VinΛi

VinAI Smart MOBILITY
PORTFOLIO

https://www.vinai.io/

About VinAI

Founded in 2019, VinAI is the world's top 20 AI R&D company with a myriad of practical research projects and products. VinAI is headquartered in Hanoi (Vietnam), with an additional location in Ho Chi Minh City. Bringing together almost 200 high-profile researchers and engineers, VinAI sets out to transform its state-of-the-art AI research into products and services that solve real-world problems. VinAI is currently led by AI/Machine Learning and Mobility Experts from Google DeepMind, Adobe, Stanford Research Institute, Bosch, Audi, Volkswagen, Toyota, DARPA Urban Challenge, Monash University, CMU, and the University of Oxford.

Creating Innovative AI-Powered Products

Our goal is not just to develop new technologies, but to deploy state-of-the-art AI that has meaningful impact on people's lives with three divisions: Smart Mobility, Generative AI and Smart Edge. By applying advanced AI technology, VinAI Smart Mobility has improved safety and driving experiences for millions of drivers worldwide. Our technologies and features have been integrated into various VinFast car models and those from European automakers.

Conducting World-class AI Research

VinAI represents one of the highest concentrations of AI expertise in the region. Our research aims to advance fundamentals in machine learning, deep learning, and to investigate how they enable new AI methods in computer vision and natural language understanding. The goal for the research group is to conduct world-class breakthrough research in AI, demonstrated by our presence in the list of top-tier publications and patents.

Building the Next-Generation of Thought Leaders in AI

VinAI Residency Program was created to identify the top young AI talents that will be trained to become future AI experts and tech leaders in the fileds. At VinAI, the residents are expected to work on real-world AI problems and applications as well as to conduct research in different techiniques and methodologies.

Our Achievements

VinAi

Top 20
Global AI R&D Companies
By Thundermark Capital 2022

CES INNOVATION AWARDS 2024 HONOREE

50K+ Ship-to-market car with our tech

700K+ Vehicles set for shipment

08 Different car models

We Are Featured On

Bloomberg **Deloitte.** **Forbes**

NIKKEI Asia **TechCrunch** **VTV**

Our Global Collaborators & Customers

Confidential Tier 1   Confidential EU-based OEM

NVIDIA   VinFast   Qualcomm

intel   Google   aws   ADVANTECH   viettel IDC   Lenovo   Hewlett Packard Enterprise

ASUS   AI SINGAPORE   Microsoft   VINHOMES   FPT   trustingsocial

Stanford University   RIKEN   VINUNIVERSITY   FUJITSU   NIC   ELSA   VINFUTURE

Next Level of Safety and Comfort

With our next-gen mobility solution that combines in-car monitoring and surrounding sensory systems, we are transforming the automotive industry by making driving a safer and more comfortable experience.

InteriorSense

This high-performance, ready-to-use in-cabin solution analyzes behavior patterns and provides real-time alerts, aiding drivers on the road.

Our multi-camera system eliminates all blind spots and offers a complete 360-degree view around the vehicle in real-time.

SurroundSense

Driver & Occupants `Current` Monitoring Systems (DOMS)

MirrorSense - Automatic Mirror Adjustment `Current`

Phone Usage Detection `Current`

Face Recognition (Anti-Spoofing) `Current`

DrunkSense - Passive `New` Drunk Detection System

AR HUD (Augmented Reality Head-Up-Display) `New`

Child, Pet, Object Left Behind Detection `New`

Emotion Detection `New`

Advanced Surround View `Current` Monitoring System & Jelly View

JellyView - Car Undercarriage See Through `Current`

Rear Parking Assist `Current`

Image Enhancement in Low Light, Bad Weather `Current`

Touch2Park - Level 2 Smart Parking `New`

Memorized Parking Assist - Level 3 Smart Parking `New`

360 Security - Safeguard Your Parked Car `New`

Narrow Street Assistance `New`

DrunkSense

▶ The Challenge

- In Europe, **around 20 to 28% of car accidents are related to drunk driving behaviors**[1]. In the US, there's **one alcohol-impaired driving fatality every 39 minutes**[2].
- Alcohol's effect BAC often takes 30-45 minutes to manifest. Drivers may start their journey below the legal BAC limit, only for it to rise dangerously as they drive, increasing accident risk. Some individuals, less tolerant to alcohol, may be unsafe to drive even with a BAC below the legal threshold.

## ▶ DrunkSense - The World's First Passive Drunk Detection System that Works without a Breathalyzer

DrunkSense combines an alcohol sensor with an advanced InteriorSense camera, optimizing breath detection efficiency and accurately identifying intoxicated behaviors.

