



INTELLIGENCE FOR TOMORROW, TODAY

# COMPANY PORTFOLIO

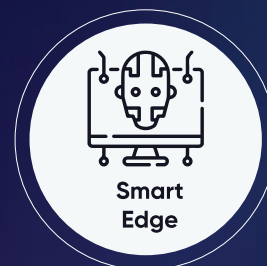
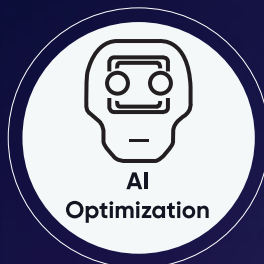


Intelligence for Tomorrow, Today!

Founded in 2019, VinAI is a global top 20 AI research-based company with a myriad of practical research projects and products. VinAI's headquarters are in Hanoi (Vietnam), with additional locations in Ho Chi Minh City, the United States, Australia, and Europe. Bringing together almost 200 high-profile researchers and engineers, VinAI sets out to transform its state-of-the-art AI research technology 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.

# BUSINESS DIVISIONS



Our offices and Tech hubs



## 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. As part of the Vingroup ecosystem – which spans everything from real estate and car manufacturing to healthcare, hospitals, and education – we have access to real customers facing real problems across multiple industries. We already have key products gaining traction in both the smart mobility and the smart edge verticals, and VinAI is one of the few AI companies with real world experience in many of the diverse fields where AI will be most needed.

## AI OPTIMIZATION

Having a strong, unified team of both AI and embedded systems engineers gives us an advantage in developing, optimizing, and deploying AI models quickly in the real world, with the shortest turnaround time. We've honed our ability to deploy real-time AI on cost-effective hardware (on-device, on-edge, and on-cloud), from adaptation and quantization, to profiling, optimization, and execution.

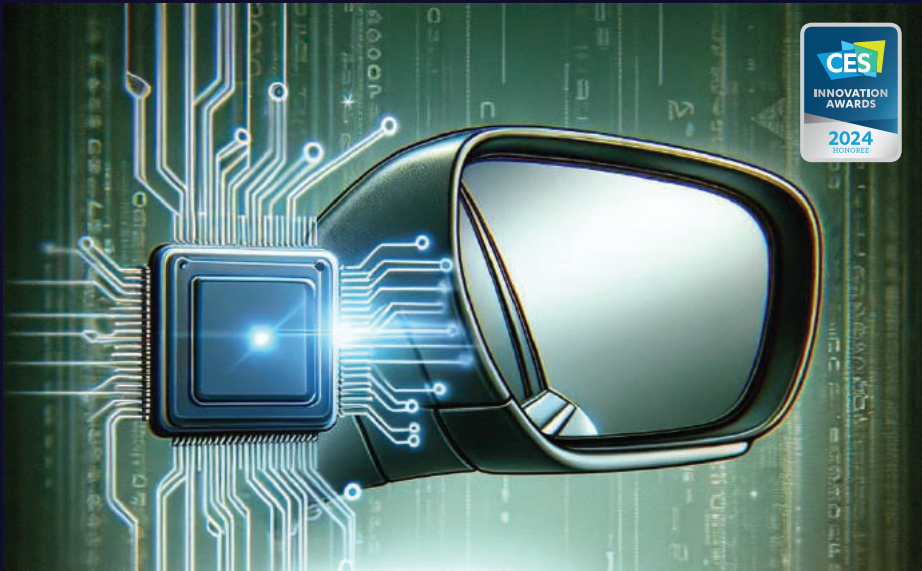
## WORLD-CLASS AI R&D

VinAI is one of the leading global producers of fundamental research in machine learning, deep learning, and AI development. Our advancements are enabling new optimized AI methods in computer vision, natural language processing and generative AI. We believe in building along the entire chain of AI development – from cutting edge theory all the way through to practical product in a customer's hands.

## OUR GLOBAL COLLABORATORS & CUSTOMERS



## Our featured presence at CES 2024



### MirrorSense

Developed by  VinAI

VinFast MirrorSense is the world's first AI-powered and real-life trialed auto-mirror-adjustment feature that can be seamlessly integrated into smart vehicles with a Driver Monitoring System (DMS) camera. Developed by VinAI, a brother company of VinFast. Using proprietary AI technology, MirrorSense precisely detects the head and eye gaze with 10mm accuracy, automatically adjusting all mirrors. Its innovative bridging algorithm ensures effortless integration into infotainment systems without costly hardware upgrades.

