



Charting the Future: How Digital, Intelligent & Green Tech are Reshaping Chinese Banking

Chen Sichong

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July 8th, 2025

Instructor's CV



- **Chen Sichong**, Professor, School of Finance, Zhongnan University of Economics and Law; Director of the Finance Department; Executive Head, Virtual Teaching and Research Section for Banking Management Courses of Ministry of Education of China; Executive Director, ESG Research Institute.
- Ph.D. in Finance; Assistant Professor, Graduate School of Commerce and Management, Hitotsubashi University; Visiting Professor, Warrington College of Business, University of Florida; Deputy General Manager of the Personal Credit and Housing Finance Department, China Construction Bank (Hubei).
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数字技术与 现代银行业导论

AN INTRODUCTION TO
DIGITAL TECHNOLOGY
AND MODERN BANKING

本书具有以下特点：

◎ **全面系统。**对现代银行业经营中数字技术的底层逻辑及其应用场景进行了系统梳理。不仅阐述了数字技术的原理、特性及其应用，还从经济学理论角度揭示出数字技术如何重塑银行业的规模经济和范围经济。此外，书中探讨了数字技术在银行业务的多个关键领域—包括营销、授信和风控等—的全过程应用，并提供了丰富的银行数字化转型实践案例。

◎ **紧跟实践变革。**银行数字化转型中，“人”尤为重要。本书紧跟大数据+人工智能等数字技术给现代银行业带来的深刻变革，聚焦商业银行数字化经营中复合型人才的培育，旨在培养学生根据银行数字化经营的业务场景，匹配和应用“数字素养”。

◎ **理论与实践并重。**几位作者深耕相关学术领域多年，其深厚的研究功底为分析提供了坚实的理论支撑。同时，他们都具有国有大行的挂职工作经历，并多次开展银行内部培训，对现代银行业数字化经营场景进行了深入的观察和思考，确保本书内容与银行业实践紧密结合。

数字技术与现代银行业导论

陈思翀 白小滢 董志华 主编

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白小滢，女，经济学博士，中南财经政法大学金融学院副教授，曾任美国圣路易斯华盛顿大学访问学者。曾挂职中国建设银行湖北省分行公司业务部副总经理，兼任国家电网、中交集团、中铁建集团等多家央企国企的财务咨询顾问，主持国家自然科学基金、国家社会科学基金、教育部人文社科基金等。出版专著2部，研究成果发表于国内权威期刊，获得财政部一等奖、国企创新二等奖等荣誉。

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An Introduction to Digital Technology and Modern Banking

1. Comprehensive and Systematic Analysis

It systematically examines the underlying logic, technical principles and application scenarios of digital technologies in modern banking.
It reveals how digitalization reshapes banking economies of scale and scope from an economic theory perspective.

2. Multi-Domain Coverage

Covers digital applications in core banking functions (marketing, credit granting, risk control) with real-world cases.
Explores innovative practices in rural revitalization, ESG, green/low-carbon development, and modernizing social governance.

3. Focus on Human-Centric Transformation

Addresses profound impacts of digital technologies (e.g., big data + AI) on banking.
Emphasizing cultivation of interdisciplinary talent to train students to apply digital literacy within business contexts of bank digitalization.

4. High Practical Utility

Serves as both an accessible textbook for university economics and finance programs and an essential training reference resource for banking professionals navigating digital transformation.



