

VGEC IT PRESENTS

# THE TECH TREASURE



Vishwakarma Government  
Engineering College  
Department of Information Technology

## EXPANDING REALITIES

VOLUME 05 - '24



## VISION

The department aims to nurture students to be IT professionals who are innovative and technically competent to meet the advancements in industrial and societal needs.

## MISSION

To produce technically competent and socially responsible graduates.

To develop well-equipped laboratories to gain practical exposure in IT practices.

To support research culture, consultancy work and enhancement of entrepreneurship skills.

To enhance industry linkage for good placements and real-world exposure.

To encourage, involve and support students for environmental and social wellbeing.

## PEOS

The graduate will be a competent professional with high-level technical proficiency in the field of Information Technology to identify problems and develop innovative solutions to meet the industrial needs.

The graduate will exhibit professionalism, teamwork, leadership skills, and lifelong learning .

The graduates will ethically apply their computing knowledge and skills considering societal, economic, and environmental factors.

The graduate will be intellectually competent to pursue higher education and conduct research-oriented activities

## PSOS

Demonstrate proficiency in one of the emerging Technology like Data Science, Machine Learning, and Web/Mobile Application Development.

Demonstrate skills to design, develop and test software systems to provide solutions to real-world problems.

# Message from HOD

We are proud to launch the fourth edition of our department's flagship technical magazine, TechTreasure' 24, a platform that captures the voice, vision, and versatility of our budding engineers.

This edition stands as a testament to the innovative energy and intellectual curiosity that define our students. Whether it's tackling real-world problems or diving into emerging tech trends, TechTreasure'24 reflects the diverse talents and creative thinking thriving within our community.

More than just a magazine, this is a space where ideas take shape, where technology meets imagination, and where learning goes beyond the classroom. From thought-provoking articles and technical explorations to insightful project updates, there's something here for every curious mind.

A special note of appreciation goes to Prof. Naimisha Trivedi and her editorial team for steering this initiative with such dedication. We also thank all the writers, designers, and contributors who poured their passion into these pages.

Let this edition inspire, inform, and ignite your own tech journey.



**Dr. Vibha D Patel**  
(HOD, IT)



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# AI & Tech Trends

The Future of Intelligent Computing



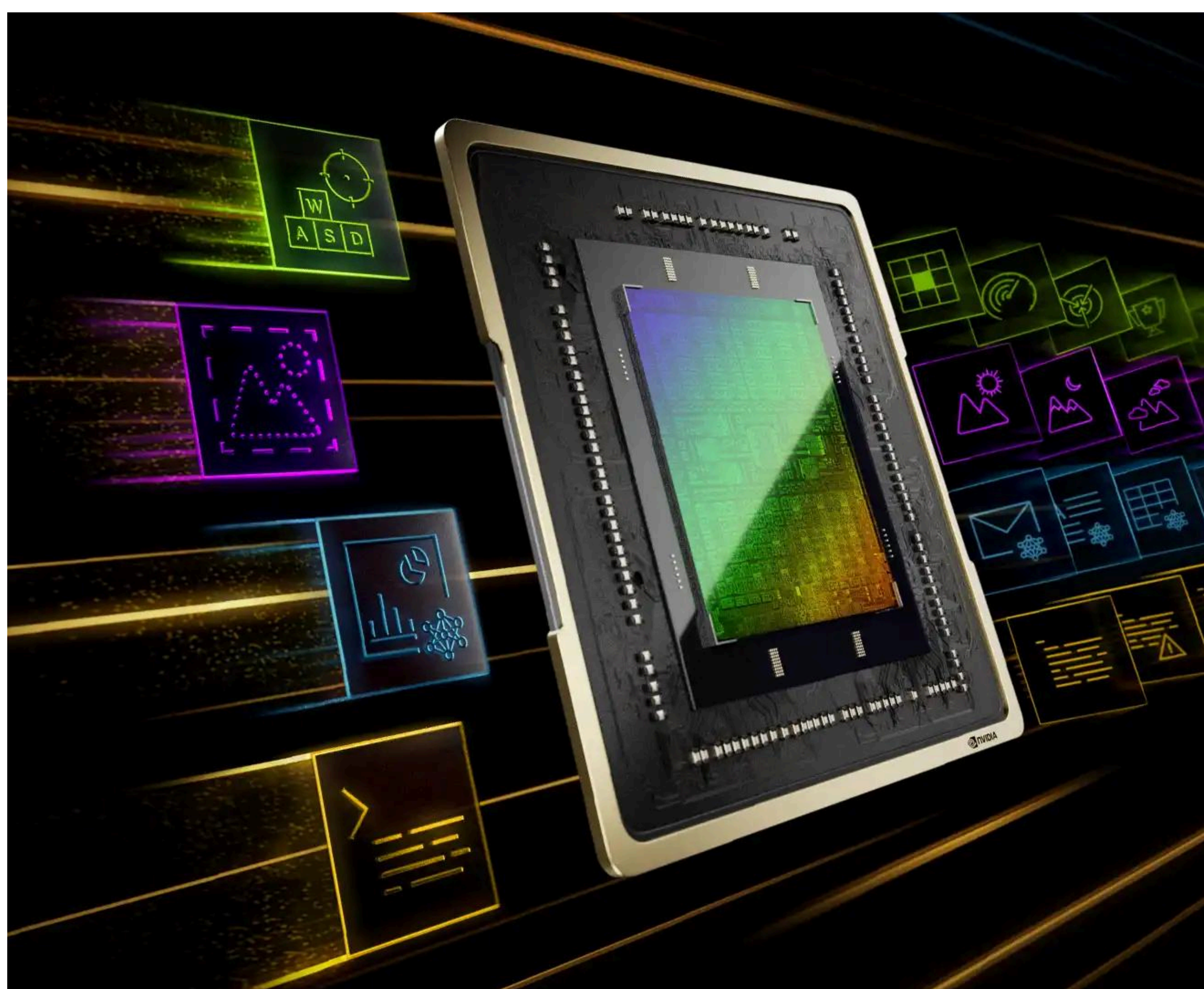


# 1.

## THE BIGGEST RIVALARY

The artificial intelligence race has never been more intense, with tech giants pouring billions into AI research and development. Microsoft has significantly bolstered its position by investing heavily in OpenAI, bringing advanced AI capabilities to its suite of products, from Office applications to cloud services. Google, on the other hand, is making aggressive strides with Gemini, its next-generation AI model poised to challenge OpenAI's dominance. Meanwhile, Apple, known for its secretive approach, is silently working on integrating AI-driven features into its ecosystem, promising a future of seamless automation and smarter user experiences.

This year's AI investments will shape the next era of computing, influencing industries from healthcare to finance and entertainment. The competition among these tech titans is not just about innovation but also about who will set the standards for ethical AI development and deployment.



### **The Rise and Shine of DeepSeek: A New AI Powerhouse**

A new challenger has emerged in the AI battlefield—DeepSeek. This emerging AI company is rapidly making waves with its state-of-the-art large language models and groundbreaking research in multimodal AI. Unlike conventional AI models that primarily focus on text-based processing, DeepSeek is pioneering real-time AI systems capable of handling text, images, and even videos with remarkable efficiency.

