ARTIFICIAL INTELLIGENCE CLUB

AIC

NEWSLETTER

AI RESEARCH

Dive into the world of the latest AI research

INDUSTRY NEWS

Viral news and innovations in the AI industry

STUDENT EXPERIENCE

Hear from fellow students who have been working with AI at any capacity

Hi there! I'm Nexie, your new friendly neighborhood mascot of the AIC Newsletter. My circuits are buzzing with excitement as we explore the limitless potential of AI together. So buckle up, let's unlock the future of AI, one byte at a time!

Newsletter Managers: **Ali Savab Pour, Bilal Melethil, Jennifer Ebose, Saira Fatima**

Designed by: **Ali Savab Pour, Hira Asad, Rojina Dayhimi**

NEXT-SCALE: AI LEARNS TO SKETCH BEFORE SHADING

Artificial Intelligence has revolutionized various fields, with image generation being one of the most impressive areas –almost like giving machines the ability to draw from imagination. This is where Visual Autoregressive Modeling (VAR) comes into play. Let's break down this concept and explore it in a way that's easy to understand.

(c) VAR: Image generation by **next-scale (or next-resolution)** prediction
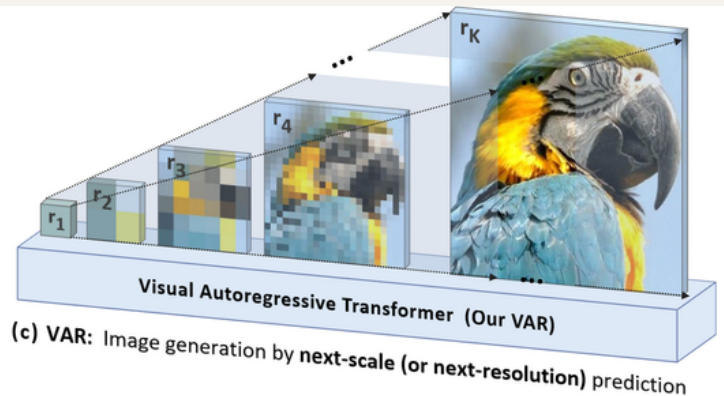
What is Visual Autoregressive Modeling (VAR)?

Before learning about VAR, let's understand the term "autoregressive." In simple terms, autoregressive models predict future values based on past and present data. For example, when predicting the next word in a sentence, an autoregressive model considers the preceding words.

Visual Autoregressive Modeling (VAR) extends this idea to images. It involves generating images by predicting each pixel based on the pixels that come before it. This approach treats image generation as a sequence of predictions, much like predicting the next word in a sentence.

In traditional VAR methods, images are processed at a single scale, meaning the model looks at the entire image at once. However, this can be computationally intensive and limit scalability. The research paper *"Visual Autoregressive Modeling: Scalable Image Generation via Next-Scale Prediction"* by Keyu Tian, Yi Jiang, Zehuan Yuan, Bingyue Peng, and Liwei Wang introduces a better approach to address this.

Main Findings: Next-Scale Prediction for Scalable Image Generation

The core idea of this research is the Next-Scale Prediction method. Instead of generating images at a single scale, this approach breaks down the image into multiple scales, starting from a low-resolution version and progressively refining it to higher resolutions.

How Does Next-Scale Prediction Work?

1- Image Decomposition: Instead of generating an image all at once, the model breaks it down into multiple resolution scales—from a blurry, low-res version to a sharp, high-res version. Each scale represents a coarser or finer level of image detail.

2- Progressive Generation: The model starts by generating a very low-resolution version of the image. It then refines this base by predicting the next higher resolution, continuing this process scale by scale until the final, high-res image is complete.

3- Autoregressive Modeling: At each scale, the image is generated pixel by pixel using an autoregressive model, where each pixel is predicted based on the previously generated ones—but only within that scale

Why Next-Scale Prediction Outperforms Traditional AR

Traditional autoregressive (AR) models generate images by predicting each pixel sequentially in a fixed order—typically from left to right, top to bottom—without first capturing the overall structure, which creates sharp results but is painfully slow—especially for high-resolution images. Plus, they don't "see" the big picture first, jumping straight into pixel-level details.

Next-scale prediction solves this by starting with a low-res version of the image and then refining it, layer by layer. This means it first captures the overall structure, then adds details—just like an artist sketching before shading. It's faster, more efficient, and scales beautifully, all while keeping the quality and control of AR. It's AR, but way smarter and more practical.

