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Request: Climate-resilient urban infrastructure design using AI and remote sensing technologies

Summary

The topic of "Climate-resilient urban infrastructure design using AI and remote sensing technologies" is a burgeoning field that leverages advanced technologies to address the challenges posed by climate change in urban environments. Several key papers contribute significantly to this area: 1. ****SAM4D: Segment Anything in Camera and LiDAR Streams**** - This paper introduces SAM4D, a multi-modal and temporal foundation model that facilitates promptable segmentation across camera and LiDAR streams. By aligning camera and LiDAR features in a shared 3D space, SAM4D enhances cross-modal interaction and temporal consistency, which is crucial for monitoring and managing urban infrastructure in real-time. The use of ego-motion compensation further supports long-horizon feature retrieval, making it a valuable tool for urban planning and resilience. 2. **A Hybrid Modeling Framework for High-Resolution Humid Heat Mapping in Metropolitan Wuhan** - This study addresses the thermal risks in urban areas exacerbated by global warming and urbanization. By integrating physical simulations with deep learning, the research provides high-resolution heat maps that can inform the design of climate-resilient infrastructure. The focus on Wuhan's unique urban landscape highlights the importance of tailored solutions in different urban contexts. 3. ****Intelligent Drainage Cleaning And Monitoring System**** - This project

proposes an IoT-based system for real-time drainage management to mitigate urban flooding. By integrating sensors and machine learning algorithms, the system can identify blockages and monitor water levels, ensuring efficient drainage management. This approach is critical for developing infrastructure that can withstand extreme weather events. 4. ****Leveraging the Internet of Things, Remote Sensing, and Artificial Intelligence for Sustainable Forest Management**** - Although focused on forest management, this paper's exploration of IoT, remote sensing, and AI technologies is directly applicable to urban infrastructure. These technologies can be used to monitor urban green spaces, assess environmental impacts, and support sustainable urban planning. 5. ****Advancing Environmental Monitoring through AI: Applications of R and Python**** - This paper discusses the integration of AI with programming languages like Python and R to enhance environmental monitoring. The ability to automate data analysis and improve communication among stakeholders is crucial for timely decision-making in urban infrastructure management, particularly in the context of climate resilience. These papers collectively highlight the potential of AI and remote sensing technologies to transform urban infrastructure design, making cities more resilient to climate change. By leveraging these advanced tools, urban planners and policymakers can develop more sustainable and adaptive urban environments.

Relevant Articles

1. Whole-Body Conditioned Egocentric Video Prediction

Date: 2025-06-26

Abstract: We train models to Predict Ego-centric Video from human Actions (PEVA), given the past video and an action represented by the relative 3D body pose. By conditioning on kinematic pose trajectories, structured by the joint hierarchy of the body, our model learns to simulate how physical human actions shape the environment from a first-person point of view. We train an auto-regressive conditional diffusion transformer on Nymeria, a large-scale dataset of real-world egocentric video and body pose ca...

2. SAM4D: Segment Anything in Camera and LiDAR Streams

Date: 2025-06-26

Abstract: We present SAM4D, a multi-modal and temporal foundation model designed for promptable segmentation across camera and LiDAR streams. Unified Multi-modal Positional Encoding (UMPE) is introduced to align camera and LiDAR features in a shared 3D space, enabling seamless cross-modal prompting and interaction. Additionally, we propose Motion-aware Cross-modal Memory Attention (MCMA), which leverages ego-motion compensation to enhance temporal consistency and long-horizon feature retrieval, ensuring r...

3. HalluSegBench: Counterfactual Visual Reasoning for Segmentation Hallucination Evaluation

Date: 2025-06-26

Source: arXiv

URL: http://arxiv.org/abs/2506.21546v1

Abstract: Recent progress in vision-language segmentation has significantly advanced grounded visual understanding. However, these models often exhibit hallucinations by producing segmentation masks for objects not grounded in the image content or by incorrectly labeling irrelevant regions. Existing evaluation protocols for segmentation hallucination primarily focus on label or textual hallucinations without manipulating the visual context, limiting their capacity to diagnose critical failures. In respons...

4. Data Efficacy for Language Model Training

Date: 2025-06-26

Source: arXiv

URL: http://arxiv.org/abs/2506.21545v1

Abstract: Data is fundamental to the training of language models (LM). Recent research has been dedicated to data efficiency, which aims to maximize performance by selecting a minimal or optimal subset of training data. Techniques such as data filtering, sampling, and selection play a crucial role in this area. To complement it, we define

Data Efficacy, which focuses on maximizing performance by optimizing the organization of training data and remains relatively underexplored. This work introduces a gener...