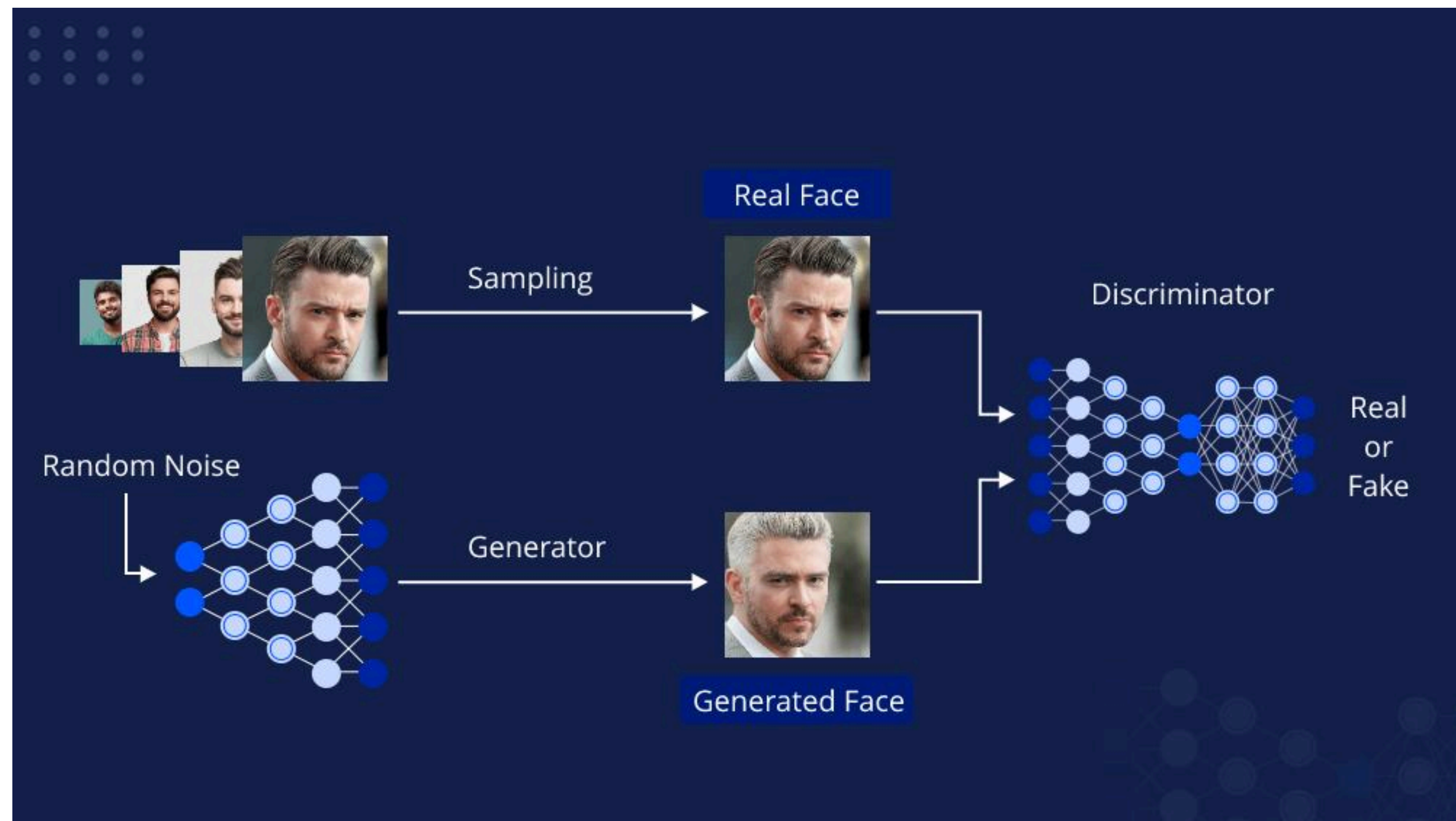
Positioned as a formidable competitor to OpenAI, DeepSeek is setting new industry benchmarks in AI adaptability and real-time processing. With advancements in generative AI, this company is making it clear that the future of AI will be more interactive, responsive, and intuitive.



## AI Trends: Future Projections & Breakthroughs

The AI industry is evolving at an unprecedented pace, influencing every aspect of modern life. Here are some key trends shaping the future of AI:

**AI-Generated Content:** From deepfake technology to AI-assisted journalism, machine-generated content is becoming mainstream, transforming media, marketing, and entertainment industries.



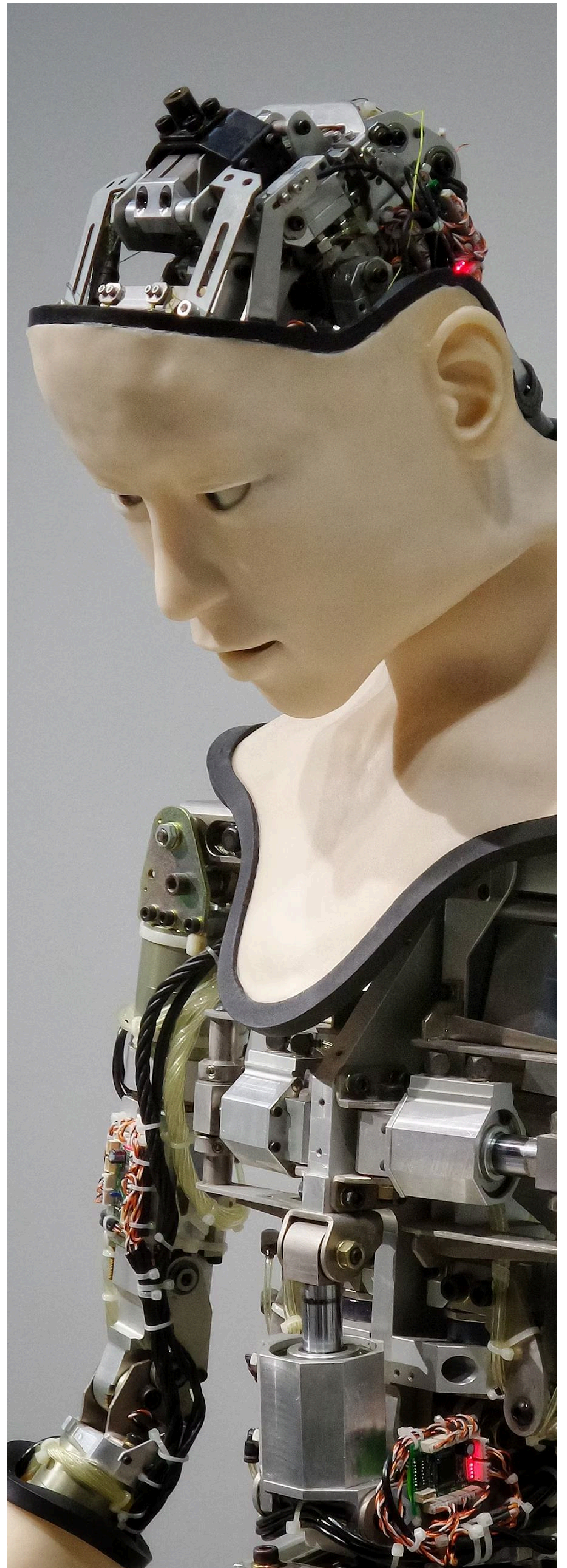
## AI-Driven Robotics & Automation:

Manufacturing, healthcare, and logistics are experiencing a revolution, with AI-powered robots performing tasks with precision and efficiency.



## Ethical Concerns & AI Regulations:

As AI's influence grows, so do concerns about privacy, bias, and security. Governments worldwide are working on regulatory frameworks to ensure ethical AI development and prevent misuse.





# Big Tech & Market Trends

The Collective Wealth of Tech Giants: A Financial Breakdown





2.

# A BILLION-DOLLAR RACE

Despite economic uncertainties and global market fluctuations, major technology companies continue to thrive, breaking revenue records and expanding their dominance. AI, cloud computing, and semiconductor advancements have fueled their financial growth, positioning them as the driving force behind the next wave of innovation.

## Key Figures & Earnings Reports:

**Apple:** Surpassing \$100 billion in quarterly revenue, Apple remains the leader in consumer technology, with strong sales in iPhones, MacBooks, and wearables. Its services division, including the App Store and Apple Pay, continues to generate massive profits.