- **Core Technologies:** DrunkSense uses a multi-sensor approach that combines input from the DMS camera, such as tracking eye movement and blinking, with vehicle information like braking and acceleration control, to capture the complete views of drivers' behaviors.
- **Passive Monitoring:** No user interaction needed.
- **Safety Oriented**: Ability to detect drunk driving even when their BAC is below the legal limit.
- **Minimized False Alarms**: Ability to distinguish between impaired drivers and intoxicated passengers. Our advanced algorithms also filter out drowsiness and distractions, minimizing false alarms.

▶ DrunkSense Highlights
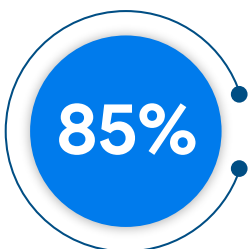
85% sensitivity in drunk driver detection, 8% higher than industry standards
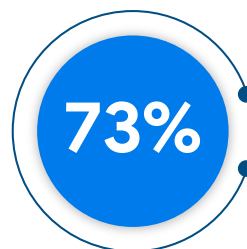
**73%** of life-saving warnings before accidents occur, 20% higher than the SOTA approach

1. European Court of Auditors - Special report 04/2024: Reaching EU road safety objectives
2. Forbes - Drunk Driving Statistics 2024

Innovative Features

VinAI's team of global researchers and dedicated engineers have been **developing numerous innovative features at lightning speed**.
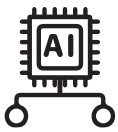
MirrorSense: The World's First AI-driven Automatic Mirror Adjustment Technology
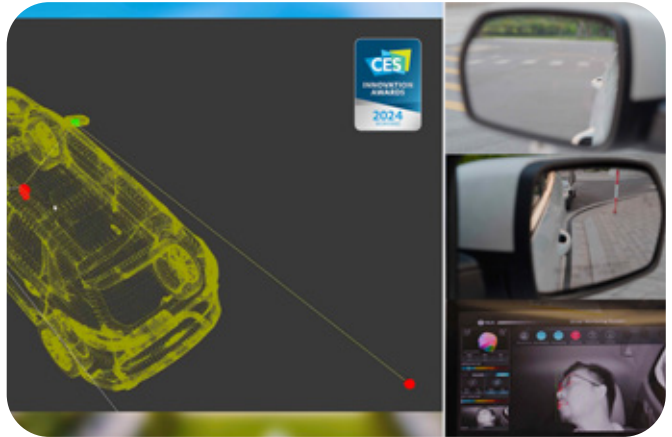
MirrorSense, the world's first AI-driven automatic mirror adjustment technology developed by VinAI, has been honored with **the Innovation Award in the Vehicle Tech and Advanced Mobility category at CES 2024**. The automatic mirror adjustment technology in VinFast MirrorSense precisely detects the car driver's head position and eye gaze direction with a 10mm accuracy, automatically adjusting the position of all corresponding mirrors. This technology can be easily expanded to enhance safety applications while driving, such as augmented reality heads-up displays and auto-adjust seat settings, providing an intelligent, convenient, and safe driving experience on every journey.

JellyView: A 3D Transparent Mode for a Whole Car-body Transparency

Jelly View allows drivers to gain a clear view beneath their vehicle. The view is constructed using images from sensors and cameras, enabling Jelly View **to be seamlessly integrated into existing vehicles without additional hardware.**

- Unlike typical SVM providers using front or rear cameras for undercarriage visuals, JellyView **synthesizes data from all cameras** to ensure coverage at every steering angle.
- Offering **diverse viewing modes**, including front/rear and surround/top view.
- Seamlessly blending the undercarriage visuals with the surrounding layers, ensuring a cohesive and visually appealing experience.

VinAI - Your Trusted Partner

VinAI's Smart Mobility is a leader in smart mobility solutions for the automotive industry. By applying advanced AI technology, VinAI has improved safety and driving experiences for millions of drivers worldwide. Their technologies and features have been integrated into various VinFast car models and those from European automakers. At VinAI, we strive to be your trusted partner in addressing the challenges of meeting regulations, improving driver safety and comfort, as well as navigating the future of in-cabin innovations.

▶ REGULATION COMPLIANCE

InteriorSense   GSR phase 1 - 2021/1341 DDAW
SurroundSense   NHTSA FMVSS 111 & UN ECE R158

▶ INNOVATION

We have developed award-winning, world's first features developed at lightning speed, including DrunkSense, MirrorSense focusing on updates via software enhancements or AI model innovations. Then, OEM can integrate latest AI solutions with minimal or no additional hardware cost.

▶ COMPATIBILITY

- Portable with different platforms & systems, adaptable to vehicles of all price ranges. Featuring multiple camera placement options (Steering Column, Instrument Cluster, Center Stack, Rear View Mirror).
- Available on the most popular SoCs in the automotive field, such as NVIDIA, Qualcomm, Renesas, or Ambarella.