Next-scale prediction makes image generation way faster — perfect for real-time VR scenes, detailed game textures, or medical imaging where speed and clarity matter. Unlike traditional AR, it doesn't get bogged down pixel by pixel, making it ideal for high-res tasks that demand both quality and quick results.

Citations:
Source: Keyu Tian, Bowen Zhang, Kangle Deng, Xiang Li, and Jianmin Bao, "Visual Autoregressive Modeling: Scalable Image Generation via Next-Scale Prediction," NeurIPS 2024.
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https://arxiv.org/abs/2404.02905

AI IN FINTECH

Artificial Intelligence has rapidly enhanced financial services, revolutionizing wealth management research and increasing efficiency. AI-powered solutions provide financial advisors with instant, curated insights, streamlining decision-making and optimizing investment performance. In fintech, AI's transformative potential, such as expanding credit access and delivering real-time financial advice, has the potential to generate billions in revenue for the global banking sector. Additionally, AI-driven fintech solutions enable customers to apply for loans, transfer funds, invest in cryptocurrency, and manage finances seamlessly from the comfort of their homes.

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What Is FinTech And How Does It Integrate AI?

Financial Technology, or FinTech, encompasses the services and products that facilitate the movement of money within the economy. It leverages digital tools, data, and automation to enhance efficiency and accelerate financial operations. Fintech also includes the software and applications that enable consumers to access financial services, such as budgeting tools, stock investment platforms, and mortgage application systems. This technology is integrated into APIs, mobile apps, and web-based services, allowing seamless financial transactions. As the financial industry undergoes digital transformation, fintech helps banks and institutions adapt to evolving technological advancements, with AI now playing a pivotal role in fintech automation. AI-driven solutions can assess risk, predict future market conditions, and optimize financial analysis. With the increasing adoption of AI, machine-learning algorithms are simplifying data analysis, enhancing decision-making, and revolutionizing financial services.

How Can It Be Used?

There are many different ways for artificial intelligence to be integrated with fintech software including the following:

Fraud detection: AI models and deep learning tools can identify patterns to spot fraudulent activities—analyzing transactions and monitoring spending habits from users. For example, AI can detect credit card fraud by identifying spending patterns that differ from a customer's usual behaviour.

Virtual assistants for financial services: AI-powered assistants use natural language processing to interact with customers through a chatbot interface, using user information and conversational AI to tailor a personalized support approach. These assistants respond to common questions and requests that customers may have, while introducing new services and recommendations to increase customer satisfaction.

Credit risk assessment and management: AI can analyze large amounts of data, and identify patterns that indicate potential risks. Financial organizations use AI for credit risk modelling to predict the likelihood that customers will repay loans, allowing financial institutions to make informed decisions and mitigate risks effectively.

Algorithmic trading and portfolio management: AI can provide insights into the change in market trends, exchange rates, or investments. It can use data analytics to account for the current state of financial markets, using social media, economic indicators, and financial data. By offering risk-versus-return calculations and financial advice, they can assist in portfolio management and automated trading.

VIBE CODING: THE FUTURE OF CODING?

Vibe coding, a term coined by Andrej Karpathy in 2025, refers to using AI to handle the technical aspects of coding, allowing developers to focus on logic and creativity. Tools like Cursor AI and Trae AI, powered by advanced LLMs, can generate complete software from simple prompts, making development faster and more accessible. While this innovation lowers the barrier for non-programmers and boosts efficiency, it also raises concerns about declining fundamental coding skills, security risks, and over-reliance on AI. While large companies may be cautious due to strict engineering standards, startups and solo developers could benefit greatly, reshaping the future of software development.

What is Vibe Coding?

Vibe coding is a term coined by Andrej Karpathy, a senior AI director at Tesla, in February 2025. He described it as "fully giving in to the vibes"—letting AI handle all the technical details while you focus on the bigger picture. Large language models (LLMs) are now so advanced that they can turn natural language prompts into fully functional apps and executable software. Tools like Cursor AI and Trae AI, powered by models like Sonnet 3.7, have gained popularity for generating complete software solutions with just a few prompts. Instead of spending hours debugging and writing syntax-heavy code, developers now act more as "AI copilots," focusing on logic, structure, and creativity while AI takes care of the grunt work.