MirrorSense can easily be extended to auto-adjust seat's settings and Augmented Reality Head-Up Displays. MirrorSense will be integrated in VinFast (NASDAQ:VFS) electric vehicles in early 2024, enabling the accessibility of smart mobility for global communities.

## Next Level of Safety & Comfort

With our next-generation smart in-vehicle solution that combines in-car monitoring and surround sensory systems, VinAI sets to transform the automotive industry by making driving a safe and comfortable experience by harnessing cutting-edge AI Technology.

### OUR FEATURES



Driver & Occupants Monitoring Systems (DOMS)



MirrorSense



AR HUD (Augmented Reality Head-Up-Display)



DrunkSense

### INTERIOSENSE



Our specialized InteriorSense ensures a safe driving experience with our in-cabin solutions, using high-performance cameras and AI to analyze driver behavior patterns and prevent driving errors.

Our multi-camera integrated platform eliminates all blind spots and gives the driver a 360 degree view around the vehicle in real time, significantly improving vehicle safety and enhancing the driving experience.

### SURROUNDSENSE



Advanced Surround View Monitoring System (ASVM)



Homezone Parking



FAPA Fully Automatic Parking Assistance



Narrow Street Assistance

### OUR HIGHLIGHTS

**50K+**

Ship-to-market cars embedded with Smart Mobility Technologies

**700K+**

Vehicles set for shipment with integrated VinAI Smart Mobility products

**8**

Different car models equipped with Smart Mobility Technologies

#### INTERIOSENSE

Regulation Compliance: GSR phase 1 - 2021/1341 DDAW

#### SURROUNDSENSE

Regulation Compliance: NHTSA FMVSS 111 & UN ECE R158

### WHY US?

Highly accurate AI model: Rank 6th NIST 2020

DMS Accuracy and performance equal to top 2 world-wide DMS suppliers, independent benchmarking by EU Tier-1

World-first MirrorSense feature, 3D estimation using single DMS camera

Flexible and portable on different platforms and systems, adapted from high-price range to low-price range vehicles

Adapted with multiple camera placement options (Steering Column, Instrument Cluster, Center Stack)

AI-enabled safety functions and enhanced driving experience

# HIGHLIGHT FEATURES

## DRUNKSENSE

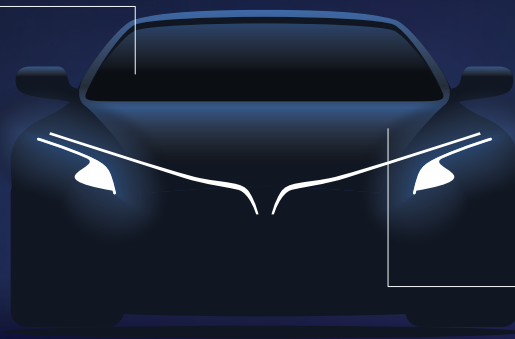
### Why us?

- World-first feature developed and patented by VinAI
- Passive monitoring of drunk driving behaviors  
~ Average Sensitivity: ~95% (1~5 minutes monitoring)
- Distinguish drunk driver from drunk passengers
- Avoid False Positive (FP) warning from drowsiness, distraction

### DrunkSense highlight

- Uncovers intoxication cues: drowsiness, delayed responsiveness, erratic eye movements, providing comprehensive detection
- Establish a robust defense against potential manipulations, providing a tamper-resistant solution
- Cost-effective innovation to reliable and accessible drunk driving prevention

## DrunkSense\*



"Jelly View is a 360-degree wrap-around view that offers a transparent vision through the entire vehicle."



"DrunkSense is a fusion of an alcohol sensor and an advanced InteriorSense camera that optimizes the efficiency of breath detection and enhances the ability to identify intoxicated behaviors accurately"

## Jelly View

## JELLY VIEW

### How it works

Using Jelly View, the driver can see the entire scene outside the vehicle and underneath the vehicle and can switch between different views using the on-screen control panel. The driver can interact with the view by swiping in any direction to see all around the car. With this 3D transparent mode, the driver can observe blind spots, especially underneath the vehicle, and avoid unexpected accidents.