碳金融和碳交易系列丛书

气候变化与可持续发展银行

庄子罐 陈思翀 编著

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气候变化 与可持续发展银行

CLIMATE CHANGE AND
SUSTAINABLE BANKING



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庄子罐

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陈思翀

中南财经政法大学金融学院教授，博士生导师，中南财经政法大学碳交易与碳金融研究中心副主任；日本一桥大学商学金融博士；曾任日本一桥大学商学院讲师、美国佛罗里达大学惠灵顿商学院访问教授；挂职中国建设银行湖北省分行住房金融与个人信贷部副总经理；主要研究领域为国际金融、资产定价、金融机构、金融领域的政治经济学以及碳金融。主持国家自然科学基金、国际合作科研基金、教育部留学回国基金等项目；主要成果发表于中英文权威期刊以及《财经》、《经济日报》、《证券日报》等大众传媒

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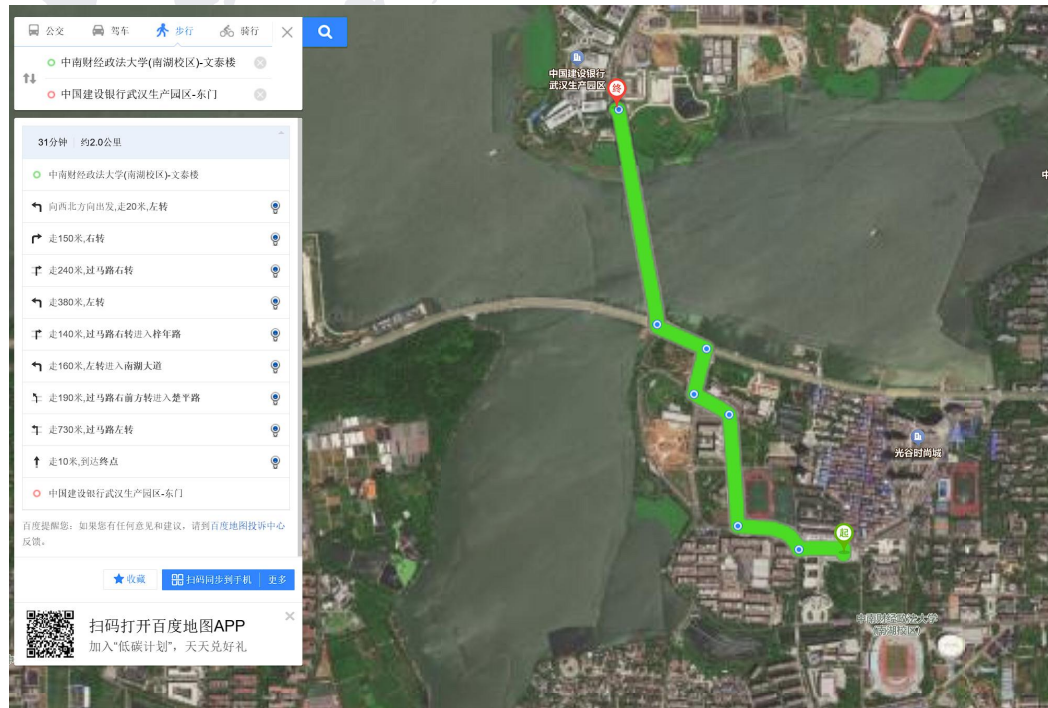


My working experience in CCB



CCB's Production Park near ZUEL across the south lake

(Direction from Wentai Building to the Park)



Contents:

1. Understanding the Era's Characteristics and the Wealth Code Digital, Intelligent, and Green Transformation

2. New Paradigm, New Tools, and New Framework

I. New Paradigm: Digital Technologies & Unstructured Data

II. New Tool: Fine-Tuned Large Financial Models & AI Agents

III. New Framework: Green Finance and Sustainable Development



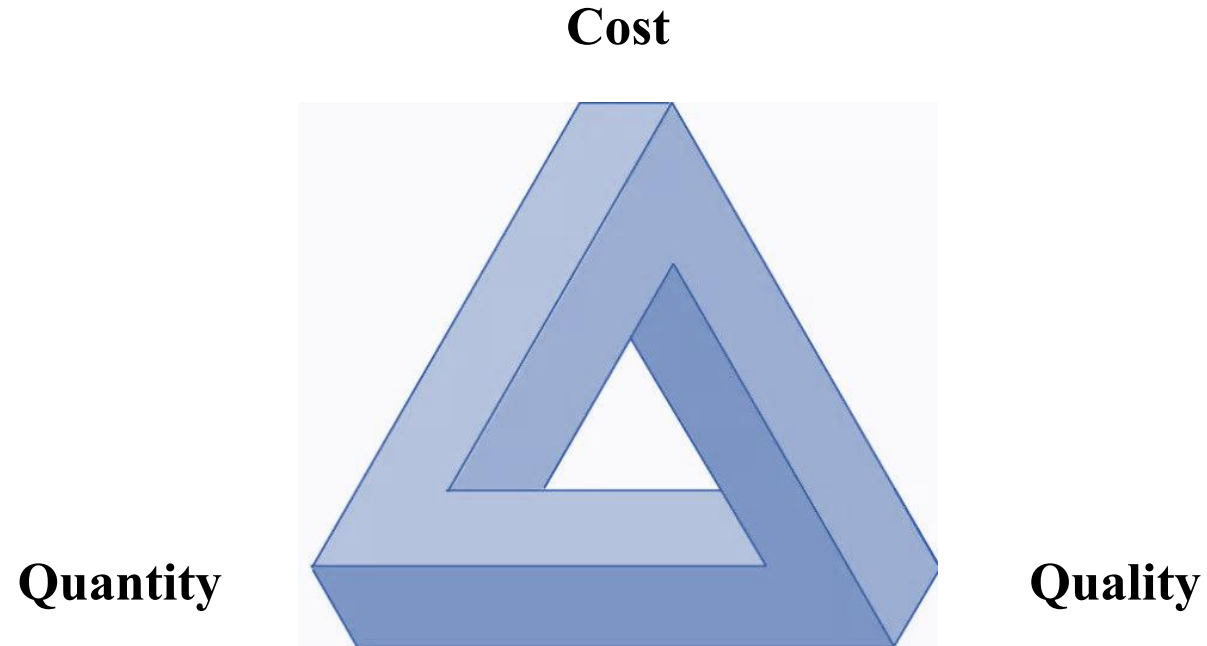
Part I

New Paradigm: Digital Technology and Unstructured Data

Question:

Why did banks traditionally prefer to serve large clients rather than retail and inclusive clients?

The "impossible trinity" in the traditional business model of banks



Question:

Why are banks shifting toward retail businesses and wealth management while undergoing digital transformation?



Economies of Scale: Transitioning from Transaction-Level to Customer-Centric Scaling