▶ ACCURACY

Our AI model ranked 6th in NIST 2020. Independent benchmark by an EU Tier 1 supplier confirms our solution equals the performance of the world's top 2 DMS suppliers.

Generative AI

Our approach to Generative AI (GenAI) and Large Language Models (LLMs) is driven by our vision to make AI accessible to everyone. From optimized AI models to exceptional engineering, we have been moving aggressively to make GenAI faster, greener, and more efficient for people, businesses everywhere while addressing regional languages and needs.

▶ Foundation Models

Democratizing foundational models shows our dedication to the AI community.

SwiftBrush	PhoWhisper	PhoGPT
SwiftBrush v2 (Instant Image Generation) sets a new standard in AI image generation. Unlike other models, it creates high-quality images (low FID) in a single step, surpassing both Generative Adversarial Network (GAN) and multi-step Stable Diffusion approaches.	Available in 5 versions: base, tiny, small, medium, large. Its robustness is achieved through fine-tuning the multilingual Whisper on an 844-hour dataset that encompasses diverse Vietnamese accents.	A new LLM developed for the Vietnamese nuances. PhoGPT is highly competitive compared to the closed-source GPT-4 model.

Images generated by SwiftBrush

▶ Products and Frameworks

Customizing and enhancing the efficiency of Generative AI models for enterprizes and developers

PRAISE

- Deliver efficient and secure generative AI solutions tailored for your business needs.
- Equipped with capabilities for tabular Question and Answer and text-to-SQL queries.
- Provide comprehensive multilingual support, including low-resource languages.

Generative Finetuning

- Automatic service for Generative AI developers to build domain-specific foundation model.
- Include capabilities for fine-tuning end-to-end genAI applications, such as Retrieval-Augmented Generation (RAG) applications

Real-time Guard that Makes Any Cameras Smarter

Our AI system surpasses traditional video monitoring by analyzing activity as it happens. Advanced features such as facial recognition, body language analysis, and real-time notification work together, allowing for immediate detection of suspicious behavior and unauthorized access. Thanks to SmartStream (High Throughout Video Analytics SDK) and AI Optimization, Smart Edge can support large-scale systems with thousands of camera streams while remaining remarkably cost-effective compared to other solutions.

▶ Features

Safety	Compliance	Convenience & Well-being
• Face Anti Spoofing	• Parking Violation Detection	• Licensing Plate Recognition
• Blacklist/Whitelist	• Face Mask Policy Violation Detection	• Fall/Unconsciousness Detection
• Intruder Detection	• Line Crossing Detection	• Identification
• Harassment Detection	• Unauthorized Object Detection in Hallways	• People Counting
• Kidnapping Detection	• Unauthorized Object Detection in Elevators	
• Loitering Detection	• Pet Detection	
• Crowd Estimation		
• Person and Vehicle Attribute Recognition		
• Person Re-identification		