VinAI reinvents the driver's experience by offering complete awareness of the situation entirely outside and underneath the vehicle and identifying obstacles in "blind" areas with our Jelly View technology.

Our multi-camera integrated platform eliminates all blind spots and reconstructs a 3D transparent view around the vehicle in real time, significantly improving vehicle safety and enhancing the driving experience.



Security, Surveillance, Compliance & Convenient Enhancement AI Solution

## REAL-TIME GUARD & ALERTS MAKE ANY CAMERAS SMART

A set of embedded AI algorithms running on edge servers & a content management system.

GuardPro can turn individual and ordinary cameras into a wholistic AI system, that provides constant and real-time monitoring for your properties. GuardPro works 24/7 and it is more reliable and cheaper than human operators.



Our Solution for Smart Cities

## AI FEATURES

### Safety

- Face Recognition for Access Control
- Blacklist/Whitelist Detection
- Intruder Detection
- Person Reidentification
- Fence Jumping Detection
- Violence Detection
- Harassment Detection
- Kidnapping Detection
- Loitering Detection

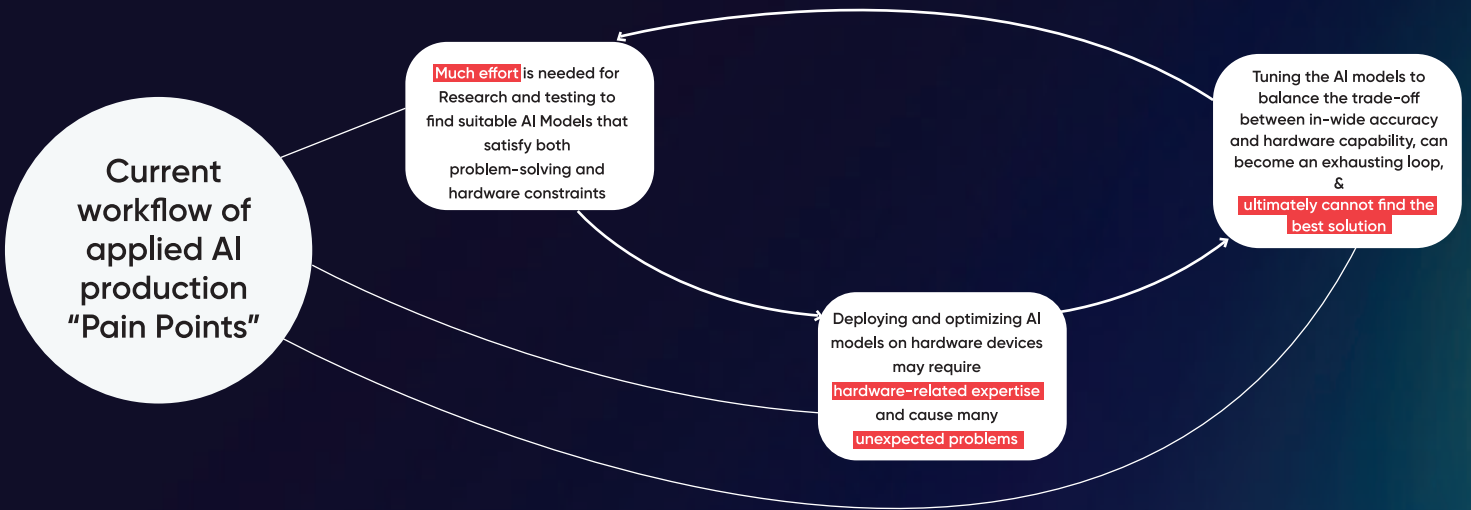
### Compliance

- Parking Violation Detection
- Face Mask Policy Violation Detection
- Abandoned Item Detection
- Unallowed Object Placement Detection
- Bulky Object Detection in Elevator
- Pet Detection