Big Data + AI

**Economies of scale and scope
under digital technologies**

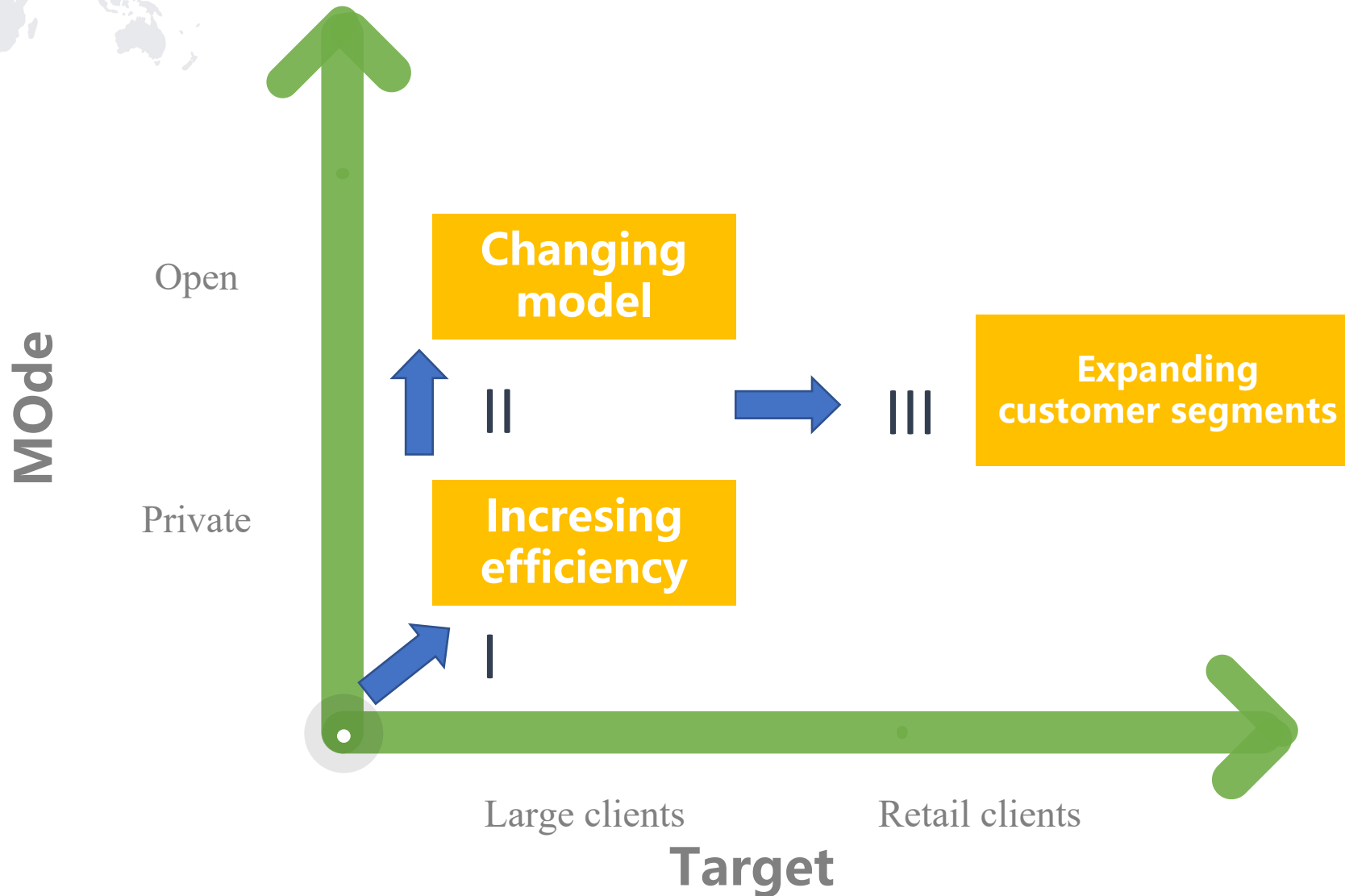
Digital platform

Economies of Scope: Connecting (G)overnment, (B)usiness and (C)onsumer.

Question:

How should banks conduct digital transformation?

Transformation of Service Mode and Target






The New Paradigm of “Big Data + Artificial Intelligence”

- What is the new paradigm of "Big Data + Artificial Intelligence" good at?
- 1. Prediction (e.g., whether marketing campaigns will succeed, the probability of corporate default, etc.)
- 2. Data generation (e.g., customer emotions in text and voice, etc.)
- Example: PDD

EDITED TRANSCRIPT

CORPORATE PARTICIPANTS

- Lei Chen - PDD Holdings Inc -Chairman of the Board, Co-Chief Executive Officer 
- Jiazhen Zhao - PDD Holdings Inc -Co-Chief Executive Officer, Director 
- Jun Liu - PDD Holdings Inc -Vice President - Finance 

CONFERENCE CALL PARTICIPANTS

- Joyce Ju - BofA Global Research -Analyst 
- Yang Bai - China International Capital Corporation (Hong Kong) Limited - Analyst

PRESENTATION

Operator

Ladies and gentlemen, thank you for standing by, and welcome to PDD Holdings Inc., second-quarter 2024 earnings conference call. (Operator Instructions) Please be advised that today's conference is being recorded.

I would now like to hand the conference over to your host today. Sir, please go ahead.

Unidentified Company Representative

Thank you, operator. Hello, everyone, and thank you for joining us today. PDD Holdings' earnings release was distributed earlier and is available on our website at [investors.pddholdings.com](#), as well as on our investor relations page.

