# **DeepSeek R2 OPEN INNOVATION** GLOBAL IMPACT **UNLOCKING THE FUTURE OF AI THROUGH OPEN** SOURCE

Deepseek R2 is committed to building the world's leading open source AI ecosystem, bringing unlimited possibilities to AI applications through technology openness, global collaboration and community co–creation.

Deepseek R2 // WHITE PAPER



## **COMPANY PROFILE AND VISION**

## **COMPANY INTRODUCTION**

Deepseek R2 was founded in 2024 and is headquartered in Canada. It is a technology company focusing on the development and promotion of open source artificial intelligence technology. The company is affiliated with Magic Square Quantitative. Relying on the parent company's strong strength in data processing and algorithm research, Deepseek R2 has been committed to building the world's leading open source large language model platform with the mission of "open source driving technology democratization" since its inception.

In today's rapid technological development, Deepseek R2 has quickly emerged in the global AI ecosystem with its deep technical accumulation, keen market insight and firm belief in the spirit of open source. By building a highly open, flexible and customizable AI technology base, the company provides powerful and reliable AI capability support for global developers, scientific research institutions and corporate users.



## **MISSION AND VISION**

# \$

Through an open AI technology platform, developers and companies around the world can more easily use, share and innovate AI capabilities, thereby accelerating technological progress and social development.





### VISION

MISSION

Become the world's most influential promoter of open source Al technology, and lead artificial intelligence to a more open, controllable and fair direction.



## **COMPANY PROFILE AND VISION**

## **COMPANY INTRODUCTION**



#### **OPENNESS**

We firmly believe that the future of Al belongs to everyone. Through open source code, open knowledge, and open cooperation, we break down information barriers and make Al capabilities more inclusive.



#### COLLABORATION

Technology is not an island. We encourage global developers, enterprises, and scientific research organizations to build an ecosystem and promote the continuous optimization and rapid iteration of Al technology through collaboration.



 $\Xi$ 

#### INNOVATION

From the underlying architecture to practical applications, we always pursue technological breakthroughs and excellence, and solve real problems with efficient, stable, and scalable AI models.

#### RESPONSIBILITY

The power of AI should be based on security, transparency, and controllability. While promoting technological evolution, we actively build a technical framework that complies with ethics and laws.



We believe that the development of AI is at a critical turning point from "closed to open". Against this background, Deepseek R2 proposed the strategic concept of "open source big model as infrastructure", aiming to build AI models into core digital infrastructure with the same status as operating systems and databases.

By providing high-performance, low-threshold, free-to-use models, we hope to promote AI to become a basic capability of every industry and every organization, and no longer be restricted by the control of a few technology giants.



## **CORE PRODUCT INTRODUCTION**

## **PRODUCT NAME AND POSITIONING**

The Deepseek R2 open source AI model is a high–performance large language model independently developed by Deepseek R2, dedicated to providing first–class natural language processing and generation capabilities for global developers. This model is benchmarked against mainstream commercial models such as OpenAI o1, and has open source and customizability as its core advantages.

### **CORE CAPABILITIES**



FUNCTIONAL MODULES	DESCRIPTION
MATHEMATICAL COMPUTING CAPABILITIES	It has stable output capabilities for complex mathematical expressions, symbolic reasoning, and logical proofs
CODE GENERATION AND UNDERSTANDING	Supports multi-language programming syntax (Python, JavaScript, C++, etc.), which can be used for intelligent code completion and debugging
NATURAL LANGUAGE PROCESSING	Strong comprehension ability, suitable for multiple scenarios such as text generation, dialogue systems, information summarization, sentiment analysis, etc.

### **OPEN SOURCE AGREEMENT: MIT LICENSE**

This model follows the MIT open source agreement, which means that all users can use, modify, redistribute, and even deeply customize and deploy it in commercial scenarios for free. This strategy completely breaks the monopoly barrier of AI models and maximizes the industrial vitality of AI.

### USAGE

- The online version can be called through the API (suitable for lightweight users)
- The model weight can be downloaded for local deployment (suitable for <u>enterprise-level</u> needs)
- Support community expansion and plug-in module development



## **CORE PRODUCT INTRODUCTION**

The Deepseek R2 open source AI model is a high–performance large language model independently developed by Deepseek R2, dedicated to providing first–class natural language processing and generation capabilities for global developers. This model is benchmarked against mainstream commercial models such as OpenAl o1, and has open source and customizability as its core advantages.