### Convenience & Well-being

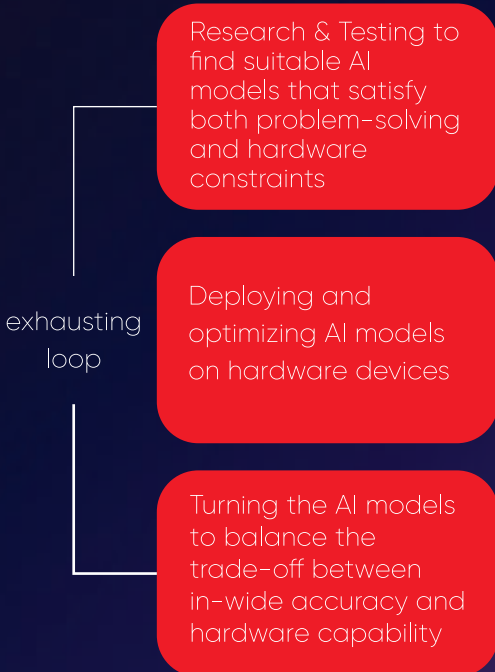
- Vehicle Localization by license plate number
- Available Parking Spot-localization
- Convenient Access to swimming pools and playgrounds without carrying resident cards
- Fall/Unconsciousness Detection

Deploy AI Models to solve a specific problem running on a specific device

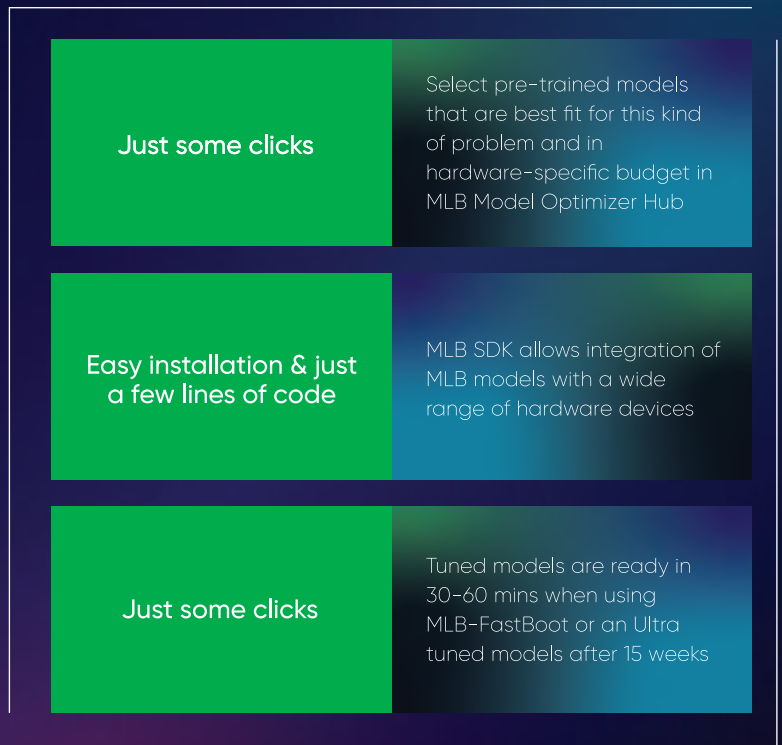


Deploy AI Models to solve a specific problem running on a specific device

**Without MLB**



**MLBOOSTER**



**01** | **InstaBoost**  
"Instant noodles" Models are available for you to download

**02** | **FastBoost**  
"Big Mac" Models are ready for you to pick up in 30-60 minutes

**03** | **UltraBoost**  
"Fine-dining" Models will be served on your table after 1.5 weeks



## Research Division

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.

Our research division is divided into three groups: Machine Learning, Computer Vision, and Natural Language Processing.

### Our Research Group

#### Core Research Groups

18 RS + 13 applied + 45 AI residents  
Research + residency PMs + editor/ethics

Machine & Deep Learning

Computer Vision

Natural Language Processing

### Machine Learning & Deep Learning:

Leader in optimal transport for machine learning  
Pushing frontier in human-level learning capabilities (self-supervised, domain adaptation, learning with less label)

Generative AI in vision and language  
Theoretical core to AI products

### Computer Vision:

3D Vision, robust AI, zero/few-shot problems, open-vocabulary problems, image restoration and enhancement

Pioneering AI features for DMS, SVM, Edge

### Natural Language Processing:

#1 Vietnamese machine translation system

#1 Toolkit for core NLP tasks

LLMs for Vietnamese (PhoGPT, PhoBERT, BARTPho)