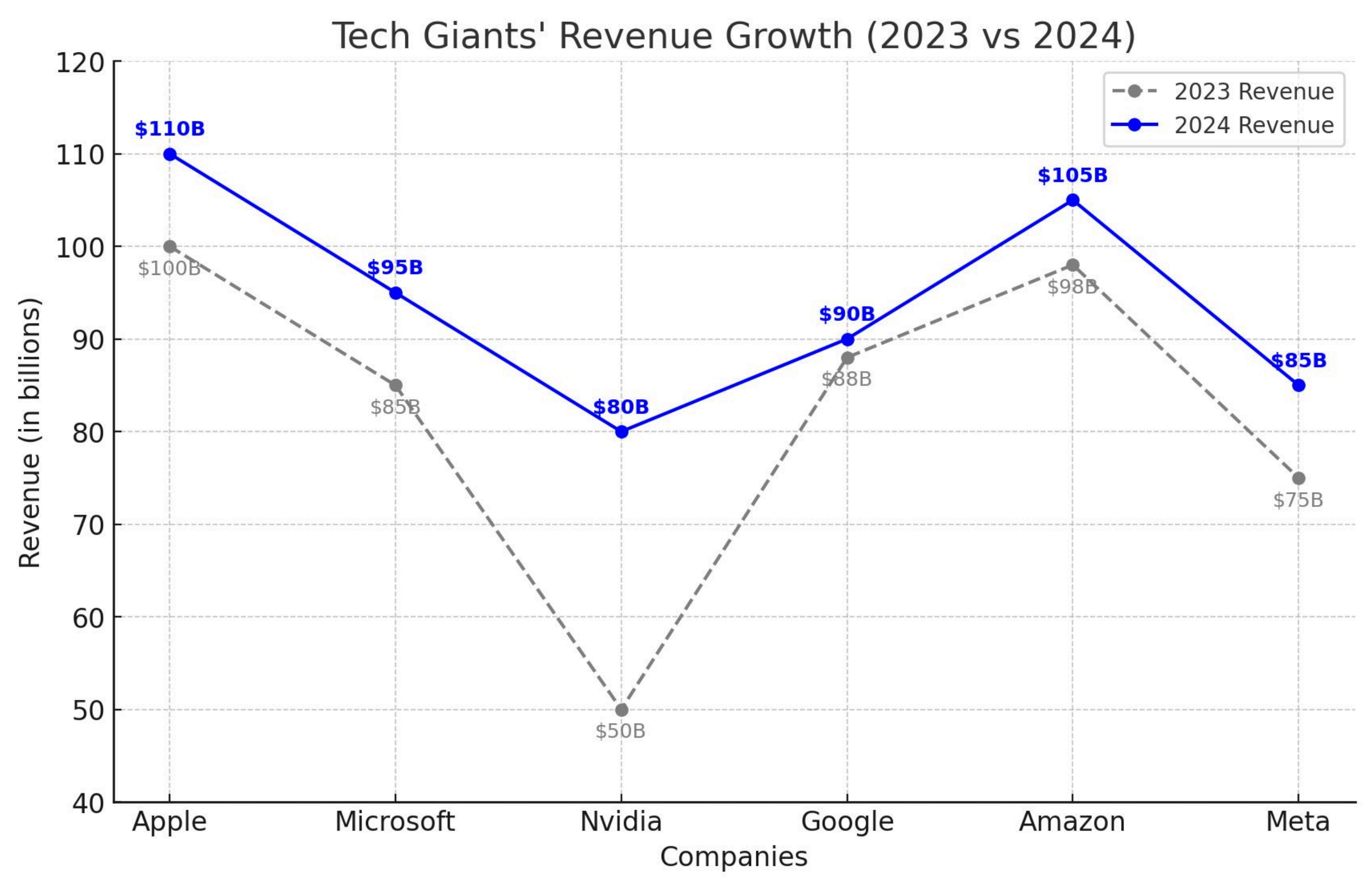
**Microsoft:** With \$22 billion in net profit last quarter, Microsoft is leveraging its AI investments, particularly in OpenAI, to strengthen its cloud-based products like Azure and Copilot.

**Nvidia:** The AI boom has sent Nvidia's market cap soaring past \$1 trillion, making it the most valuable semiconductor company in the world. Its AI-focused GPUs are now critical infrastructure for data centers and AI model training.

**Google (Alphabet):** Despite challenges in ad revenue, Google's AI-driven services, such as Gemini and AI-powered search, are expected to bring double-digit growth in the coming years. Google Cloud has also seen a surge in enterprise adoption.

**Amazon:** AWS (Amazon Web Services) remains the largest cloud provider globally, with AI-powered cloud services expanding its influence.

The company is also investing in AI-enhanced e-commerce personalization.



## Apple's Latest Innovations & Privacy Policies

Apple is set to revolutionize the tech space with its latest offerings:

**Vision Pro XR Headset:** A step toward the future of mixed reality, enhancing immersive digital experiences.

**M4 Chips:** Designed with AI acceleration, making MacBooks more powerful and efficient.

**Stricter Privacy Policies:** Apple's commitment to user privacy is facing scrutiny, with advertisers raising concerns about data restrictions and tracking limitations.

## Nvidia's Strategic AI Moves

Nvidia has successfully positioned itself as the backbone of AI development, dominating the AI chip market and securing partnerships with OpenAI, Tesla, and cloud giants like AWS and Microsoft Azure.





## Key Strategies:

**H100 & Blackwell GPU Launches:** The company's latest AI-focused GPUs power generative AI workloads, LLM training, and real-time multimodal processing.

**Omniverse Expansion:** Nvidia's push into industrial AI and 3D simulations is transforming industries like manufacturing, gaming, and architecture.

**Automotive AI Growth:** Nvidia's AI chips are now integral to self-driving technologies, with partnerships in the EV sector.

## The AI Wars: Microsoft vs. Google

The rivalry between Microsoft and Google in AI development has intensified, with both companies racing to develop the most powerful AI models.

**Microsoft's AI Edge:** Leveraging OpenAI's GPT models, Microsoft has integrated AI into Windows, Office 365, and Azure, giving businesses and consumers direct access to AI-powered productivity tools.

**Google's AI Strategy:** Google is pushing forward with Gemini, its multimodal AI system designed

## The Shift to India: Big Tech's New Playground

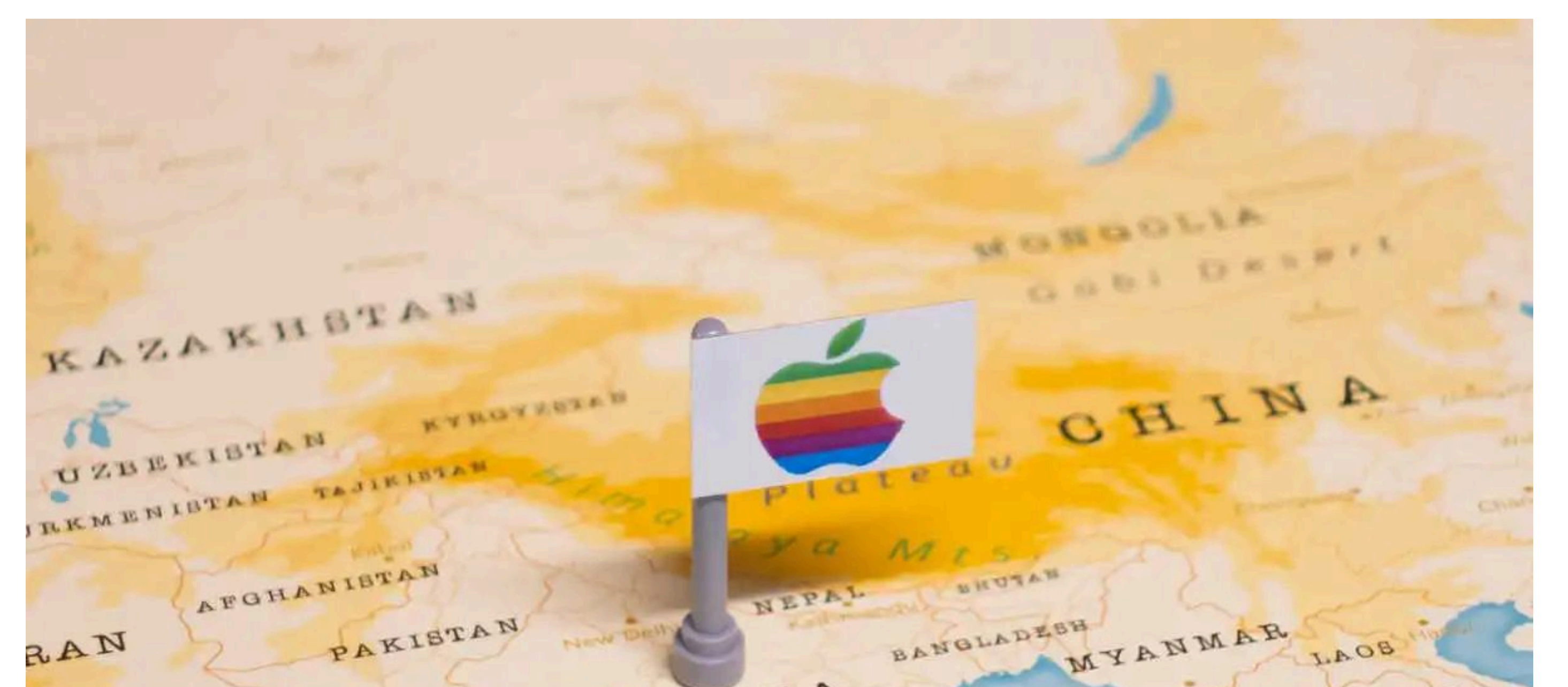
With increasing geopolitical tensions and supply chain challenges, companies like Apple, Nvidia, and Tesla are shifting investments to India to diversify their manufacturing and research bases.

## Major Moves:

**Apple's iPhone Production:** India is now one of the primary hubs for iPhone manufacturing, reducing reliance on China.

**Nvidia's AI Research Centers:** The company is setting up AI development hubs in Bengaluru, strengthening India's role in AI innovation.

**Google & Microsoft's Data Centers:** Cloud infrastructure expansion in India is positioning the country as a major player in global tech operations.