5. StruMamba3D: Exploring Structural Mamba for Self-supervised Point Cloud Representation Learning

Date: 2025-06-26

Source: arXiv

URL: http://arxiv.org/abs/2506.21541v1

Abstract: Recently, Mamba-based methods have demonstrated impressive performance in point cloud representation learning by leveraging State Space Model (SSM) with the efficient context modeling ability and linear complexity. However, these methods still face two key issues that limit the potential of SSM: Destroying the adjacency of 3D points during SSM processing and failing to retain long-sequence memory as the input length increases in downstream tasks. To address these issues, we propose StruMamba3D, ...

6. PsyLite Technical Report

Date: 2025-06-26

Source: arXiv

URL: http://arxiv.org/abs/2506.21536v1

Abstract: With the rapid development of digital technology, AI-driven psychological counseling has gradually become an important research direction in the field of mental health. However, existing models still have deficiencies in dialogue safety, detailed scenario handling, and lightweight deployment. To address these issues, this study proposes PsyLite, a lightweight psychological counseling large language model agent developed based on the base model InternLM2.5-7B-chat. Through a two-stage training st...

7. Exploring the Design Space of 3D MLLMs for CT Report Generation

Date: 2025-06-26

Source: arXiv

URL: http://arxiv.org/abs/2506.21535v1

Abstract: Multimodal Large Language Models (MLLMs) have emerged as a promising way to automate Radiology Report Generation (RRG). In this work, we systematically investigate the design space of 3D MLLMs, including visual input representation, projectors, Large Language Models (LLMs), and fine-tuning techniques for 3D CT report generation. We also introduce two knowledge-based report augmentation methods that improve performance on the GREEN score by up to 10\%, achieving the 2nd place on the MICCAI 2024 A...

8. "What's Up, Doc?": Analyzing How Users Seek Health Information in Large-Scale Conversational AI Datasets

Date: 2025-06-26

Source: arXiv

URL: http://arxiv.org/abs/2506.21532v1

Abstract: People are increasingly seeking healthcare information from large language models (LLMs) via interactive chatbots, yet the nature and inherent risks of these conversations remain largely unexplored. In this paper, we filter large-scale conversational AI datasets to achieve HealthChat-11K, a curated dataset of 11K real-world conversations composed of 25K user messages. We use HealthChat-11K and a clinician-driven taxonomy for how users interact with LLMs when seeking healthcare information in ord...

9. Detectability and Parameter Estimation for Einstein Telescope Configurations with GWJulia

Date: 2025-06-26

Source: arXiv

URL: http://arxiv.org/abs/2506.21530v1

Abstract: Future gravitational-wave (GW) detectors are expected to detect tens of thousands of compact binary coalescences (CBC) per year, depending also on the final

detectors layout. For this reason, it is essential to have a fast, reliable tool for forecasting how different detector layouts will affect parameter estimation for these events. The Fisher Information Matrix (FIM) is a common tool for tackling this problem. In this paper, we present a new open source code GWJulia to perform FIM analysis of ...

10. WAFT: Warping-Alone Field Transforms for Optical Flow

Date: 2025-06-26

Source: arXiv

URL: http://arxiv.org/abs/2506.21526v1

Abstract: We introduce Warping-Alone Field Transforms (WAFT), a simple and effective method for optical flow. WAFT is similar to RAFT but replaces cost volume with high-resolution warping, achieving better accuracy with lower memory cost. This design challenges the conventional wisdom that constructing cost volumes is necessary for strong performance. WAFT is a simple and flexible meta-architecture with minimal inductive biases and reliance on custom designs. Compared with existing methods, WAFT ranks 1st...

11. A Hybrid Modeling Framework for High-Resolution Humid Heat Mapping in Metropolitan Wuhan: Integrating Physical Simulations and Deep Learning

Date: 2025-05-21

Source: OpenAlex

DOI: https://doi.org/10.5194/icuc12-201

URL: https://openalex.org/W4410558407

Abstract: Under the dual challenges of global warming and rapid urbanization, Wuhan faces escalating thermal risks exacerbated by frequent heatwaves and intensified urban heat island effects. The city's distinctive land use land cover configuration with hundreds of lakes in a basin creates a self-reinforcing thermal trap: extensive water networks elevate humidity through evaporation, while vertical urban canyons restrict ventilation and prolong heat and moisture retention. This study develops an innovativ...

12. Digital economy and agricultural development: An analysis on BIMSTEC countries

Date: 2025-01-24

Source: OpenAlex

DOI: https://doi.org/10.24294/jipd10786

URL: https://openalex.org/W4406743543

Abstract: This research explores the role of digital economy in driving agricultural development in the BIMSTEC region, which includes Thailand, Myanmar, Sri Lanka, Nepal, India, Bangladesh and Bhutan (with Bhutan excluded due to data limitations) with a particular focus on mobile technologies, computing capacity and internet connectivity which were the most readily available data points for BIMSTEC. Using a combination of document analysis, and panel data analysis with the data covering 10 years (2012–20...