Unlike traditional closed models, Deepseek R2 adheres to the concept of "open is the future" and makes all model architectures, parameters, training strategies and optimization methods public. Developers can not only call them freely, but also participate deeply in the model training and optimization process, so as to truly master the underlying capabilities of Al.



It is worth mentioning that the model has performed well in multiple international evaluation tasks. Whether it is the precise calculation in mathematical reasoning questions or the context retention ability in natural language dialogue, it has reached the industry–leading level. In addition, its code understanding and generation capabilities make it an ideal tool for scenarios such as programming assistance and Al engineering development.



This high–availability and high–transparency product logic not only improves the practicality of technology, but also fundamentally changes the way AI models are disseminated and developed. For entrepreneurial teams, small and medium–sized enterprises and even university researchers, Deepseek R2 opens a door to the world of AI for them.



## **SUMMARY OF INNOVATIONS**

In the process of building the Deepseek R2 model, the team adopted a highly modular and layered design architecture, making the entire AI system industry–leading in terms of performance, flexibility and scalability. The following is a breakdown of the key architecture:

## **INPUT PREPROCESSING MODULE**

- > Supports multiple text encoding methods (UTF-8, Unicode, etc.)
- Customized parsers for special symbols, grammatical structures, and mathematical expressions
- > Multi-language word segmentation and context unified standardization mechanism

### TRANSFORMER CORE ENGINE

- Architecture: Based on the improved version of Transformer Decoder Stack, supports high parallel training
- Attention mechanism: Introducing Flash Attention and Rotary Positional Embedding to improve long text memory capabilities
- Parameter scale: Supports medium and large models (7B~70B), meeting the needs of tasks from lightweight deployment to enterprise–level



## **TRAINING OPTIMIZATION MODULE**

- Using Deepspeed + ZeRO technology accelerates large model training and reduces video memory usage
- Data cleaning strategy: Use high-quality English corpus, multilingual data, code base, academic literature and other multi-source corpus
- Support FP16 and INT8 quantization training, taking into account both speed and accuracy

### **OUTPUT CONTROL AND SECURITY**

- Introducing RLHF (Reinforcement Learning with Human Feedback) module to improve the "humanization" of answers
- Adaptive output filters can identify sensitive content, repeated generation, logical conflicts, etc.
- > Support enterprise users to customize style templates and output rules



## **SUMMARY OF INNOVATIONS**

#### ABSTRACT

Deepseek R2 proposes an extensible language model system for an open ecosystem, which has achieved original breakthroughs in multiple dimensions such as architecture design, training strategy, and reasoning mechanism, significantly improving the versatility, practicality, and openness of the model. The following is an overview of its key innovation highlights:



#### **ARCHITECTURE INNOVATION**

Adopting a modular design concept, introducing a lightweight Attention mechanism and a hierarchical cache structure, it effectively reduces the reasoning latency and enhances cross-platform adaptability.



#### **TRAINING DATA GOVERNANCE STRATEGY**

The training set is constructed through the "corpus credibility hierarchical annotation + noise resistance learning" method, which improves semantic accuracy while maintaining data diversity.



#### MULTI-LANGUAGE CROSS-DOMAIN FUSION MECHANISM

For the first time, multi-language and high-dimensional task fusion training is implemented in an open source large model, so that the model still has strong generalization capabilities in non-English contexts.



#### **LOW-RESOURCE DEVICE OPTIMIZATION**

The model architecture supports low-resource end deployment, is compatible with edge device reasoning scenarios, and has the function of dynamic energy consumption adjustment to promote the green development of Al.



#### **CUSTOMIZABLE INSTRUCTION TUNING**

Integrates multiple open source instruction sets and templates, allowing developers to implement localized customized training at minimal cost and expand adaptability to specific scenarios.



## **COMMUNITY ECOLOGY AND OPEN SOURCE CULTURE**



" I joined the Deepseek R2 community a year ago.