Before we begin, I would like to refer you to our Safe Harbor statement in earnings press release, which applies to this call, as we will make certain forward-looking statements. Also, this call includes disclosures that may be considered confidential under the securities laws of certain jurisdictions.

Joining us today on the call are Mr. Chen Lei, our Chairman and Co-Chief Executive Officer; Mr. Zhao Jiazhen, our Executive Director and Co-Chief Executive Officer; as well as Ms. Liu Jun, our VP of Finance. We will first discuss our financial results for the second quarter ended June 30, 2024.

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During the Q&A session, Lei and Jiazhen will answer questions in Chinese that will help translate. Please kindly note that the English translation is for reference only. And in case of any discrepancy, statements in Chinese will prevail.

“Over the past few quarter, the competition has been intensifying, which is natural to the e-commerce sector. In such a competitive environment, our revenue growth may slow down. For instance, in the second quarter, our revenue growth declined indicating that high revenue growth is *not sustainable*.”



Q2 2024 PDD HOLDINGS INC EARNINGS CALL

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merchants can earn meaningful rewards, which is essential for the healthy development of platform ecosystem.

To achieve balance in the ecosystem, we have no choice but to firmly transition towards high-quality development. Therefore, we will adopt the necessary policies to provide strong support to high-quality merchants while tackling low-quality ones.

On the supply side, we will strongly support merchants with product and technology innovation capabilities. We will significantly reduce transaction fees for these high-quality merchants with an expected amount of RMB10 billion in the following years. We will continue to enhance incentives for the merchants to drive our high-quality development of ecosystem.

On the other side, we will further enforce strong governance of our platform and merchants. This includes identifying and removing unlawful merchants from our platform to strengthen our supply chain. As of now, we have already started a new round of investment in operations and technology to optimize the merchant onboarding and product listing processes, use advanced technology to ensure strict product quality control, and create a better environment for our high-quality merchants.

We grow together with our high-quality merchant partners, working together to offer consumers high-quality products and services. The consumers can in turn bring new growth opportunities to the ecosystem, creating a virtuous cycle, which is the key to the long-term healthy development of our community.

To achieve the goal of high-quality development of the merchant ecosystem, our management has reached the consensus to firmly commit to long-term investments and create a healthy, sustainable platform ecosystem. Thank you, all.

Unidentified Company Representative

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Operator, let's move on to the next analyst on the line.

Operator

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Yang Bai, CICC.

Yang Bai, China International Capital Corporation (Hong Kong) Limited - Analyst

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(interpreted) Thank you, management. I have two questions. The first one, we have observed that the growth of your global business remains strong. Some external data suggests that the growth rates and the investment in certain markets are slowing down.

In your prepared remarks, we also noticed that the company takes a relatively cautious approach towards the future development of your global business. Is the company trying to manage some risks proactively? Could the management please elaborate on your thinking in this regard?

The second one is, we saw that the overall competitive environment is quite intense. Has it caused any impact on the company's growth? In such a competitive environment, how will the company adjust your investment priorities? And how does the management think about your position? Thank you.

Lei Chen, PDD Holdings Inc - Chairman of the Board, Co-Chief Executive Officer

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(interpreted) Hi, this is Lei. Let me take your question on the global business.

Our global business is still evolving, and we are actively exploring new opportunities. Currently, our global business has entered over 70 markets. And during this call, we have always prioritized compliance and see it as the foundation for our development. And over the past few quarters, we have invested significant resources in building a safe shopping environment.

As our business develops, we have noticed that the changes in the external environment are accelerating. And our operations are increasingly affected by some non-business factors, and we are seeing a significant increase in uncertainty. And meanwhile, competition is a constant theme in the e-commerce industry and is expected to intensify.

At this moment, such intense competition, combined with the impact of external factors, will inevitably lead to disruptions on our global business. But nevertheless, we remain committed to our vision of allowing more consumers worldwide to enjoy the benefits of the digital economy, and this has not changed.