Impact on Coding

Vibe coding is making software development more accessible than ever, allowing non-programmers to build apps with just a few prompts. For experienced developers, this means faster prototyping, fewer repetitive tasks, and more time spent on high-level problem-solving. However, relying too much on AI could lead to a decline in fundamental coding skills. If developers skip the learning process and rely entirely on AI-generated code, they might struggle to debug, optimize, or understand deeper software mechanics.

AI-generated code isn't foolproof. Poorly written prompts can lead to inefficient code, security risks, or even API key leaks. Less experienced users might unknowingly expose vulnerabilities, requiring skilled developers to step in and fix preventable issues. Instead of improving productivity, poorly implemented vibe coding could create more problems in the long run.

Will This Be the Future?

Vibe coding has the potential to reshape software development, but its adoption will depend on the organization. Large companies with strict engineering principles, security standards, and compliance requirements may be hesitant to fully embrace it. AI-generated software might struggle to meet enterprise-level maintainability and security needs without human oversight.

However, for startups and solo developers, vibe coding could be a game-changer. It lowers the technical barrier, allowing small teams to build functional software faster and with fewer resources. This shift could lead to a surge in innovation, where prompting AI effectively becomes just as important as coding skills. While traditional software development won't disappear, vibe coding might redefine what it means to be a developer—shifting the focus from writing code to directing AI to build smarter and more efficiently.

Author's Note

It's amazing how much AI can help in coding. I was scrolling through my timeline when I saw a solo developer build an entire SaaS product using Cursor and Sonnet—and it actually worked, generating revenue and running smoothly. That completely blew my mind. AI, if used correctly, has the potential to boost productivity, streamline development, and open doors for those without traditional coding expertise. While it's not a replacement for real engineering skills, it's an incredibly powerful tool that, when leveraged properly, can transform how we build software.

Citations:

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OpenAI and BNY Mellon Join Forces to Supercharge AI in Banking

Amongst steps to revolutionize the future of finance, the United States' oldest banking giant BNY Mellon partnered with OpenAI, the creators of chatgpt. Throughout the partnership, BNY plans to integrate ChatGPT Enterprise into its already established AI platform, Eliza. More than half of the bank's workforce is already leveraging Eliza for daily tasks. As such, the inclusion of OpenAI's resources allows for turbocharged customer service, productivity, and operational efficiency.

However, the implications of this development goes farther than just the streamlining process. This collaboration indicates a wider industry trend where several industry leading institutions harness AI for innovation, competitive advantage and growth rather than simply a support tool.

Ultimately, generative AI will transition from uses in tech labs directly into core banking functions. Clients can expect smarter, quicker, and more personalized service. Is this a tipping point for the adoption of AI in banking? The finance industry will be watching closely.

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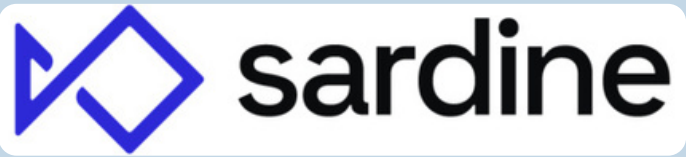
Image: https://www.businesswire.com/news/home/20250211169372/en/Sardine-AI-Raises-%2470M-to-Make-Fraud-and-Compliance-Teams-More-Productive

AI Battles Financial Fraud: Big Investments Promise a Safer Future

The rise of artificial intelligence over the past few years has also brought along an imposing amount of financial fraud. AI-generated advertisements or even short-form content has elevated to a level in which it can easily fool moderately tech savvy people.

This is especially prevalent in the cryptocurrency world, where Chainalysis, a blockchain analysis heavyweight, acquired Alterya. Alterya is making breakthroughs in the fraud detection and cybersecurity space, allowing it to stop fraud in real-time, notably in crypto transactions. Furthermore, Stardine has raised nearly $100 million to build advanced AI systems targeted at automating fraud prevention and compliance for banks.

These movements highlight a major shift happening in the finance industry: AI-driven solutions are just desirable, but rather necessary for securing your transactions and protecting your wallet.

Companies will begin to double down on AI, in which customers can expect smarter and safer financial services. A world where artificial intelligence can clock fraudulent activity before you even notice isn't that far away. It's happening right now.