▶ Why Us

10+   AI features Smart Edge deployed for customers

36%   saving in CapEx

![VinAI logo]
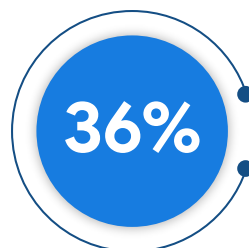
World-class AI Research

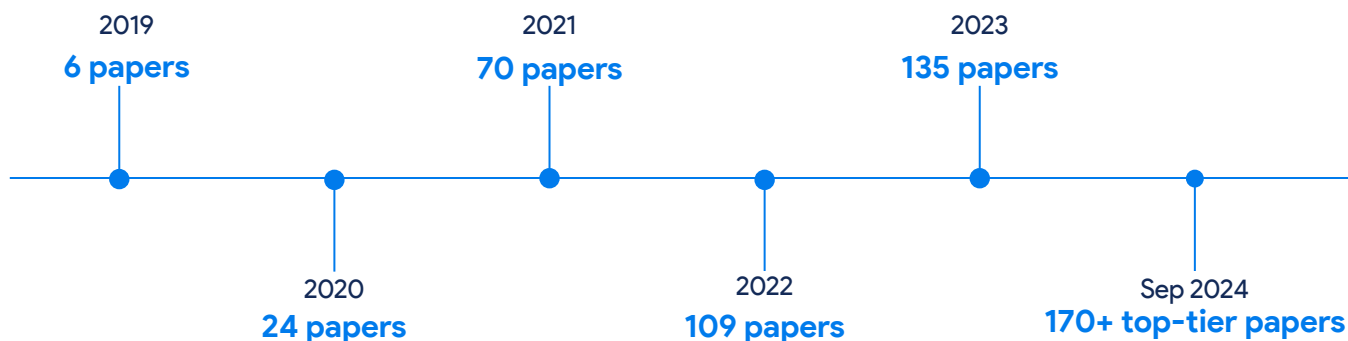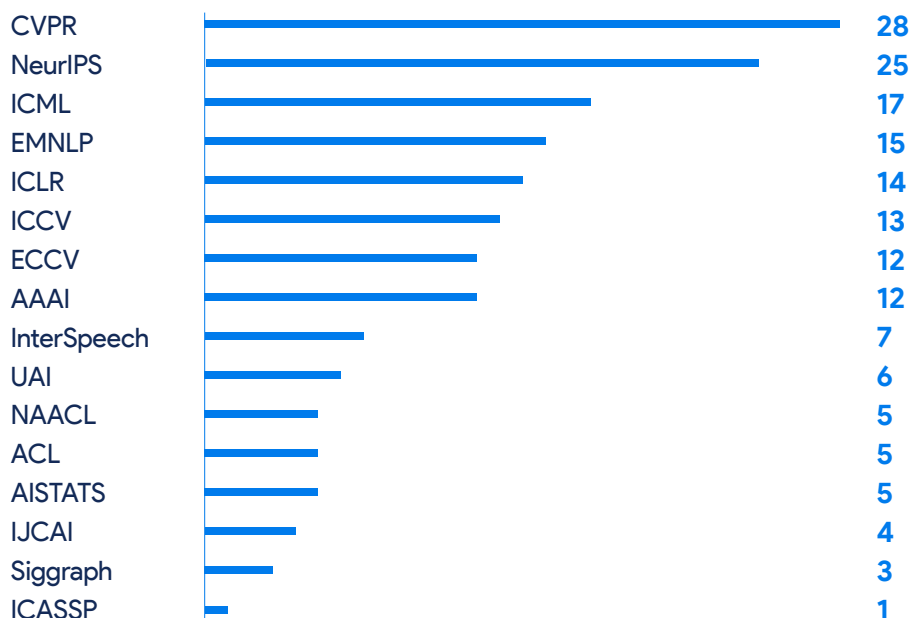Research at VinAI is dedicated to expanding the boundaries of AI, fostering new applications, and deepening theoretical insights. While our research is often inspired by the transformative potential of practical applications, it is propelled by scientific curiosity. We tackle practical applications head-on, yet delve into core challenges, scrutinize established theories, and re-evaluate basic assumptions. This is followed by the development of algorithms to address these fundamental issues, always with an eye on cost-efficiency and the engineering hurdles of real-world deployment. Additionally, as we push forward in both science and engineering, we maintain vigilance over the risks associated with AI models, proactively investigating these risks, establishing measures to ensure the integrity of AI models, and devising strategies to combat the misuse of AI. To date, VinAI has become the world's top 20 AI R&D companies* and published more than 170 publications in only the very best AI venues, spanning across three core areas of AI: Machine Learning (ICML, NeurIPS, ICLR), Computer Vision (CVPR, ICCV, ECCV), Natural Language Processing (ACL, EMNLP, InterSpeech), representing one of the highest concentrations of AI expertise in the region.

Our Publications by Year

Year	Papers
2019	6 papers
2020	24 papers
2021	70 papers
2022	109 papers
2023	135 papers
Sep 2024	170+ top-tier papers

Our Publications at Top-tier Conferences

Conference	Count
CVPR	28
NeurIPS	25
ICML	17
EMNLP	15
ICLR	14
ICCV	13
ECCV	12
AAAI	12
InterSpeech	7
UAI	6
NAACL	5
ACL	5
AISTATS	5
IJCAI	4
Siggraph	3
ICASSP	1

*Scan the QR code to access Thundermark Capital report on the global AI research companies

VinAi

Building the Next Generation of Thought Leaders in AI

Launched in the summer of 2019, **the AI Residency Program** was established to identify and nurture exceptional AI talent in Vietnam. Our goal is to empower these young minds to become future thought leaders in the field. Through our rigorous two-year program, residents gain invaluable hands-on experience working alongside world-class AI researchers. This immersive experience equips them with the skills and knowledge necessary to make significant contributions to the field of AI.

The AI residents will tackle real-world AI challenges and explore cutting-edge techniques and methodologies. They are guided through the research process and taught how to effectively consult materials, conduct thorough research, and adhere to international standards.

Some PhD Programs Where Our AI Residents Go

110+ residents recruited, representing the top 1% of AI talents in Vietnam

80+ accepted papers with our residents as first authors

40+ GenAI & AI optimization applied projects completed

80% pursuing PhD post-residency with full scholarships (35% went to the the Top 20 CS programs)

30+ top-tier host universities in 09 countries

*as of Q3 2024

VinAi

INTELLIGENCE FOR TOMORROW, TODAY

Contact us at
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