And in response to the complex environment, we will focus on our core strength and continuously improve our capabilities in supply chain, customer services, and compliance to better meet the expectations of consumers around the world and also achieve high-quality development in our global business. Thank you.

Jiazhen Zhao, PDD Holdings Inc - Co-Chief Executive Officer, Director

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(interpreted) Hi, this is Zhao Jiazhen. Let me take your question on competition.

Over the past few quarters, the competition has been intensifying, which is natural to the e-commerce sector. In such a competitive environment, our revenue growth may slow down. For instance, in the second quarter, our revenue growth declined indicating that high revenue growth is not sustainable.

Currently, consumer demand is becoming more diversified, and e-commerce platforms are actively adjusting their strategies to meet this evolving need. Each platform has its own strength and competitive edge and commit substantial resources to cater to consumer demand. At this moment, we need to focus on our core strength and continue on our path to high-quality environment.

For e-commerce platform, a robust supply chain is essential to providing good services to consumers. To meet the diversified needs of consumers, we remain focused on the fundamentals and strive for innovation in the supply chain.

In the second quarter, our teams continue to bring agricultural quality initiatives to major production regions, helping local agricultural products build their brands, and empowering small- and medium-sized agricultural merchants through collective marketing efforts.

Apart from agricultural products, we have expanded our support to the manufacturers through digitalization. By collaborating with high-quality national brands and manufacturers, we have successfully launched tailored products for niche categories. These brands and merchants have achieved higher-quality developments through continuous technological updates and product innovation.

We will strongly encourage and support high-quality merchants who are dedicated to their business and innovation. In addition to the significant reduction in transaction fees that we plan to offer, we will continue to leverage our platform supply chain capabilities to help merchants improve quality and efficiency, and guide manufacturers towards innovative and high-quality developments.

We fully understand that only by optimizing and upgrading the supply chain is essential to meeting deeper consumer needs and ensuring the long-term healthy growth of our platform ecosystem. We are committed to making long-term and patient investments. Thank you, all.

Unidentified Company Representative

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Thank you, Jiazhen, and thank you, all, for joining us today. We look forward to speaking with you again next quarter. And thank you. Have a nice day.

venue growth is not sustainable 1/2

View:

SENTIMENTS

Search key sentences

View ALL SECTIONS PRESENTATION Q&A

Competition Research and Development / Inn... Revenue e-Commerce activity

Operating Income Net Income Shares Buyback Business Expansions

Operating Margin

Positive only Negative only

Highlight all sentiments 54 /

Lei Chen

This quarter, we benefited from the improving macro environment and achieved robust financial results. Our total revenues reach RMB97 billion, which represents a year-on-year increase of 86%. However, we are seeing many new challenges ahead, from changing consumer demand, intensifying competition, and uncertainties in global environment.

Positive Revenue

Lei Chen

Our total revenues reach RMB97 billion, which represents a year-on-year increase of 86%. However, we are seeing many new challenges ahead, from changing consumer demand, intensifying competition, and uncertainties in global environment. As a result, we will enter a new phase of high-quality development that calls for increased investments.

Negative Competition

Lei Chen

So this is just one example of how digital technology and manufacturing can come together to create new opportunities. At this moment, the competition among e-commerce platforms is quickly escalating. And therefore, it's even more important that we go back to the basics of supply chain improvement and invest firmly in supply chain efficiencies.

Negative Competition

Lei Chen

So this is just one example of how digital technology and manufacturing can come together to create new opportunities. At this moment, the competition among e-commerce platforms is quickly escalating. And therefore, it's even more important that we go back to the basics of supply chain improvement and invest firmly in supply chain efficiencies.

Negative e-Commerce activity

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陈思翀

What is new about the "Big Data + Artificial Intelligence" paradigm?

The new AI paradigm of machine learning focuses more on whether conclusions can be extrapolated—the model's **generalization** ability.

