...  
URL: https://arxiv.org/abs/2502.13722

**6. Multi-Agent Stock Prediction Systems: Machine Learning Models, Simulations, and Real-Time Trading Strategies**  
作者: Daksh Dave,Gauransh Sawhney,Vikhyat Chauhan  
摘要: This paper presents a comprehensive study on stock price prediction, leveragingadvanced machine learning (ML) and deep learning (DL) techniques to improve financial forecasting accuracy. The research ...  
URL: https://arxiv.org/abs/2502.15853

## math.CO (组合学)

**1. Advancing Geometry with AI: Multi-agent Generation of Polytopes**  
作者: Grzegorz Swirszcz,Adam Zsolt Wagner,Geordie Williamson,Sam Blackwell,Bogdan Georgiev,Alex Davies,Ali Eslami,Sebastien Racaniere,Theophane Weber,Pushmeet Kohli  
摘要: Polytopes are one of the most primitive concepts underlying geometry. Discovery and study of polytopes with complex structures provides a means of advancing scientific knowledge. Construction of polyt...  
URL: https://arxiv.org/abs/2502.05199

## hep-th (高能物理 - 理论)

**1. Refining Integration-by-Parts Reduction of Feynman Integrals with Machine Learning**  
作者: Matt von Hippel,Matthias Wilhelm  
摘要: Integration-by-parts reductions of Feynman integrals pose a frequent bottle-neck in state-of-the-art calculations in theoretical particle and gravitational-wave physics, and rely on heuristic approach...  
URL: https://arxiv.org/abs/2502.05121

## math.PR (可能性)

**1. Noise Sensitivity of Hierarchical Functions and Deep Learning Lower Bounds in General Product Measures**  
作者: Rupert Li,Elchanan Mossel  
摘要: Recent works explore deep learning's success by examining functions or data with hierarchical structure. Complementarily, research on gradient descent performance for deep nets has shown that noise se...  
URL: https://arxiv.org/abs/2502.05073

**2. Tight Bounds on the Binomial CDF, and the Minimum of i.i.d Binomials, in terms of KL-Divergence**  
作者: Xiaohan Zhu,Mesrob I. Ohannessian,Nathan Srebro  
摘要: We provide finite sample upper and lower bounds on the Binomial tail probability which are a direct application of Sanov's theorem. We then use these to obtain high probability upper and lower bounds ...  
URL: https://arxiv.org/abs/2502.18611

## cond-mat.soft (软凝聚态物质)

**1. On the use of neural networks for the structural characterization of polymeric porous materials**  
作者: Jorge Torre,Suset Barroso-Solares,M. A. Rodríguez-Pérez,Javier Pinto  
摘要: The structural characterization is an essential task in the study of porous materials. To achieve reliable results, it requires to evaluate images with hundreds of pores. Current methods require large...  
URL: https://arxiv.org/abs/2502.07076

## physics.ins-det (仪器仪表和探测器)

**1. DiffNMR3: Advancing NMR Resolution Beyond Instrumental Limits**  
作者: Sen Yan,Etienne Goffinet,Fabrizio Gabellieri,Ryan Young,Lydia Gkoura,Laurence Jennings,Filippo Castiglione,Thomas Launey  
摘要: Nuclear Magnetic Resonance (NMR) spectroscopy is a crucial analytical technique used for molecular structure elucidation, with applications spanning chemistry, biology, materials science, and medicine...  
URL: https://arxiv.org/abs/2502.06845

**2. Rethinking Timing Residuals: Advancing PET Detectors with Explicit TOF Corrections**  
作者: Stephan Naunheim,Luis Lopes de Paiva,Vanessa Nadig,Yannick Kuhl,Stefan Gundacker,Florian Mueller,Volkmar Schulz  
摘要: PET is a functional imaging method that visualizes metabolic processes. TOF information can be derived from coincident detector signals and incorporated into image reconstruction to enhance the SNR. P...  
URL: https://arxiv.org/abs/2502.07630