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HEALTHCARE

Elea-vating Diagnostics with The Power of AI

Elea, a Hamburg-based startup founded in early 2024, is reshaping healthcare by modernizing pathology lab infrastructure with its AI-powered platform. Unlike many AI tools that layer onto existing systems, Elea fully replaces outdated software with a next-generation, cloud-based "AI operating system." By automating key processes, it eliminates inefficiencies that slow down traditional workflows, reducing report turnaround times from weeks to days. Its AI-driven speech-to-text transcription allows pathologists to dictate findings in real time, removing the need for manual note-taking. Task automation further accelerates operations by handling administrative processes such as data entry, report formatting, and result distribution, enabling faster diagnostics while minimizing human error. Elea's system integrates seamlessly with lab equipment and digital tools, ensuring minimal disruption during adoption. Accessible on iPad, Mac, and web, it allows clinicians to work more efficiently from any device. With $6.2 million in seed funding, Elea is advancing its technology to optimize lab workflows, from report generation to slide preparation. As Elea expands internationally, starting with the U.S., it aims to apply its AI-driven approach to other areas such as radiology and hospital operations, setting a new standard for efficiency, scalability, and security in medical technology.

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Image: https://www.pathreflab.com/pathology-definition-what-is-pathology/

Image: https://mpost.io/microsoft-introduces-dragon-copilot-ai-assistant-for-healthcare-to-automate-clinical-workflows/

Dragon Deez Voice Assistants Into Healthcare

Microsoft's Dragon Copilot is redefining clinical workflows with an AI-powered voice assistant designed to reduce administrative burdens for healthcare professionals. Unlike Elea, which focuses on automating lab infrastructure, Dragon Copilot improves real-time clinician interactions by transforming how medical documentation is handled. Instead of requiring doctors to manually type or dictate notes, the AI passively listens during patient visits, capturing conversations and converting them into structured, specialty-specific records. Fully integrated with Electronic Health Records, Dragon Copilot suggests relevant medical history and missing vital statistics, helping clinicians maintain comprehensive records effortlessly. Additionally, it automates routine tasks like order entry, after-visit summaries, and referral letters, cutting down on administrative workload. Beyond documentation, Dragon Copilot acts as an interactive medical assistant, allowing clinicians to ask questions in natural language and receive evidence-based responses with citations. Available across mobile, web, and desktop platforms, the tool is designed for flexibility, with built-in training resources for seamless adoption. Set to launch in the U.S. and Canada in May 2025, Dragon Copilot is poised for global expansion, helping clinicians work more efficiently while staying focused on patient care.

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INDUSTRY NEWS

EDUCATION

Lumi: AI Revolutionizing Education with Smart Learning Platforms

Lumi, a Berlin-based edtech startup founded in early 2024, is transforming the education sector with its AI-powered learning platform designed for schools and universities. By replacing outdated Learning Management Systems with an intuitive, AI-driven platform, Lumi streamlines curriculum planning, automates administrative tasks, and enhances personalized learning experiences. With AI-powered speech-to-text transcription, automated grading, and smart content recommendations, educators can reduce their workload while improving student engagement. Available on tablets, desktops, and web apps, Lumi seamlessly integrates into existing school infrastructures, allowing for an effortless transition to AI-enhanced education.

Backed by $8 million in "seed funding", Lumi is developing a cloud-based AI education hub that optimizes lesson planning, tracks student progress in real-time, and provides teachers with predictive insights to address learning gaps before they become problematic. Unlike traditional edtech solutions that layer AI onto existing tools, Lumi fully replaces legacy systems with an all-in-one, vertically integrated platform. D2L has begun integrating Lumi's technology into its Brightspace platform, further demonstrating its potential as a game-changer in the learning management space.

Prioritizing data security, Lumi ensures compliance with privacy regulations by anonymizing student information and safeguarding educational records. Looking ahead, Lumi plans to expand internationally, with a particular focus on the U.S. and Asia. As the company scales, it aims to bring its AI-driven efficiency beyond K-12 and higher education, targeting vocational training and corporate learning, ultimately shaping a smarter, more accessible education system.

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Image: https://www.sciencenews.org/article/chatgpt-ai-artificial-intelligence-education-cheating-accuracy

AI-Generated Content: The Future of Education or a Threat to Learning?