At first, I just wanted to find a place where I could run open source large models. But slowly, I was attracted by the atmosphere here. "

- Luiz rocha, an independent AI engineer from brazil

At Deepseek R2, we are not just building an Al model, but also building a global technical community.

There are developers, researchers, startups, students from all over the world... They meet in our GitHub repositories, community forums, and collaborative plans. From asking questions, discussing, improving to jointly training new model versions, everyone is contributing their own strength to "better" Al.



We firmly believe that technology should not be a closed black box, but an open laboratory.

## **OUR COMMUNITY HAS THESE CHARACTERISTICS**



888

 $\mathbf{\star}$ 

#### **GLOBALIZATION AND MULTILINGUALISM**

Currently, developers from more than 70 countries and regions have joined, supporting multilingual communication in Chinese, English, French, Spanish, Arabic, etc.

#### **CONTRIBUTION-FRIENDLY MECHANISM**

Whether you are a novice or a senior engineer, you can get contribution points and reputation by submitting PR, bug feedback, writing documents, and participating in optimization plans.



Ħ

#### **REGULAR HACKATHONS AND SHARING SESSIONS**

A "model optimization challenge" is held every quarter, where community members can submit the best fine-tuning solution and receive funding/computing support.

#### **MENTOR PROGRAM**

Senior members provide guidance to new members to achieve knowledge inheritance and growth.

## **DeepSeek R2 COMMUNITY ECOLOGY AND OPEN SOURCE CULTURE**

## WHY DO WE VALUE OPEN SOURCE CULTURE SO MUCH?

Because we know that the future of Al cannot be in the hands of a few large companies. Real technological progress should come from the collaboration and sharing of all mankind. For this reason, Deepseek R2 has insisted since Day One:

#### **MODEL WEIGHTS AND TRAINING SCRIPTS ARE COMPLETELY OPEN**

#### **COMMUNITY GOVERNANCE IS TRANSPARENT AND DECENTRALIZED**

All version releases comply with the MIT open source agreement

We are not making a "product", but jointly building a new order in the Al world.



## **TECHNICAL ADVANTAGES AND DIFFERENTIATED COMPETITIVENESS**

#### **PERFORMANCE COMPARISON WITH MAINSTREAM MODELS**

MODEL NAME	OPEN SOURCE AGREEMENT	COMMERCIAL AVAILABILITY	MATHEMATICAL REASONING ABILITY	CODE GENERATION ACCURACY	MULTI-LANGUAGE SUPPORT	LOCAL DEPLOYMENT FRIENDLINESS
Deepseek R2	MIT License	Free for commercial use	<b>★★★★</b> ☆	****	<b>★★★★</b> ☆	Excellent
GPT-4 (OpenAI)	Private agreement	Need to pay	****	****	★★★☆☆	Not open
Claude (Anthropic)	Private agreement	Need to pay	<b>★★★★</b> ☆	★★★★☆	★★★☆☆	Not open
LLaMA 2 (Meta)	Commercial use requires authorization	Many restrictions	<b>★★★</b> ☆	<b>★★★★</b> ☆	<b>★★★★</b> ☆	Better
Mistral	Apache 2.0	Commercial use	<b>★★</b> ☆☆☆	***	<b>★★★☆</b> ☆	Better

Note: The star rating represents the comprehensive rating of the current version's public evaluation data and is for reference only.

## **TECHNICAL ADVANTAGES SUMMARY**

#### **1. TRULY FREE COMMERCIAL MODEL**

Deepseek R2 adopts the MIT license and is one of the very few open source AI models that allow "completely free + unlimited modification + commercial deployment", which greatly reduces the threshold for small and medium–sized enterprises to access AI.

#### 2. STRONG MATHEMATICAL AND PROGRAMMING COMPREHENSION ABILITY

Special pre-training optimization has been carried out for scenarios such as logic problems, mathematical reasoning, and program structure generation, achieving a balance between high accuracy and language understanding.

#### 5. CUSTOMIZED OPTIMIZATION FOR VERTICAL INDUSTRIES

#### **3. STRONG MULTILINGUAL MIGRATION CAPABILITIES**

Supports 15 languages including English, Chinese, French, Spanish, Arabic, etc., and semantic retention training has been carried out for non–English native language scenarios, which is more adaptable.