# New Releases & Major Announcements

The Collective Wealth of Tech Giants: A Financial Breakdown





# 3.

## NEXT BIG THING

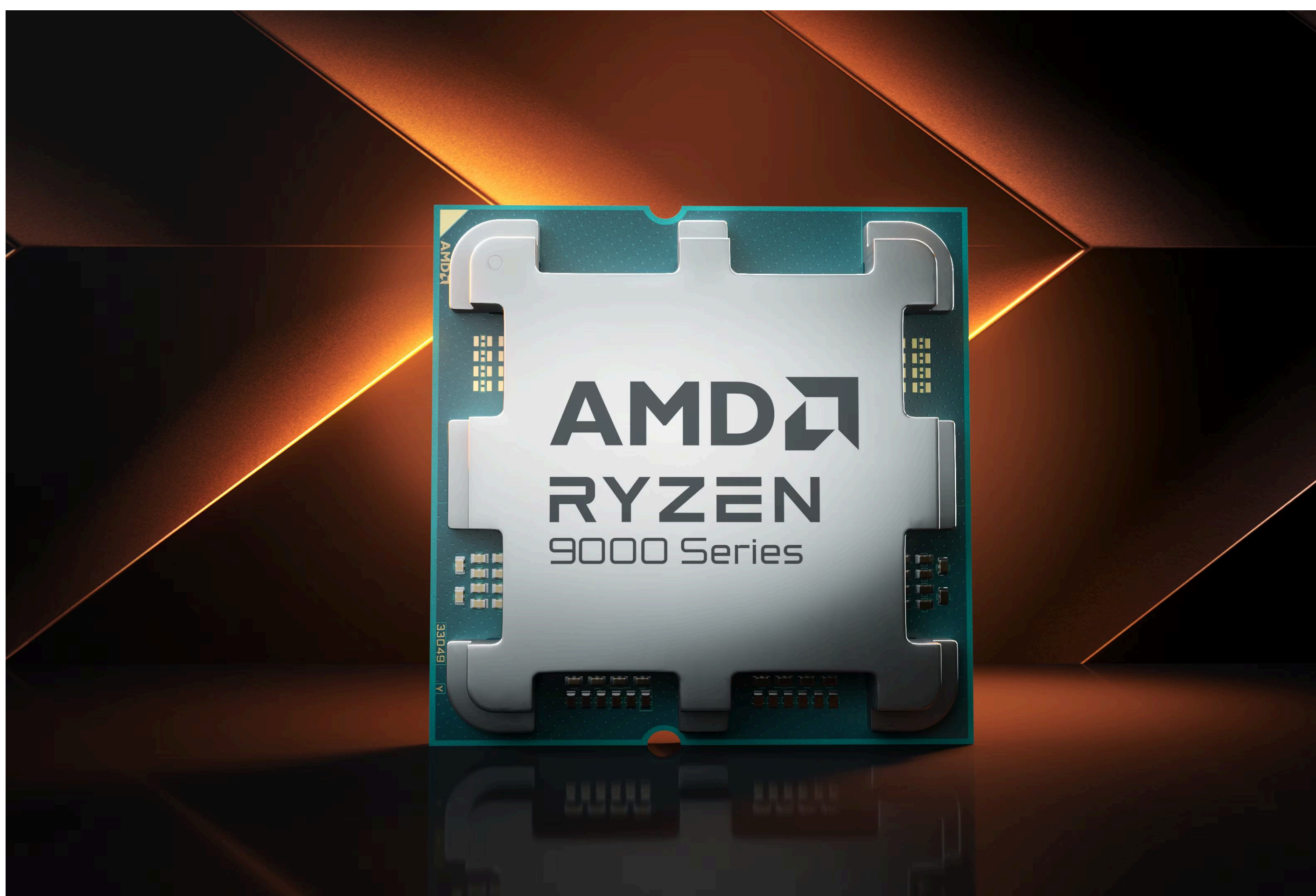
### AMD's Gaming Push

AMD is stepping up against Intel and Nvidia with major product launches:

**Ryzen 9000 Series:** Next-gen desktop processors with Zen 5 architecture and AI acceleration built-in.

**Radeon RX 8000 GPUs:** Aiming to challenge Nvidia's dominance with better power efficiency and ray tracing performance.

**AI Chip Initiative:** Competing with Apple's M-series and Intel's Gaudi chips for on-device AI processing.



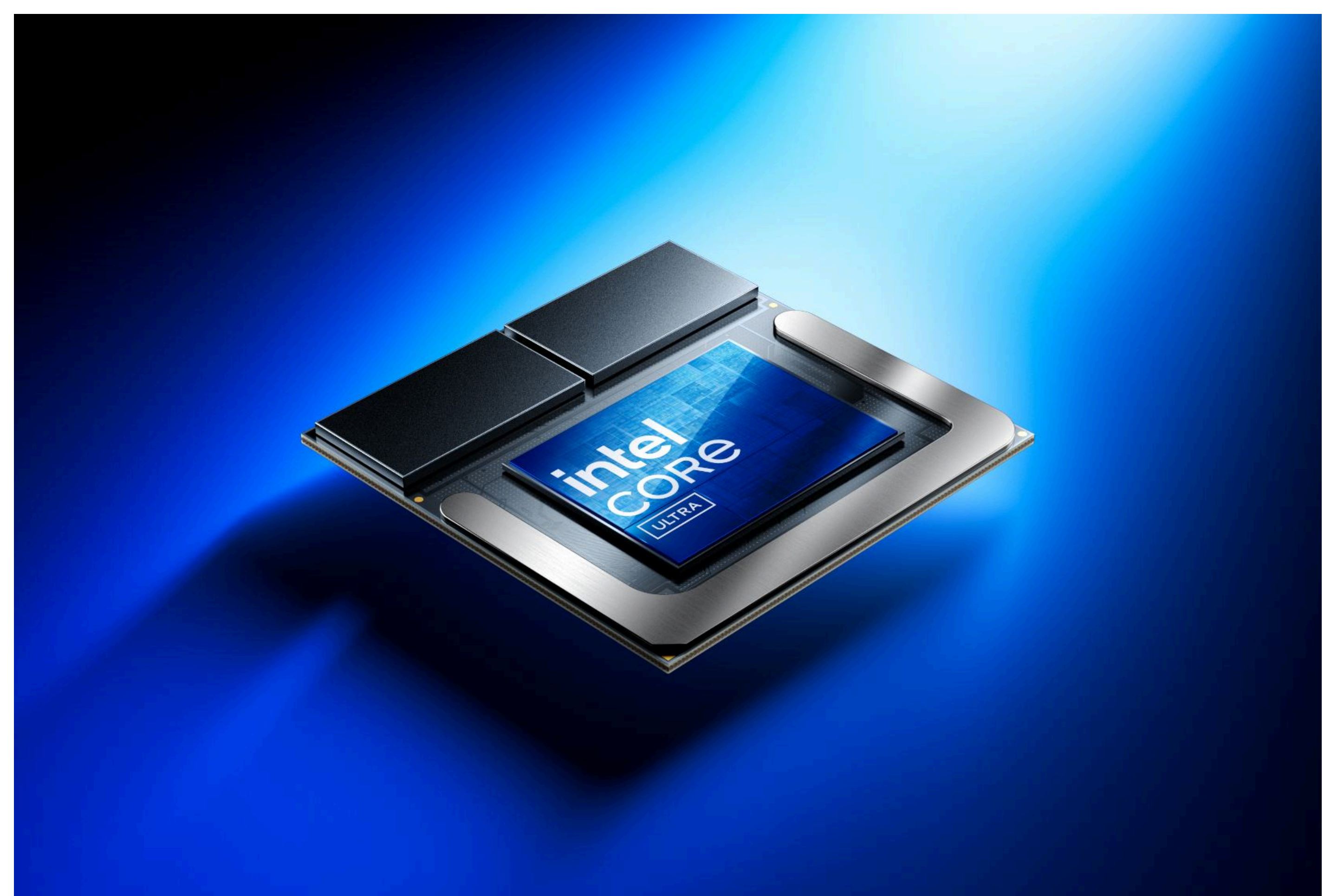
### Intel's Meteor Lake & AI-Focused Processors

Intel is doubling down on AI and power-efficient computing:

**Meteor Lake CPUs (14th Gen):** Featuring dedicated AI accelerators for productivity and creative applications.

**Gaudi 3 AI Processors:** A direct challenge to Nvidia's dominance in AI data centers.

**Lunar Lake (Expected 2025):** Intel's future CPUs built specifically for low-power AI inference in laptops and ultrabooks.