13. Digital Revolution in Agriculture: Using Predictive Models to Enhance Agricultural Performance Through Digital Technology

Date: 2025-01-24

Source: OpenAlex

DOI: https://doi.org/10.3390/agriculture15030258

URL: https://openalex.org/W4406797954

Abstract: Digital innovation in agriculture has become a powerful force in the modern world as it revolutionizes the agricultural sector and improves the sustainability and efficacy of farming practices. In this context, the study examines the effects of digital technology, as reflected by the digital economy and society index (DESI), on key agricultural performance metrics, including agricultural output and real labor productivity per person. The paper develops a strong analytical method for quantifying ...

14. A Thriving Future through Diversity, Equity, and Inclusion for Resilient and Innovative Communities

Date: 2025-01-23

Source: OpenAlex

DOI: https://doi.org/10.5772/intechopen.1008368

URL: https://openalex.org/W4406736876

Abstract: This study explores the critical role of Diversity, Equity, and Inclusion (DEI) in sustainable development, emphasising reducing poverty. Through a systematic literature review, we analyse scholarly perspectives, policy discussions, and case studies from various sectors, including project management, labour markets, women's entrepreneurship, and sustainable agriculture. Our findings show that DEI strengthens stakeholder engagement, promotes inclusive decision-making, and empowers disadvantaged p...

15. Intelligent Drainage Cleaning And Monitoring System

Date: 2025-01-22

Source: OpenAlex

DOI: https://doi.org/10.36948/ijfmr.2025.v07i01.35626

URL: https://openalex.org/W4406783664

Abstract: In this developing era, the development leads to the rapid increase in the production of waste in our Nation.

This results in the occurrence of clogs, which may lead to many problems like pandemics, floods, etc. This project proposes a novel real-time and IoT-based intelligent drainage cleaning and monitoring system to mitigate urban flooding and ensure efficient Drainage management. This integrates sensors, IoT devices, and machine learning algorithms that identify blockages, track water levels...

16. Comparative study of multivariate hybrid neural networks for global sea level prediction through 2050

Date: 2025-01-21

Source: OpenAlex

DOI: https://doi.org/10.1007/s12665-025-12090-x

URL: https://openalex.org/W4406639530

Abstract: ...

17. Advancing Environmental Monitoring through AI: Applications of R and Python

Date: 2025-01-20

Source: OpenAlex

DOI: https://doi.org/10.5772/intechopen.1007683

URL: https://openalex.org/W4406763696

Abstract: The integration of Large Language Models (LLMs), artificial intelligence (AI), and programming languages such as Python and R has revolutionized environmental monitoring. These technologies enhance data analysis, automate reporting, and improve communication among stakeholders, enabling more informed and timely decision-making. AI-driven tools facilitate a wide range of environmental monitoring activities, including pollution tracking, species conservation, and climate change analysis, by increa...

18. Impact on sales of basic items during the Covid-19 pandemic in local supply chain

Date: 2025-01-20

Source: OpenAlex

DOI: https://doi.org/10.54033/cadpedv22n1-192

URL: https://openalex.org/W4406656435

Abstract: The Covid 19 pandemic caused global social, economic, and political impacts, including significant changes in the sales of consumer goods, the focus of this study. Using data from a food product distributor, the study analyzed the sales volume of industries before and during the pandemic. Companies with different profiles were selected to contrast realities. Semistructured interviews with industry representatives, the distributor, and final customers revealed how the pandemic period affected con...

19. Leveraging the Internet of Things, Remote Sensing, and Artificial Intelligence for Sustainable Forest Management

Date: 2025-01-17

Source: OpenAlex

DOI: https://doi.org/10.58496/bjiot/2025/001

URL: https://openalex.org/W4406583498

Abstract: Sustainable forest management is vital for addressing climate change, biodiversity loss, and deforestation. Human-induced stresses on forest ecosystems demand innovative approaches to ensure long-term health and productivity. This study explores how cutting-edge technologies, including the Internet of Things (IoT), remote sensing, and artificial intelligence (AI), enhance sustainable forest management practices. Researchers reviewed 196 studies published between 2021 and 2024 from IEEE Xplore Di...

20. A Survey of Blockchain Applications for Management in Agriculture and Livestock Internet of Things

Date: 2025-01-17

Source: OpenAlex

DOI: https://doi.org/10.3390/fi17010040

URL: https://openalex.org/W4406526139

Abstract: In the area of agriculture and livestock management, the integration of the Internet of Things (IoT) has emerged as a groundbreaking strategy to enhance operational efficiency and advance intelligent process management. However, this sector faces significant challenges, including ambiguity in product origins and limited regulatory oversight of IoT devices. This paper explores the innovative integration of blockchain technology within the agricultural and livestock IoT, highlighting how this conv...