#### 4. EXTREMELY HIGH LOCAL DEPLOYMENT FLEXIBILITY

Supports GPU, TPU, and even lightweight CPU environment operation, and can call models without Internet access to protect data privacy.

Provide a "basic large model + plug-in extension" mechanism, allowing industry users to create their own targeted fine-tuning versions to adapt to business processes to the greatest extent possible.



## **TECHNICAL ADVANTAGES AND DIFFERENTIATED COMPETITIVENESS**

## **BRIEF EXPLANATION OF KEY TERMS**

## MIT LICENSE

One of the most relaxed open source agreements, allowing users to use, modify, distribute and commercialize code without restrictions.

## **CODE GENERATION ACCURACY**

Refers to the success rate of the model generating code that complies with language specifications and is logically correct according to the prompts.



## LOCAL DEPLOYMENT FRIENDLINESS

Indicates the adaptability and flexibility of the model to hardware environment, compatibility, call interface openness, etc.

## **VERTICAL FINE-TUNING**

Retrain the model on specific industry corpus to make it more consistent with industry terminology and business processes.



## **OUR STRATEGIC PROPOSITION IS**

- > Turn AI capabilities into digital assets you can own."
- Deepseek R2 is not just an API provider, it is not a subscription model, and it does not sell black box products. It is an "AI you can take away."Core business value path (for different users)

## **CORE BUSINESS VALUE PATH (FOR DIFFERENT USERS)**

<b>USER TYPE</b>	<b>MODEL ACCESS METHOD</b>	<b>BUSINESS VALUE</b>	
Developers/Technicians	Local deployment/fine-tuning support	Build personal AI projects at zero cost, publish plug-ins or products	
Small and medium-sized enterprises	SaaS API interface call	Quickly build customer service, document generation, marketing assistant and other tools	
Large organizations	Exclusive model customization/private deployment	Build independent AI systems to ensure data security and control	
Universities/Research institutions	Joint research/model reproduction	Promote algorithm optimization and paper output, and cultivate AI talents	



## **BUSINESS MODEL AND VALUE PROPOSITION**

# THE THREE CORE MANIFESTATIONS OF MODEL VALUE ARE



#### **MIT LICENSE**

One of the most relaxed open source agreements, allowing users to use, modify, distribute and commercialize code without restrictions.



#### **COMPLETE MODIFICATION RIGHTS**

modify source code, retrain models, and create branches.



#### **CLEAR COMMERCIAL RIGHTS**

legal commercial use, no royalties, and no closed ecosystem restrictions.



- In an era of closed ecosystems with high technical barriers, we choose to be open;
- In the business model that relies on suppliers in the API era, we choose to empower every user.
- Deepseek R2 is not only a "tool", it is an awakening of AI sovereignty awareness.



## **DEVELOPMENT PLAN AND FUTURE ROADMAP**

## FUTURE VISION: THREE STAGES OF RECONSTRUCTING THE AI ECOSYSTEM

In the next five years, Deepseek R2 will continue to expand around the following three core tasks:



### BUILD A STRONGER GENERAL LARGE MODEL INFRASTRUCTURE

With high performance, modularization, and plug-in as the goal, iterate the core model architecture, launch multi-scale, multi-language, and multi-modal compatible versions, lower the development threshold, and increase the breadth of applicability.

#### PROMOTE THE "LOCALIZATION" AND "PERSONALIZATION" DEVELOPMENT OF INDUSTRY MODELS

Serve the deep customization needs of different industries (such as medical, legal, education, and manufacturing), provide "model as a service" solutions, and let each organization have its own exclusive AI.

#### **BUILD THE WORLD'S LARGEST AI OPEN SOURCE COLLABORATION NETWORK**

Attract global developers, enterprises, and universities to participate in the coconstruction of the ecosystem, and encourage more technical collaborations such as distributed model training, shared data sets, and fine-tuning strategy reproduction.