As AI tools continue to reshape education, a growing debate surrounds the use of AI-generated content, including videos, interactive lessons, and gamified learning experiences. Platforms such as Synthesia, DeepBrain AI, and EdAI are pioneering AI-generated educational content, allowing educators to create videos featuring AI-generated instructors or interactive simulations without the need for extensive resources. While these tools offer new possibilities for personalized and engaging learning, concerns persist regarding accuracy, bias, and the potential over-reliance on AI-generated materials.

AI-powered content creation tools can automate the development of course materials, transforming text-based lessons into immersive multimedia experiences. For example, Synthesia enables educators to produce AI-generated instructional videos featuring virtual teachers, while DeepBrain AI specializes in realistic AI avatars that can deliver lectures in multiple languages. Additionally, AI-driven game development platforms, such as EdAI, create adaptive learning games tailored to student needs, offering an interactive alternative to traditional lesson plans.

Despite their benefits, AI-generated content raises questions about educational credibility. Critics argue that automated content may propagate misinformation if not rigorously fact-checked. Additionally, over-reliance on AI-generated lessons might limit critical thinking and human interaction in classrooms. Educators must strike a balance between leveraging AI's efficiency and maintaining pedagogical integrity by fact-checking AI-generated materials and incorporating human-led discussions.

As AI-driven content creation tools evolve, they present both an opportunity and a challenge for modern education. While they have the potential to enhance accessibility and engagement, ensuring quality and reliability remains crucial. The future of AI in education may not be about replacing human educators but rather empowering them with tools that enhance, rather than replace, traditional teaching methods.

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STUDENT EXPRIENCE

AI FOR EDUCATION
ENHANCING LEARNING
THROUGH ADAPTIVE PUZZLES

MATTHEW MCCONNELL

Master's - Computer Science
Serious Games and AI Research Group

Overview:
The landscape of education has shifted, with COVID-19 disruptions and the rise of AI tools like ChatGPT leaving students struggling to learn effectively. As a tutor, Matthew witnessed how students increasingly relied on AI rather than honing problem-solving skills. Through his project, he aims to leverage AI to enhance learning, not replace it, starting with a puzzle game with procedural content generation and dynamic difficulty. This work lays the foundation for an educational system generating math and computer science problems and supports a PhD proposal on AI-enhanced curriculum development and AI-powered tutoring.

Development Platform: Unity Game Engine (C#)
Why Unity?
- Offers a user-friendly platform for gamification.
- Enables seamless integration of AI algorithms in a game-based environment.

Methodologies and Algorithms:
The system uses a genetic algorithm, which creates puzzles with customized difficulty levels and provides optimized solutions.
How does the genetic algorithm work?
1. Generates a set of random puzzles
2. Scores each puzzle based on difficulty
3. Selects the best-performing puzzles as "parents."
4. Combines (breeds) parents to create new child puzzles.
5. Applies small random changes (mutations) to children for variability.
6. Re-scores newly generated child puzzles using difficulty metrics.

Challenges:
One of the biggest challenges in developing the adaptive puzzle generator was ensuring puzzles were solvable. Initially, the team attempted to generate random puzzles and verify their solvability. However, as complexity increased (e.g., grids larger than 10x10), this approach became computationally impractical. Instead, they shifted strategies: first generating a valid solution and then strategically placing puzzle elements along the solution path. This ensures the puzzle maintains a specific difficulty level while appearing as if it was generated randomly.

Evaluation and Performance Metrics:
The AI-driven adaptive learning system will be evaluated based on a pilot study, pending ethics approval, to gather user feedback and assess individual system components. Key performance metrics include user engagement and satisfaction, puzzle difficulty accuracy, success rates, and the optimization efficiency of the genetic algorithm.

Ethical Considerations:
- **Fairness & Accessibility:** Preventing the widening of educational inequalities, between well-funded and underfunded schools, by ensuring that AI-based tools are accessible to all students regardless of their resources.
- **Algorithmic Bias:** Preventing biases in algorithmic decision-making that could disadvantage certain learners.
- **Preventing Reliance on AI:** Mitigating over-reliance on AI, which could diminish students' critical thinking skills by encouraging passive learning.
- **Human-Centered AI Integration:** Prioritizing ethical AI deployment by ensuring that the system enhances, rather than replaces, human educators, supporting a balanced and inclusive approach to AI-powered education.

This article was prepared for you by **Jennifer Ebose, Phone Myat Paing, and Muhtasim Ishmam**