**3. FPGA-Accelerated SpeckleNN with SNL for Real-time X-ray Single-Particle Imaging**  
作者: Abhilasha Dave,Cong Wang,James Russell,Ryan Herbst,Jana Thayer  
摘要: We implement a specialized version of our SpeckleNN model for real-time speckle pattern classification in X-ray Single-Particle Imaging (SPI) using the SLAC Neural Network Library (SNL) on an FPGA. Th...  
URL: https://arxiv.org/abs/2502.19734

**4. Reservoir Computing and Photoelectrochemical Sensors: A Marriage of Convenience**  
作者: Gisya Abdi,Lulu Alluhaibi,Ewelina Kowalewska,Tomasz Mazur,Krzysztof Mech,Agnieszka Podborska,Andrzej Sławek,Hirofumi Tanaka,Konrad Szaciłowski  
摘要: Sensing technology is an important aspect of information processing. Current development in artificial intelligence systems (especially those aimed at medical and environmental applications) requires ...  
URL: https://arxiv.org/abs/2502.20342

## econ.TH (理论经济学)

**1. NDAI Agreements**  
作者: Matthew Stephenson,Andrew Miller,Xyn Sun,Bhargav Annem,Rohan Parikh  
摘要: We study a fundamental challenge in the economics of innovation: an inventor must reveal details of a new idea to secure compensation or funding, yet such disclosure risks expropriation. We present a ...  
URL: https://arxiv.org/abs/2502.07924

## physics.plasm-ph (等离子体物理)

**1. 5D Neural Surrogates for Nonlinear Gyrokinetic Simulations of Plasma Turbulence**  
作者: Gianluca Galletti,Fabian Paischer,Paul Setinek,William Hornsby,Lorenzo Zanisi,Naomi Carey,Stanislas Pamela,Johannes Brandstetter  
摘要: Nuclear fusion plays a pivotal role in the quest for reliable and sustainable energy production. A major roadblock to achieving commercially viable fusion power is understanding plasma turbulence, whi...  
URL: https://arxiv.org/abs/2502.07469

**2. Multiscale autonomous forecasting of plasma systems' dynamics using neural networks**  
作者: Farbod Faraji,Maryam Reza  
摘要: Plasma systems exhibit complex multiscale dynamics, resolving which poses significant challenges for conventional numerical simulations. Machine learning (ML) offers an alternative by learning data-dr...  
URL: https://arxiv.org/abs/2502.11203

## math.HO (历史与概述)

**1. Mathematical Data Science**  
作者: Michael R. Douglas,Kyu-Hwan Lee  
摘要: Can machine learning help discover new mathematical structures? In this article we discuss an approach to doing this which one can call "mathematical data science". In this paradigm, one studies mathe...  
URL: https://arxiv.org/abs/2502.08620

## hep-ph (高能物理-现象学)

**1. Communicating Likelihoods with Normalising Flows**  
作者: Jack Y. Araz,Anja Beck,Méril Reboud,Michael Spannowsky,Danny van Dyk  
摘要: We present a machine-learning-based workflow to model an unbinned likelihood from its samples. A key advancement over existing approaches is the validation of the learned likelihood using rigorous sta...  
URL: https://arxiv.org/abs/2502.09494

**2. Enhancing anomaly detection with topology-aware autoencoders**  
作者: Vishal S. Ngairangbam,Błażej Rozwoda,Kazuki Sakurai,Michael Spannowsky  
摘要: Anomaly detection in high-energy physics is essential for identifying new physics beyond the Standard Model. Autoencoders provide a signal-agnostic approach but are limited by the topology of their la...  
URL: https://arxiv.org/abs/2502.10163

**3. Unraveling particle dark matter with Physics-Informed Neural Networks**  
作者: M. P. Bento,H. B. Câmara,J. F. Seabra  
摘要: We parametrically solve the Boltzmann equations governing freeze-in dark matter (DM) in alternative cosmologies with Physics-Informed Neural Networks (PINNs), a mesh-free method. Through inverse PINNs...  
URL: https://arxiv.org/abs/2502.17597