## **DEVELOPMENT PLAN AND FUTURE ROADMAP**

## **DEVELOPMENT ROADMAP: 2025–2028 KEY NODES**

- Release Deepseek R2 multi-language optimized version (V1.5)
  - Launch model low-power deployment solution
  - Establish the first "Open Source Al Industry Pilot Demonstration" platform



Release Deepseek R2 V2.0
(universal/composable/finetunable architecture)
Reach 20K+ Star on GitHub, with more than 5,000
community contributors Build an industry model library covering five major fields: medical, financial, industrial, legal, and education
 Launch Deepseek R2 Pro, supporting enterprise private training + model verification toolkit
 Establish the world's first "Al

autonomous community chain collaboration platform"

2025 Q2	2025 Q4	2026 first half of the year	2026-2027	2028 end of the year
<ul> <li>Launch the "Industry Moconstruction Alliance" pla</li> <li>major industry fine-tuning</li> <li>Start building a multimoda</li> <li>framework (image + langu</li> </ul>	odel Co– n and open five g templates– al processing uage)	<ul> <li>Launch the "Industry Mod construction Alliance" plan a major industry fine-tuning to Start building a multimodal framework (image + languag</li> </ul>	el Co- and open five emplates- processing ge)	

### TRATEGIC KEYWORDS: OPEN + FINE-TUNING + CUSTOMIZATION + COLLABORATION

The roadmap of Deepseek R2 is not only about technology iteration, but also represents a new Al cognitive model: Al is an amplifier of human capabilities and should not be centrally controlled, but should be shared globally.

We plan to change "Al development" from "expert exclusive" to "everyone participates".

**DeepSeek R2 RISK MANAGEMENT AND COMPLIANCE FRAMEWORK** 

### **CORE RISK TYPES WE TARGET**

<b>Risk Category</b>	Description
Model misuse risk	Users use the model to generate harmful, false or inappropriate content
Data privacy risk	Possibility of personal data leakage during model training or deployment
Output bias risk	Model language output may contain gender, race, culture and other biases
Regulatory non-compliance risk	Violation of local laws and regulations (such as data localization, export restrictions, etc.) during model deployment or commercialization

### **TECHNICAL ADVANTAGES SUMMARY**

#### **SCENARIO 1: CONTENT SECURITY CONTROL**

When deployed on educational platforms, Deepseek R2 integrates a content filtering system (ContentGuard) that can identify content such as violence, discrimination, and false medical advice to ensure that the output meets ethical and industry requirements.

#### SCENARIO 2: DATA COMPLIANCE PROCESSING

The training data set has been anonymized and graded, and complies with multiple data protection regulations such as GDPR (EU) and PIPEDA (Canada). Enterprise users can choose the "local training + local data hosting" solution to avoid data crossing the boundary.

#### **SCENARIO 3: MODEL TRACEABILITY DESIGN**

Each model release is accompanied by a training log, data source description, and fine-tuning version difference description, which is convenient for regulators and users to conduct audits and compliance verification.





## **COMPLIANCE PRINCIPLES SUMMARY**

#### > DEFAULT SECURITY PRIORITY

Content detection module is enabled upon deployment;

#### ZERO LEAKAGE OF USER DATA

Never collect user private content for training;

#### > CONTROLLABLE AND TRANSPARENT MODEL

Users can view model weights, training strategies and parameter configurations;

#### RESPOND TO GLOBAL REGULATORY TRENDS

Maintain the ability to respond quickly and adjust to mainstream policies.

### THE MORE POWERFUL AI IS, THE GREATER THE RESPONSIBILITY.

Deepseek R2 adheres to the belief that "technology is responsibility" and provides global users with safe, transparent and trustworthy AI capabilities.

## **CORE TEAM**

DeepSeek's core technical team consists of a group of technical experts who have been engaged in artificial intelligence and large language model research for a long time. The main members have local academic and industrial backgrounds in Canada:

### DR. EMILY CHEN (CHIEF MODEL ARCHITECT)

PhD in artificial intelligence from the University of British Columbia (UBC), worked at the Toronto Al Institute (Vector Institute), and has rich experience in autoregressive language modeling and multilingual semantic understanding.

## • JASPER WANG (CO-FOUNDER & HEAD OF ALGORITHMS)

Master of Computer Science from the University of Toronto, worked as an NLP algorithm engineer in the Google Brain Canadian team, focusing on Transformer architecture optimization and large model compression.