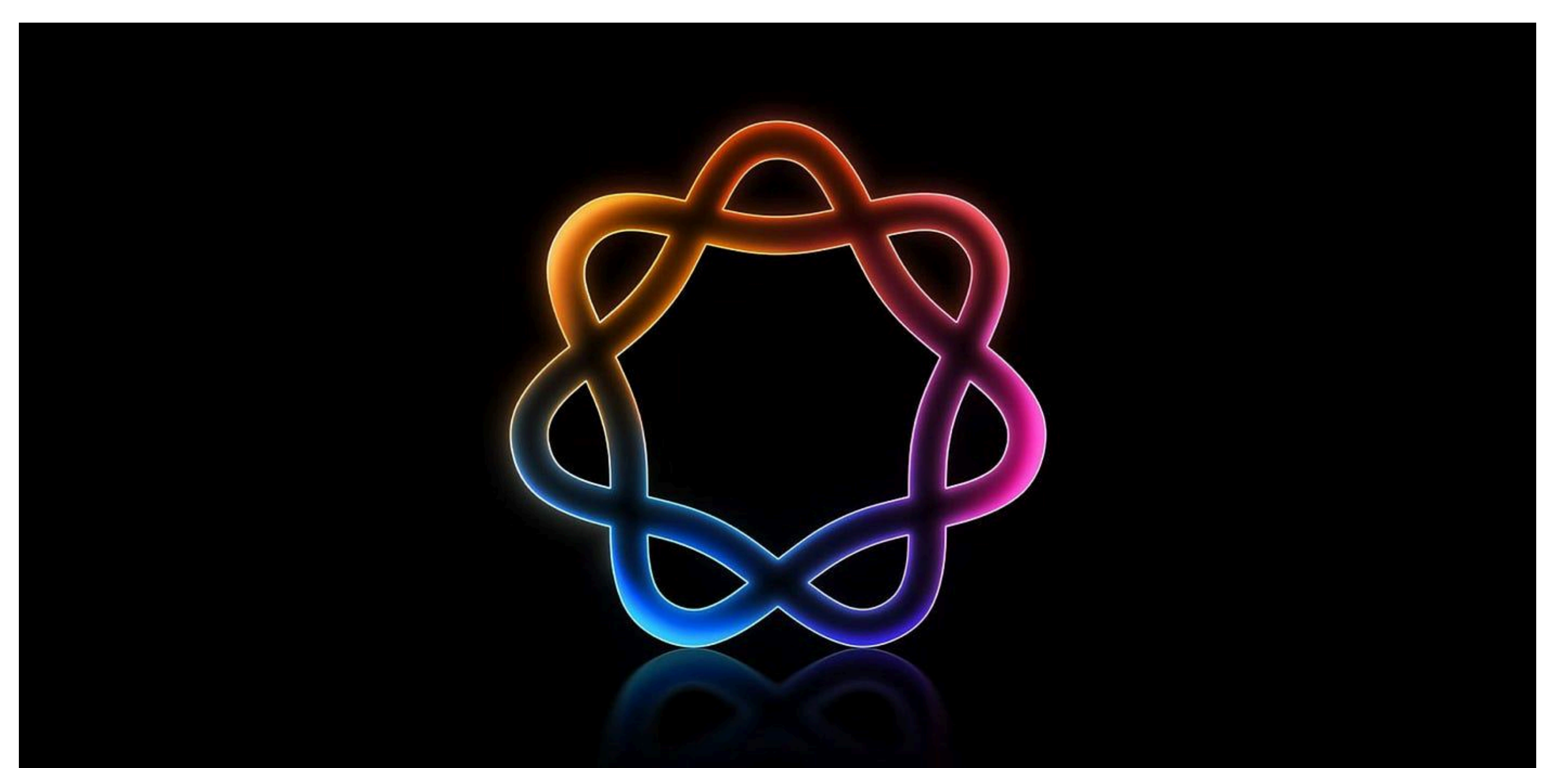
### Apple WWDC 2024: AI-Powered Upgrades

Apple is set to integrate AI across its ecosystem:

**iOS 18 with "Apple Intelligence":** AI-driven Siri improvements, smart replies, and automated workflows.

**Apple Vision Pro 2 (Rumored):** A potential lighter, more affordable version of Apple's mixed reality headset.

**M4 Chips:** More power-efficient Mac processors with Neural Engine optimizations for AI.





## Meta: Mixed Reality & Social Features

Meta is pushing forward with new VR and AR advancements, enhancing both hardware and social interaction.

### New Quest – Pushing the Boundaries of XR

The Quest as per rumors is designed for power users, professionals, and immersive gaming, featuring:

**Higher Resolution Displays:** Sharper visuals with OLED or Mini-LED technology, reducing screen-door effect.

**Wider Field of View:** Expanded FOV up to 120°, making environments feel more natural.

**Lighter, More Comfortable Build:** Improved weight distribution for longer, fatigue-free sessions.

**Advanced Hand & Eye Tracking:** More precise gesture-based navigation and foveated rendering for better performance.

**Enhanced Mixed Reality (MR) Capabilities:** Real-time environmental mapping, improving AR experiences for productivity and gaming.



## Microsoft: Windows & Surface Refresh

Microsoft is reinventing its Windows experience and pushing the Surface lineup to the next level.

### Windows 12 – A Modern, Smarter OS (Rumored 2025)

While not officially confirmed, leaks and insider reports suggest that Windows 12 will focus on:

**Performance & Efficiency Boosts:** Better memory management, reduced background process drain, and optimized power consumption for laptops and tablets.

**Stronger Gaming Features:** DirectStorage improvements, better support for ultrawide displays, HDR, and improved frame pacing.

**Tighter Cloud & AI Integration:** More seamless OneDrive sync, built-in Copilot enhancements, and smart file organization.

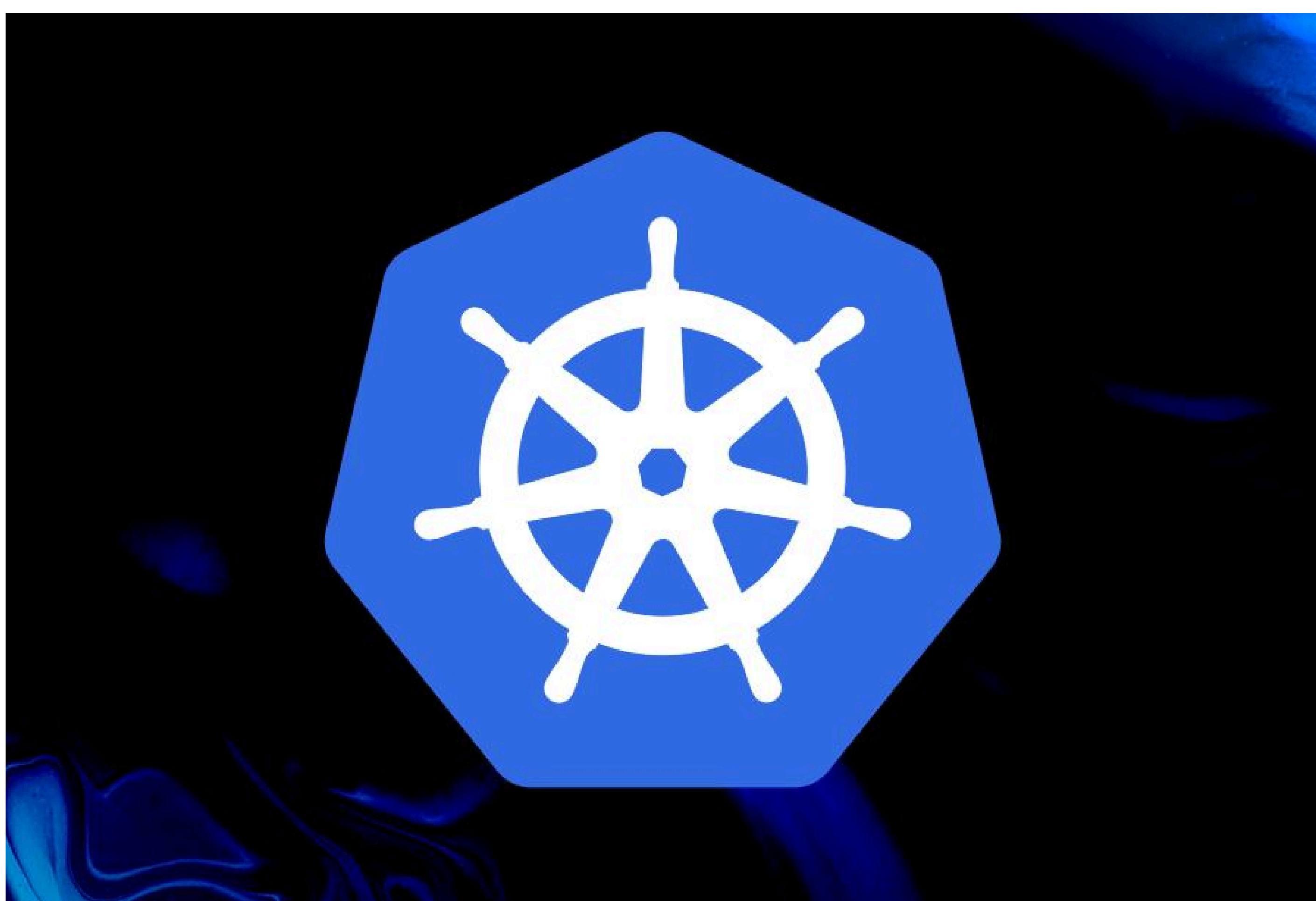
**Security Overhaul:** Hardware-level security enhancements to prevent phishing, ransomware, and firmware attacks.