## math.NT (数论)

**1. Learning Euler Factors of Elliptic Curves**  
作者: Angelica Babei,François Charton,Edgar Costa,Xiaoyu Huang,Kyu-Hwan Lee,David Lowry-Duda,Ashvni Narayanan,Alexey Pozdnyakov  
摘要: We apply transformer models and feedforward neural networks to predict Frobenius traces $a\_p$ from elliptic curves given other traces $a\_q$. We train further models to predict $a\_p \bmod 2$ from $a\_q ...  
URL: https://arxiv.org/abs/2502.10357

**2. Studying number theory with deep learning: a case study with the Möbius and squarefree indicator functions**  
作者: David Lowry-Duda  
摘要: Building on work of Charton, we train small transformer models to calculate the Möbius function $μ(n)$ and the squarefree indicator function $μ^2(n)$. The models attain nontrivial predictive power. We...  
URL: https://arxiv.org/abs/2502.10335

## q-bio.OT (其他定量生物学)

**1. Strategic priorities for transformative progress in advancing biology with proteomics and artificial intelligence**  
作者: Yingying Sun,Jun A,Zhiwei Liu,Rui Sun,Liujia Qian,Samuel H. Payne,Wout Bittremieux,Markus Ralser,Chen Li,Yi Chen,Zhen Dong,Yasset Perez-Riverol,Asif Khan,Chris Sander,Ruedi Aebersold,Juan Antonio Vizcaíno,Jonathan R Krieger,Jianhua Yao,Han Wen,Linfeng Zhang,Yunping Zhu,Yue Xuan,Benjamin Boyang Sun,Liang Qiao,Henning Hermjakob, et al. (37 additional authors not shown)  
摘要: Artificial intelligence (AI) is transforming scientific research, including proteomics. Advances in mass spectrometry (MS)-based proteomics data quality, diversity, and scale, combined with groundbrea...  
URL: https://arxiv.org/abs/2502.15867

## nlin.CD (混沌动力学)

**1. A Fokker-Planck-Based Loss Function that Bridges Dynamics with Density Estimation**  
作者: Zhixin Lu,Łukasz Kuśmierz,Stefan Mihalas  
摘要: We have derived a novel loss function from the Fokker-Planck equation that links dynamical system models with their probability density functions, demonstrating its utility in model identification and...  
URL: https://arxiv.org/abs/2502.17690

## math.GT (几何拓扑)

**1. Colored Jones Polynomials and the Volume Conjecture**  
作者: Mark Hughes,Vishnu Jejjala,P. Ramadevi,Pratik Roy,Vivek Kumar Singh  
摘要: Using the vertex model approach for braid representations, we compute polynomials for spin-1 placed on hyperbolic knots up to 15 crossings. These polynomials are referred to as 3-colored Jones polynom...  
URL: https://arxiv.org/abs/2502.18575

## astro-ph.GA (星系天体物理学)

**1. Shared Stochastic Gaussian Process Latent Variable Models: A Multi-modal Generative Model for Quasar Spectra**  
作者: Vidhi Lalchand,Anna-Christina Eilers  
摘要: This work proposes a scalable probabilistic latent variable model based on Gaussian processes (Lawrence, 2004) in the context of multiple observation spaces. We focus on an application in astrophysics...  
URL: https://arxiv.org/abs/2502.19824

## nucl-th (核理论)

**1. Global Framework for Simultaneous Emulation Across the Nuclear Landscape**  
作者: Antoine Belley,Jose M. Munoz,Ronald F. Garcia Ruiz  
摘要: We introduce a hierarchical framework that combines ab initio many-body calculations with a Bayesian neural network, developing emulators capable of accurately predicting nuclear properties across the...  
URL: https://arxiv.org/abs/2502.20363