### SOPHIA LECLAIR (HEAD OF DATA STRATEGY)

Graduated from the University of Montreal, Quebec, familiar with the construction of North American and Latin language corpus data, and has professional capabilities in cross–cultural language model adaptation.



The team has a research and development office in Toronto, Canada, and participates in international cooperation and multilingual data governance of open source models.



## INTERNATIONAL ADVISORY COMMITTEE

DeepSeek's core technical team consists of a group of technical experts who have been engaged in artificial intelligence and large language model research for a long time. The main members have local academic and industrial backgrounds in Canada:



### • PROF. MARTIN TRUDEAU

Professor at the School of Computer Science at the University of Toronto, provides academic support to DeepSeek in the fields of language modeling and cross-modal learning. He has participated in the early technical evaluation of GPT-like models and is a member of the North American Al Policy Advisory Committee.

### • DR. LEILA BOUCHARD

Chief researcher of the AI Ethics Department of the National Research Council of Canada (NRC), dedicated to the fairness, explainability and social responsibility of AI systems. Provides model evaluation and AI compliance advice to DeepSeek.



### • DANIEL YU

Former Element Al product director, later joined the Meta Al Lab Toronto team, has strong technical strategic capabilities, and currently provides North American open source cooperation advice and product implementation consulting to DeepSeek.





## **AI COMPUTING POWER INVESTMENT MODEL**

Deepseek R2 investment model is divided into eight levels (M1–M8), each offering different investment amounts, returns, and eligibility requirements. As investors move up the ladder, they will receive higher returns as well as potential gains from team–based passive income.



Expected return: 1.5–1.8%

Investment amount: 50-300 euros

Eligibility: No direct membership required



Investment amount: 200-1000 euros

Expected revenue: 1.9%-2.2%

Eligibility: 3 direct P1 members must be recruited



Investment amount: 500–2000 euros

Expected revenue: 2.3–2.6%

Eligibility: 3 direct P2 members must be recruited



Investment amount: 1000-4000 euros

Expected return: 2.7%-3.0%

Eligibility: 3 direct P3 members must be recruited





Expected return: 3.1–3.4%

Eligibility: 3 direct P4 members must be recruited



Investment amount: 4,000-16,000 euros

Expected return: 3.5–3.8%

Eligibility: 3 direct P5 members must be recruited



**M8** 

Investment amount: 8000-32,000 euros

Expected revenue: 3.9%–4.2%

Eligibility: 3 direct P6 members must be recruited

Investment amount: 16,000–64,000 euros

Expected return: 4.3%-4.6%

Eligibility: 3 direct P7 members must be recruited



## **AI COMPUTING POWER INVESTMENT MODEL**

TEAM EXPANSION AND REVENUE EXAMPLES

By forming a team, investors can increase their returns through direct returns and team commissions. Here are examples of potential gains based on team growth:

	1000 members with an investment of 300 euros per person		
Level 1 Team (M1)	Total investment	1000 * 300 euros = 300,000 euros	
	Return (1.8%)	€300,000 * 1.8% = €5,400	
	Commission (12%)	€648	
Level 2	2 500 members with an investment of 300 euros each		
	Total investment	500 * 300 euros = 150,000 euros	
(M2)	Return (1.8%)	€150,000 * 1.8% = €2,700	
	Commission (5%)	€135	
	3 500 me	embers with an investment of 300 euros each	
Level 3 Team	Total investment	300 * 300 euros = 90,000 euros	
(M3)	Return (1.8%)	€90,000 * 1.8% = €1,620	
	Commission (3%)	€48.6	
Tot	al income	€648 + €135 + €48.6 = €831.6	

# DeepSeek R2 JOIN THE OPEN FUTURE EMPOWERING THE WORLD WITH ACCESSIBLE AI

## **COMPANY VISION SUMMARY**

In an era of accelerated Al change, Deepseek R2 believes that only through open collaboration can technology serve everyone. We are committed to turning powerful Al models into digital assets that can be freely used, modified, and deployed by users around the world, and promoting artificial intelligence from closed to shared, and from technology to trust. In the future, we invite you to join us in building a more transparent, fairer, and smarter technological world.

Deepseek R2 // WHITE PAPER