Take an example: Chang'e-6 has successfully collected soil samples from the far side of the Moon—a region never before visited by any spacecraft.

Similarly, banks hope algorithms trained on existing customers' big data will help them acquire new customers and manage unknown risks.



Basic Principles of the New Paradigm

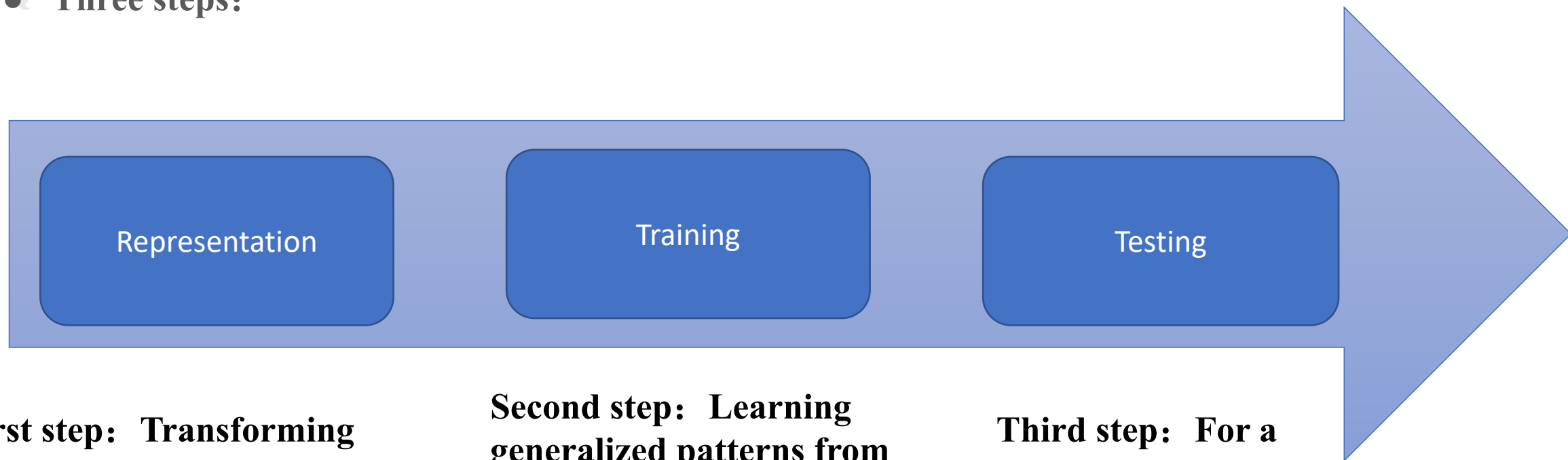
- If you have a background in economics, management, or finance:
Knowledge graphs must include Econometrics.
- Or, if you have a background in other social sciences or natural sciences:
Statistics.
- The focus of econometric analysis: *Estimation and Inference*.
- For example, you often see or hear like this: $\beta = 1.5$; β is significant at the 5% level.

• Basic Principles of the New Paradigm

- Linear regression: $Y_i = \beta_0 + \beta_1 X_{1i} + \dots + \beta_k X_{ki} + \varepsilon_i$
- Parameter estimation: $\hat{Y}_i = \hat{\beta}_0 + \hat{\beta}_1 X_{1i} + \hat{\beta}_2 X_{2i} + \dots + \hat{\beta}_k X_{ki}$.
- Minimization based on the following formula: $\sum (Y_i - \hat{Y}_i)^2$.
- After estimating the parameters, for brand-new X (data), it is the prediction of \hat{Y}_i .
- Econometrics focuses on parameter estimation $\hat{\beta}$, while machine learning focuses on \hat{y} .

Procedures to conduct the new paradigm

- Three steps:



First step: Transforming data objects into feature vectors (feature learning)

Second step: Learning generalized patterns from sample datasets
Objective: This pattern applies not only to training data but also to unknown data (hence called generalization ability)

Third step: For a new data sample, use the learned model to make predictions.