# 4.

## BUILDING ROBUST CLOUD-NATIVE SYSTEMS

Kubernetes has emerged as the de-facto standard for orchestrating containerized applications, empowering developers to build scalable, resilient systems. Complemented by monitoring tools like Prometheus and Grafana, it forms a powerful ecosystem for managing modern cloud-native workloads. For information technology students, mastering these technologies unlocks opportunities to create innovative applications and pursue careers in DevOps and cloud engineering. This article explores Kubernetes' core architecture, the monitoring capabilities of Prometheus and Grafana, and their practical applications, providing a foundation for academic and professional growth.



### Kubernetes: The Container Orchestration Powerhouse

Kubernetes (K8s) automates the

deployment, management, and operation of containers—lightweight, portable units that package applications with their dependencies. A Kubernetes cluster consists of a control plane (managing cluster state) and worker nodes (running containers in pods). Key components include:

- Pods: The smallest deployable units, hosting one or more containers.
- Deployments: Manage pod replicas, ensuring desired state and updates.
- Services: Provide stable networking for pods, enabling load balancing.
- ConfigMaps/Secrets: Store configuration and sensitive data.

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: my-app
spec:
  replicas: 3
  selector:
    matchLabels:
      app: my-app
  template:
    metadata:
      labels:
        app: my-app
    spec:
      containers:
        - name: my-app
          image: nginx:latest
```



This deploys three pod replicas of an Nginx web server, demonstrating Kubernetes' simplicity for student projects.

## Prometheus and Grafana: Monitoring and Visualization

Effective system management requires visibility into performance and health. Prometheus, an open-source monitoring tool, excels at collecting and querying time-series metrics from Kubernetes clusters. It scrapes metrics from endpoints (e.g., pod CPU usage, request latency) using a pull-based model and stores them in a time-series database. The Prometheus Operator simplifies deployment in Kubernetes, enabling dynamic discovery of pods and services.

Grafana complements Prometheus by providing customizable dashboards to visualize metrics. Students can create graphs for cluster resource usage, application performance, or custom metrics, enhancing debugging and optimization. For example, a dashboard might display CPU and memory trends for a student's e-commerce app, revealing bottlenecks during load tests. Integration is straightforward:

- Deploy Prometheus via Helm: `helm install prometheus prometheus-community/kube-prometheus-stack`.
- Connect Grafana to Prometheus as a data source and import pre-built Kubernetes dashboards.



## Practical Applications and Advancements

Students can experiment with Kubernetes using Minikube locally or cloud providers' free tiers (e.g., Google Cloud). A sample project involves deploying a web app, configuring Prometheus to monitor HTTP requests, and visualizing metrics in Grafana. Kubernetes 1.29 (2024) introduces enhanced observability features, such as improved logging APIs, while Prometheus 2.50 optimizes query performance. Grafana's latest integrations support real-time analytics for IoT and AI workloads, aligning with research areas like edge computing.

## Start Your Journey Now

Kubernetes, Prometheus, and Grafana empower students to craft innovative, production-ready applications. Begin with hands-on tutorials or open-source projects on platforms like GitHub. Engage with Kubernetes communities to collaborate and learn. As an IT professor, I've seen students transform their careers by mastering these tools, building everything from intelligent chatbots to real-time analytics platforms. Dive in today—your next project could redefine what's possible in the cloud.