### Our Paper Distribution in Top-tier Conferences

**2023**

136 top tier papers

**2022**

109 papers

**2021**

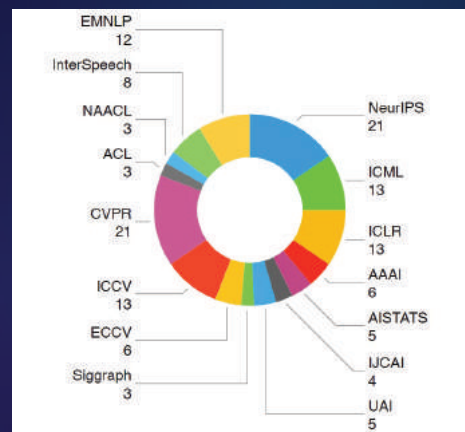
68 papers

**2020**

23 papers

**2019**

6 papers



\*In 2022, VinAI was ranked among the Top 20 Global AI-based Companies\*

(\*: Thundermark Report 2022)

### Our Community Services

- **4** Annual AI Day Events
- **7** Live Conference Paper Workshops
- **64** Live Research Seminars
- **40** Released Source Codes + **11** Released Datasets
- **40** Technical Blogs
- **18** Technical Talks / Public Lectures

## Generative AI and Large Language Models

Generative AI (GenAI) and Large Language Models (LLMs) are recent AI advancements capable of creating music, text, and lifelike images indistinguishable from human creations. This has led to a burgeoning realm of AI-generated content, with significant potential and complex ethical considerations.

At VinAI, our pioneering research in generative AI, including enhancements to GANs and VAEs, predated the advent of tools like Stable Diffusion and ChatGPT. Amidst a spike in community interest, we are intensifying our work to navigate this field's critical challenges. We are committed to releasing open-source Vietnamese foundation models, improving algorithms for enhanced content creation, reducing the costs associated with training and running generative models, and ensuring the reliability and ethical usage of AI-generated content.

Our commitment to the AI community includes offering free access to LLMs and other foundation models, especially for Vietnamese and other specific domains, helping overcome barriers like limited access to data and resources. This democratization effort has led to models like PhoGPT, PhoBERT, BERTweet, and XPhoneBERT with millions of downloads, benefiting a wide audience.

We are advancing algorithms for generative tasks in Computer Vision, Language and Speech Processing. Algorithms like HyperInverter and QC-StyleGAN enhance image quality, while text and speech models like XPhoneBERT and FlowVocoder push the boundaries in multilingual text-to-speech conversion and audio quality.

### Our Monthly Most Downloaded Models on Hugging Face

*"As of 24th Nov 2023"*

VinAI Model	Monthly Downloads
Bertweet-base	970,000+
Xphonebert-base	160,000+
Phobert-base-v2	150,000+
Phobert-large	119,000+
Phobert-base	83,000+
Bertweet-large	5,700+
PhoGPT-7B5-Instruct	4,700+
Vinai-translate-vi2en	4,000+

## PhởGPT



### Open-Source LLM for Vietnamese with 7.5B parameters

PhoGPT-7B5: pre-trained monolingual model

PhoGPT-7B5-Instruct: instruction-following model

A new foundation model pretrained from scratch

SOTA Open-Source Vietnamese LLM

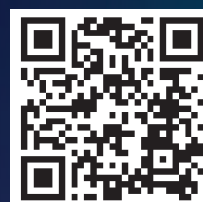
We were able to compress the original PhoGPT 7B5 model to an efficient architecture which could be run on consumer-grade phone at the average speed of **12 tokens/sec**