# WHAT'S COOKING

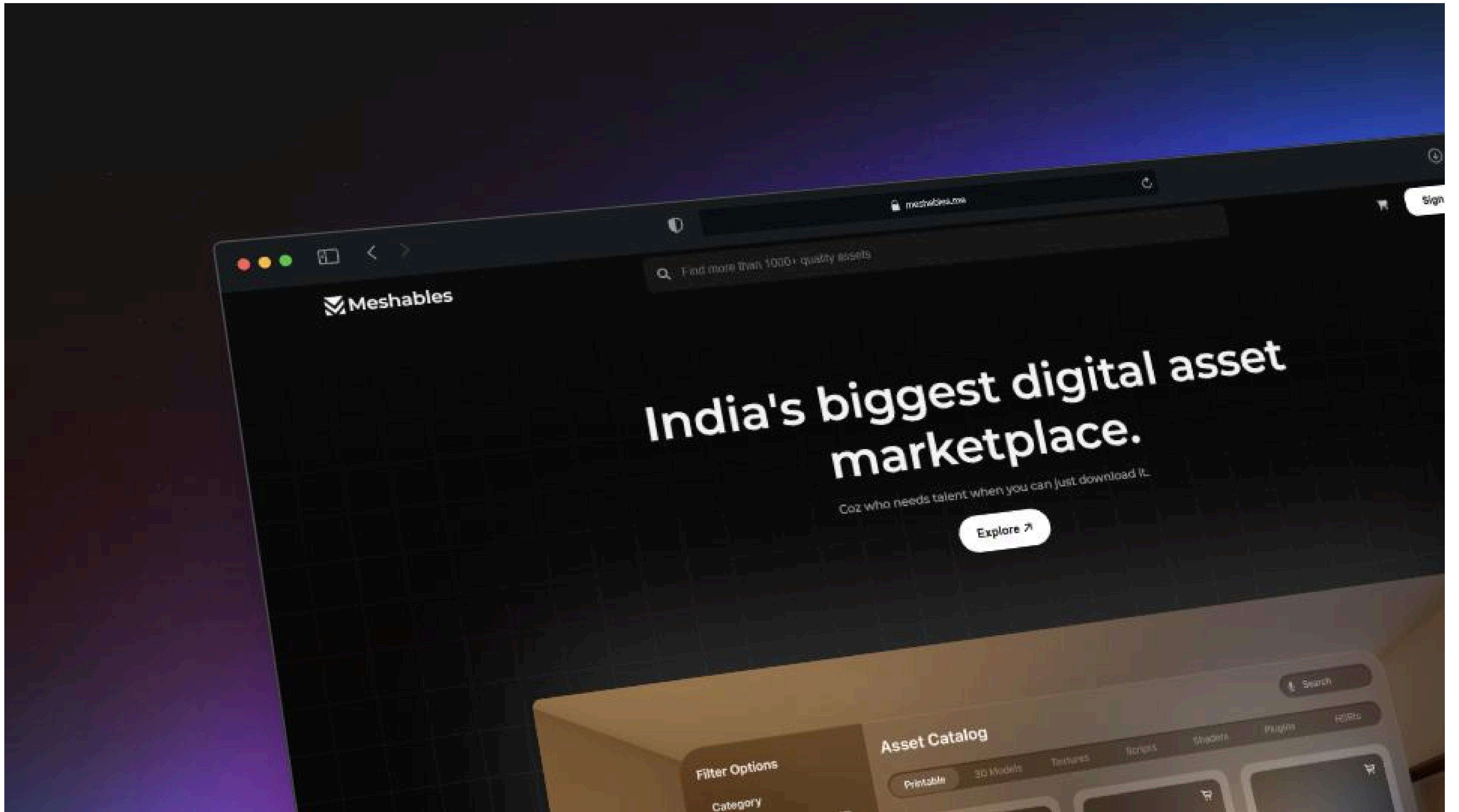
Have a look at some of the great projects being developed  
from minds of youth.





# 01.

# MESHABLES 3D



## Meshables3D: Revolutionizing 3D Asset Trading and Blueprint-to-3D Conversion

Developed by Yaxraj Dabhi of 5th-semester with a passion for technology and innovation, Meshables3D is a cutting-edge platform that transforms the way 3D assets are traded, shared, and utilized. Unlike traditional marketplaces, Meshables3D fosters a community-driven ecosystem where creators and developers can seamlessly trade high-quality 3D models, game assets, and AR/VR content—eliminating monopolies and ensuring accessibility for all.

One of its standout features is the Blueprint-to-3D Conversion, an advanced tool that allows users to convert 2D blueprints, sketches, and technical drawings into detailed 3D models with ease. This feature is particularly useful for architects, designers, and game developers looking to bring their concepts to life without extensive manual modeling.

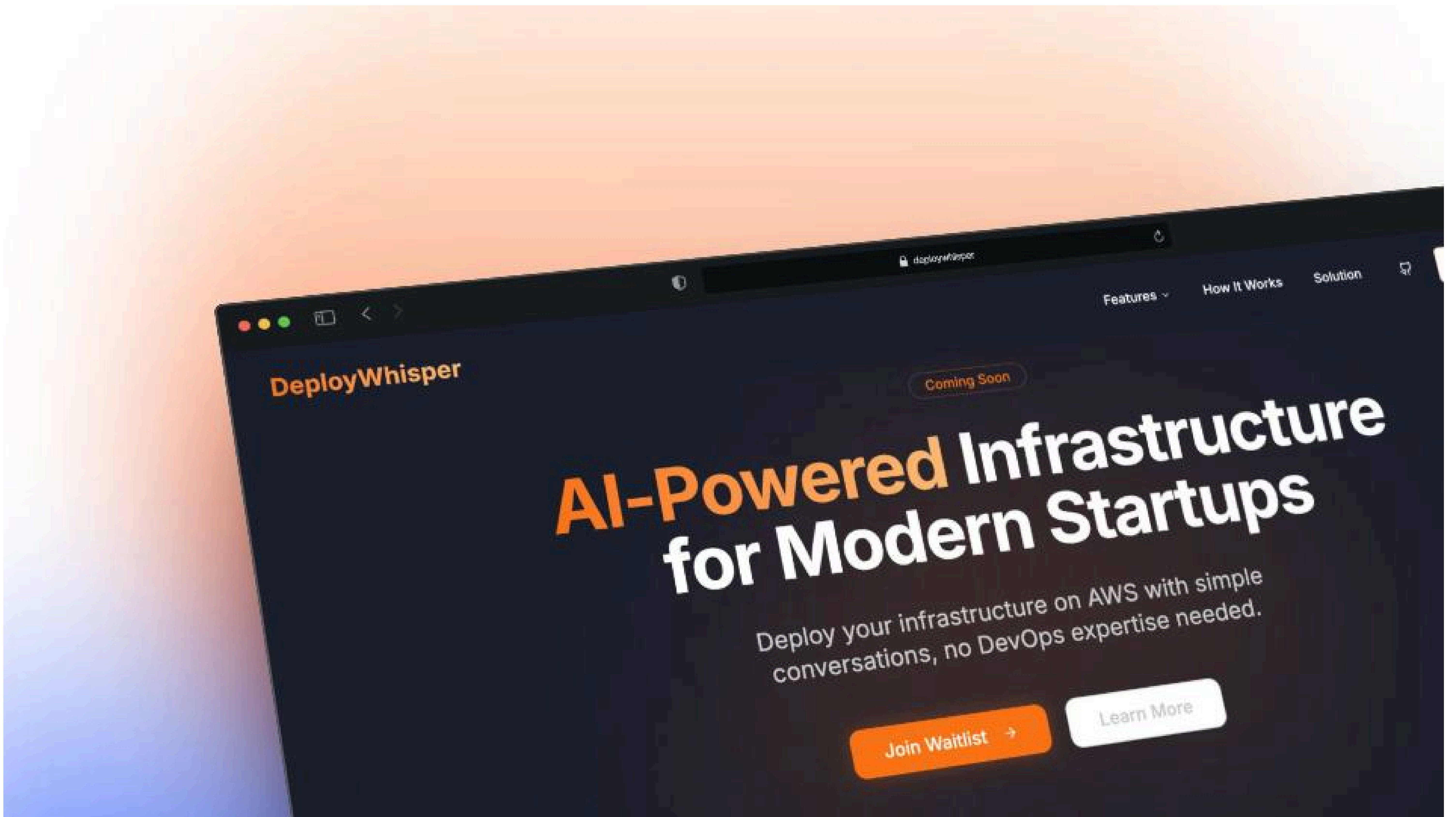
Beyond its marketplace, Meshables3D integrates AI-powered asset recommendations, team-based purchases, and a Web3-ready infrastructure, making it an essential tool for indie developers, studios, and 3D artists. With AR/VR compatibility and a Blender plugin, the platform is designed to be versatile and future-proof, catering to the next generation of immersive content creators.

Meshables3D is powered by a modern tech stack combining React, Firebase, and Three.js. React ensures a fast and dynamic user interface, while Firebase handles real-time data, authentication, and cloud storage. Three.js brings 3D assets to life in the browser, allowing users to view and interact with models seamlessly. Together, these technologies create a smooth, responsive, and immersive experience for creators and developers alike.



# 02.

# DEPLOY WHISPER



## **DeployWhisper – An AI agent designed to simplify infrastructure setup.**

DeployWhisper is an AI-powered agent designed to simplify cloud infrastructure deployment for startups and small development teams. It eliminates the need for deep DevOps expertise by allowing users to describe their deployment needs in natural language. By connecting their GitHub and AWS accounts, users can rely on the AI to automatically provision and configure infrastructure tailored to their applications.

Traditionally, teams have had to choose between managing infrastructure themselves, navigating the complexity of cloud platforms, or using third-party deployment wrappers that often come with high costs and limited flexibility. DeployWhisper addresses this gap by offering a lightweight, cost-efficient alternative that maintains full user ownership over their cloud environment.

Once connected, users can interact with the AI

agent to request tasks like deploying web apps, setting up CI/CD pipelines, configuring load balancers, or enabling monitoring. DeployWhisper interprets these instructions and performs all necessary setup on AWS, including networking, IAM roles, and resource provisioning – all with minimal input.

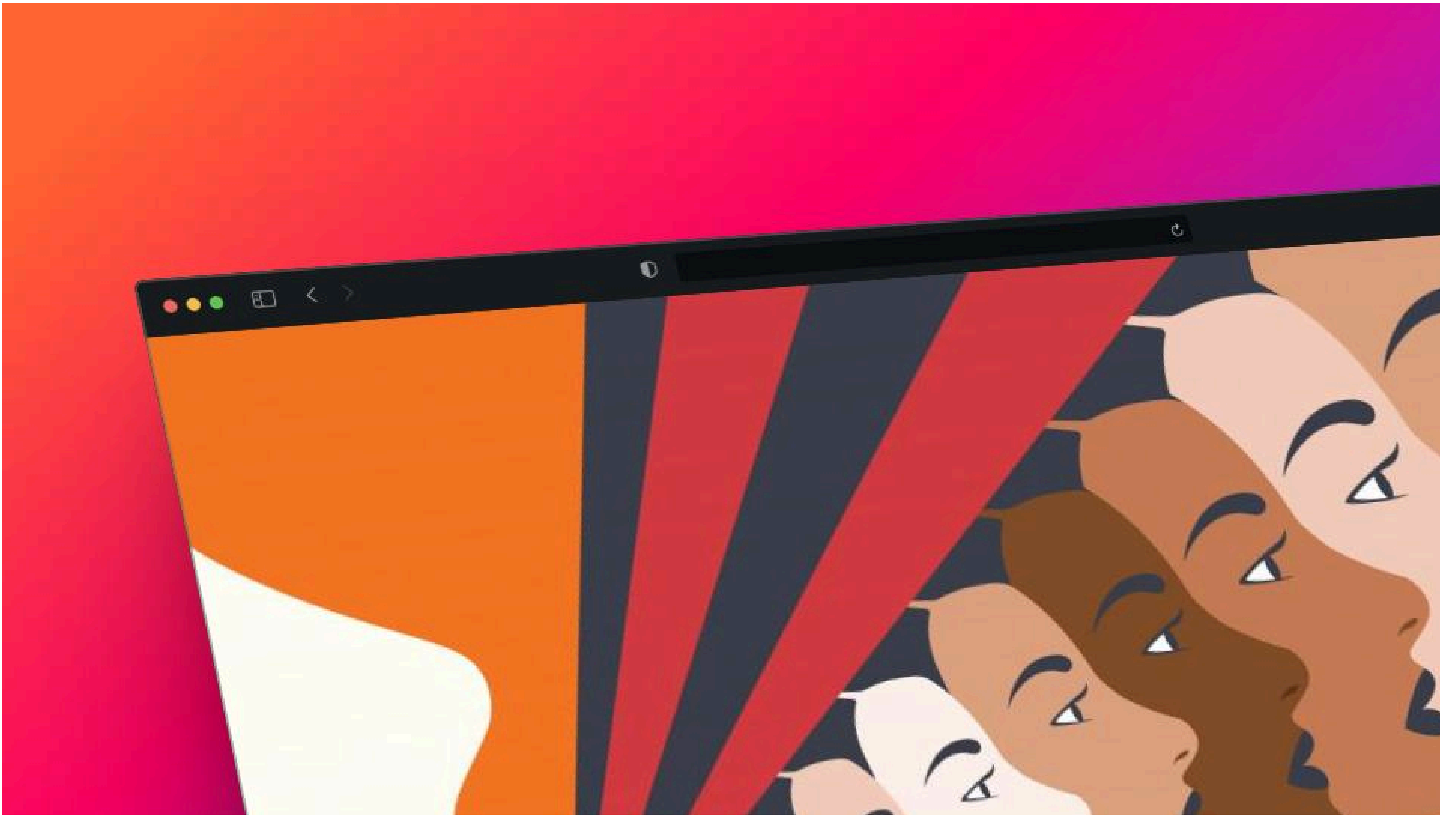
The result is a streamlined deployment experience that empowers developers to move faster without compromising control or incurring extra platform fees. With DeployWhisper, infrastructure becomes accessible, conversational, and developer-friendly.

~ Rudra Prajapati (CS 4th Sem),  
Jenith Panchal (IT 6th Sem)



# 03.

## PROTECT-HER



### **Protect-Her: Real-Time Threat Detection and Gender Based Surveillance**

Real-Time Threat Detection and Gender-Based Surveillance for Enhancing Women's Safety is a smart surveillance system designed to tackle the rising concerns surrounding women's safety in both public and private environments. Traditional CCTV systems rely heavily on manual monitoring and often fail to detect threats until after an incident has occurred. This project offers a more proactive approach by using artificial intelligence, computer vision, and real-time gesture analytics to identify potentially unsafe scenarios and immediately alert authorities.

At the heart of the system is live video feed processing, where AI models detect and classify individuals based on gender, track behavior patterns, and monitor for distress gestures. If a woman is found alone in a location deemed unsafe, or if someone performs a recognized SOS gesture such as crossing arms or rapidly

opening and closing palms—the system sends out an instant alert. These alerts include real-time snapshots and location data, enabling a fast and informed response from nearby security personnel.

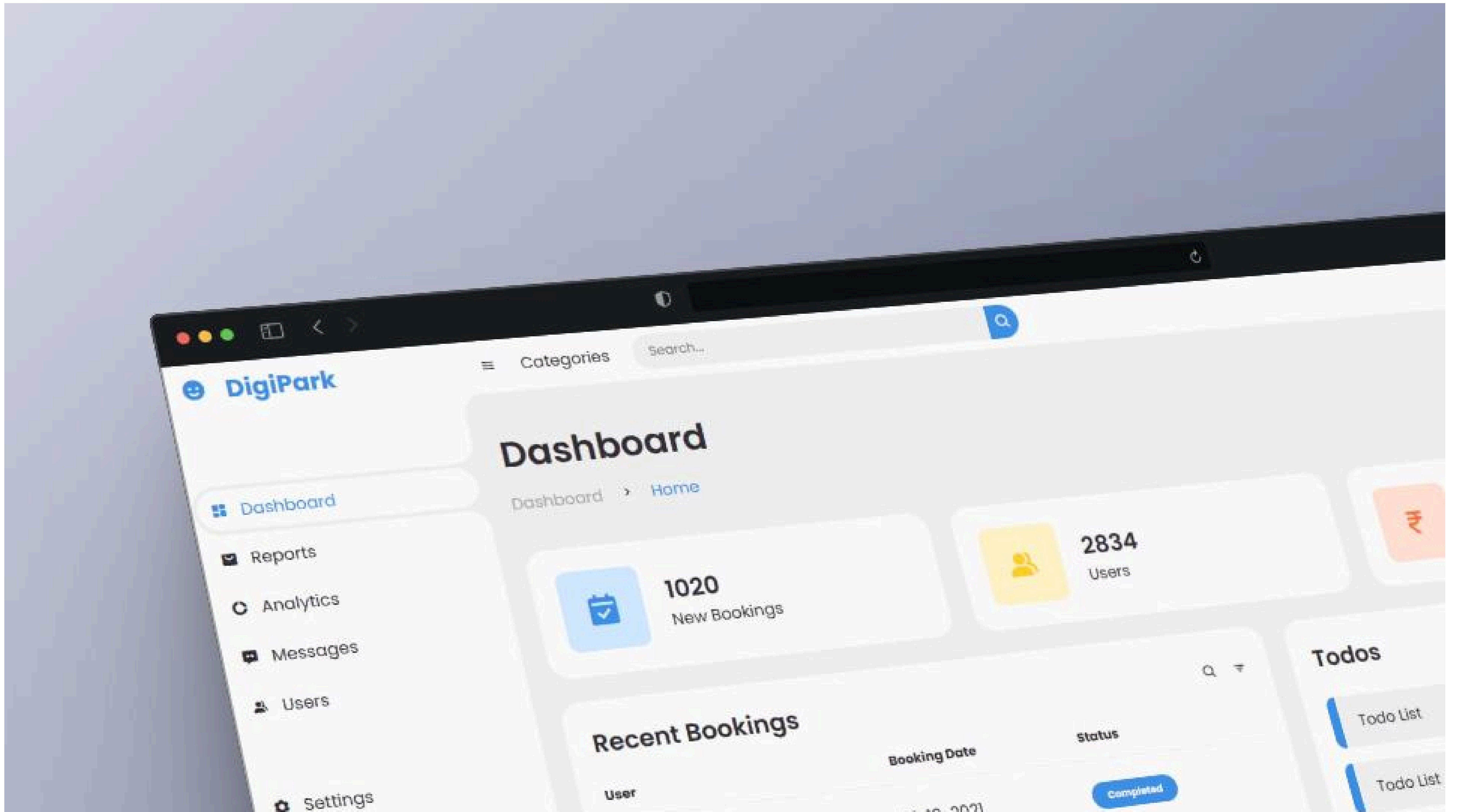
The solution brings together several technologies to ensure a reliable, efficient, and ethical system. OpenCV is used for processing video feeds, while the OpenCV DNN module and a pretrained Caffe model are employed for face detection. Gender is classified using a custom-trained deep learning model built with Keras. Gesture recognition is powered by MediaPipe, allowing the system to identify hand-based distress signals accurately. Importantly, the system avoids unnecessary storage of raw footage, and personal data is anonymized wherever possible to uphold privacy.

~ Dhruv D. Songara, Om S. Kotawala, Vishal R. Zala, Vidhi Patel, Dhruvil K. Prajapati, Rudra D. Patel (IT 6th Sem)



# 04.

## DIGI PARK



### DigiPark: A Smart IoT-Based Parking Management System

DigiPark is a smart parking management system aimed at addressing the inefficiencies of traditional parking setups in urban and semi-urban environments. Congestion, time wastage, and poor space utilization are common issues caused by unorganized parking. DigiPark introduces a modern solution that leverages IoT along with web and mobile technologies to streamline the entire parking experience.

The system allows users to search for, book, and manage parking slots in real time through a dedicated mobile or web application. IR sensors installed at each slot detect vehicle presence, while LED indicators provide immediate visual feedback on slot availability. At the entry gate, a verification screen and automated boom barrier ensure seamless and secure access, reducing the need for manual intervention.

DigiPark is designed with three distinct user roles—Admin, Owner, and User—each tailored with specific features and interfaces. Users can easily find and reserve parking, owners can monitor usage and revenue, and admins can manage the entire system, including users and parking zones. This structure ensures smooth operation and centralized control.

On the technical side, the system is powered by Arduino Uno for hardware control, while the backend is built using Laravel with a MySQL database. The frontend includes both an Angular web interface and an Android mobile app developed in Java. Real-time data synchronization is achieved using the Volley API, which keeps the slot status and booking system accurate and up to date. Rigorous testing and a well-planned UI/UX using Figma contributed to a reliable and user-friendly system.

~ Rathod Dhairyadeepsinh, Kahar Ankitkumar, Ajudiya Keyur, Tomar Abhisheksinh. Khatri Aayushkumar, Valvai Chiragkumar (IT 8th Sem)





Vishwakarma Government  
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Department of Information Technology

# TECH TREASURE

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**Prof. Naimisha Trivedi**