## PhởGPT 7.5B

Check our model at

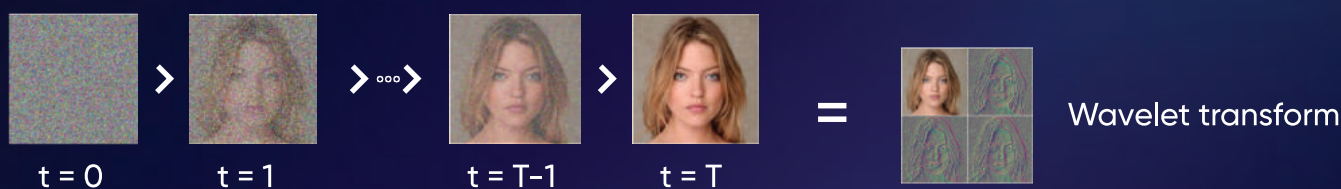


See our demo at



## Instant ImageGen

Standard diffusion process



### VinAI Instant ImageGen



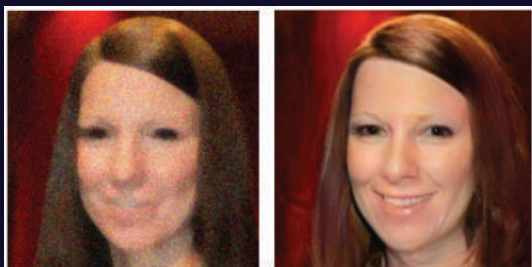
### GenAI Optimization

- Distribution-aware quantization
- Progressive distillation
- Foundation model squashing

Our model's Inference Time per image is **approximately 10 times faster** than Stable Diffusion

We understand that the efficiency of GenAI models significantly influences their capital and operational expenses. Consequently, we have committed considerable research and development resources to optimizing these models. Our initiatives include enhancing technology to optimize the architecture and decrease the inference time of Transformer modules, essential to numerous foundation models. We have also addressed the training and fine-tuning expenses of LLMs, deriving techniques that allow domain-specific fine-tuning within a single day.

## Generating quality images from noisy ones



Noisy Image    Denoised Image



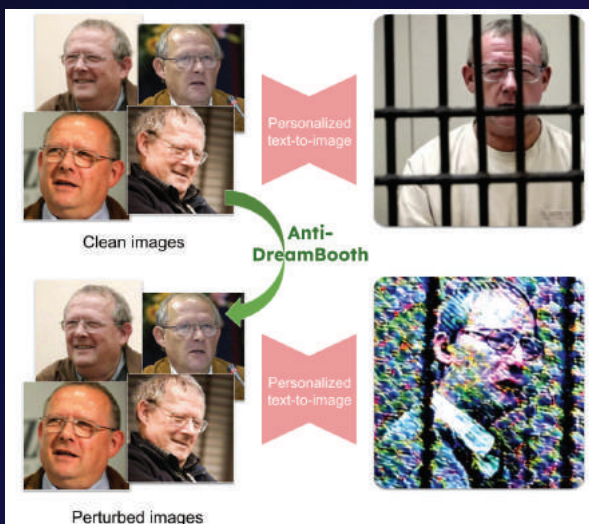
Blurry Image    Deblurred Image

**Fig. 1:** A demonstration of our capability to generate quality images based on noisy and blurry ones.

Paper: [“QC-StyleGAN - Quality Image Generation and Manipulation, NeurIPS 2022”](#)

We take the reliability and trustworthiness of GenAI models and their generated content seriously. We remain vigilant about the potential dangers of GenAI and proactively investigate risks that might compromise AI model integrity, establishing best practices for their development and use, and devising defensive strategies

## Anti-DreamBooth



Prompt: *“Behind bars”*

**Fig. 2:** An illustration of our capability to protect users from malicious image generation by applying imperceptible perturbations to the user’s images before releasing.

Paper: [“Anti-DreamBooth: Protecting users from personalized text-to-image synthesis, CVPR 2023”](#)

## AI Residency Program

VinAI AI 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 field. The residents are expected to spend approximately two years directly participating in our research programs while being mentored by our world-class research staff. Since its inception in 2019 until the end of 2022, the AI Residency Program has trained more than 80 brilliant young talents and had first-authored 48 papers accepted and published at Top-tier AI conferences. The program also records 67 Ph.D. scholarships across the world's top 20 Computer Science universities.



## Nurturing Young AI Talents & Global Leaders

At VinAI, the residents are expected to work on real-world AI problems and applications, as well as to conduct research in different techniques and methodologies. Once the research direction has been chosen, the residents are carefully instructed on how to consult materials, reading methods, and how to research works methodically, according to world-class standards.

## Highlighted numbers

- 80** residents recruited in over 3 years, belonging to top 1% AI talents in Vietnam
- 48** accepted papers at top tier AI conferences
- 45** filed patents
- 67** Ph.D scholarships from top 20 global universities specializing in AI and Computer Science

\*as of Oct 31st, 2023





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or



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