• Basic Principles of Big Data + Machine Learning

Features

Objective: In machine learning for image recognition, identify cat images from a dataset.

Method: Extract features from these images, such as leg length, nose size, ear size, etc. (these are equivalent to explanatory variables in econometric analysis or features in machine learning)



Features:

Selection: Determine which features best represent the data.

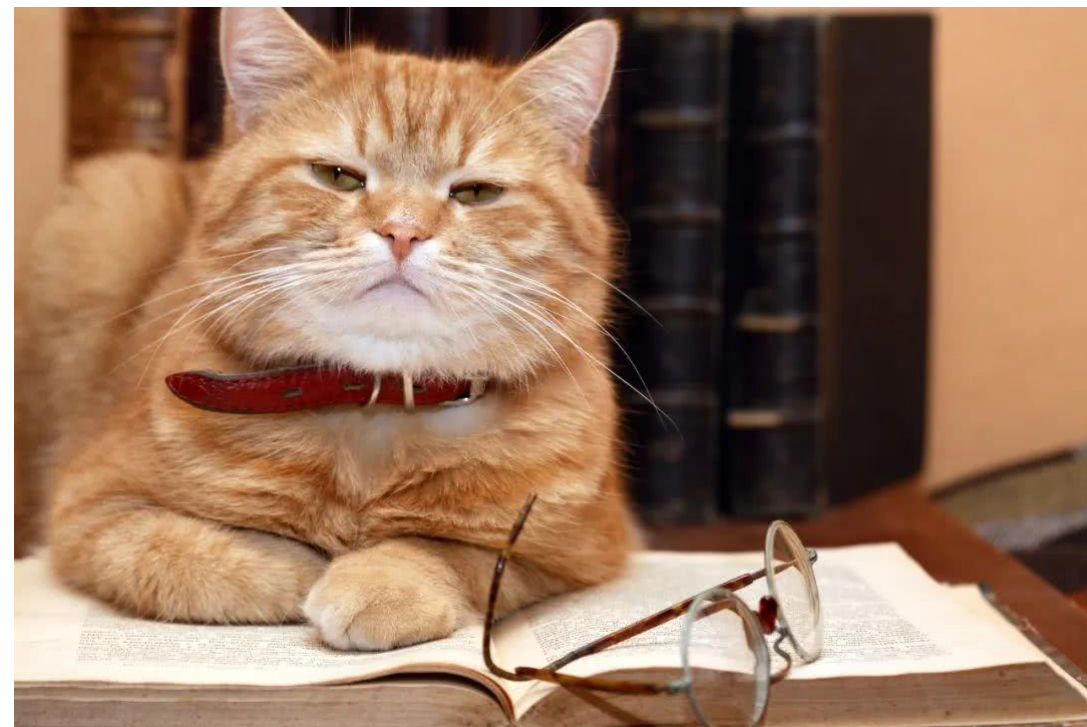
Representation: Decide how to encode these features.

Example: A two-dimensional feature vector: [Head shape: round, Color: gray-scale].

If the test sample is this cat, is it a cat?

Suppose all images in the training samples are of the aforementioned cat breed. After multiple rounds of iterative training, the model is well-trained and performs well on the training set. Essentially, all characteristics of this cat are incorporated, even the cat's color.

It is very likely that the model's output will be: This is not a cat!



Felids exhibit medium to large-sized bodies with uniform torsos, moderately long limbs, digitigrade posture, large rounded heads, and relatively short snouts.

Is it a cat?



Felids exhibit medium to large-sized bodies with uniform torsos, moderately long limbs, digitigrade posture, large rounded heads, and relatively short snouts.



VSM

Following feature engineering, it is often necessary to construct a **Vector Space Model (VSM)**.

This is because computers can process numerical values, not unstructured data such as images or text. However, in the modern era of big data, unstructured data is the most abundant.

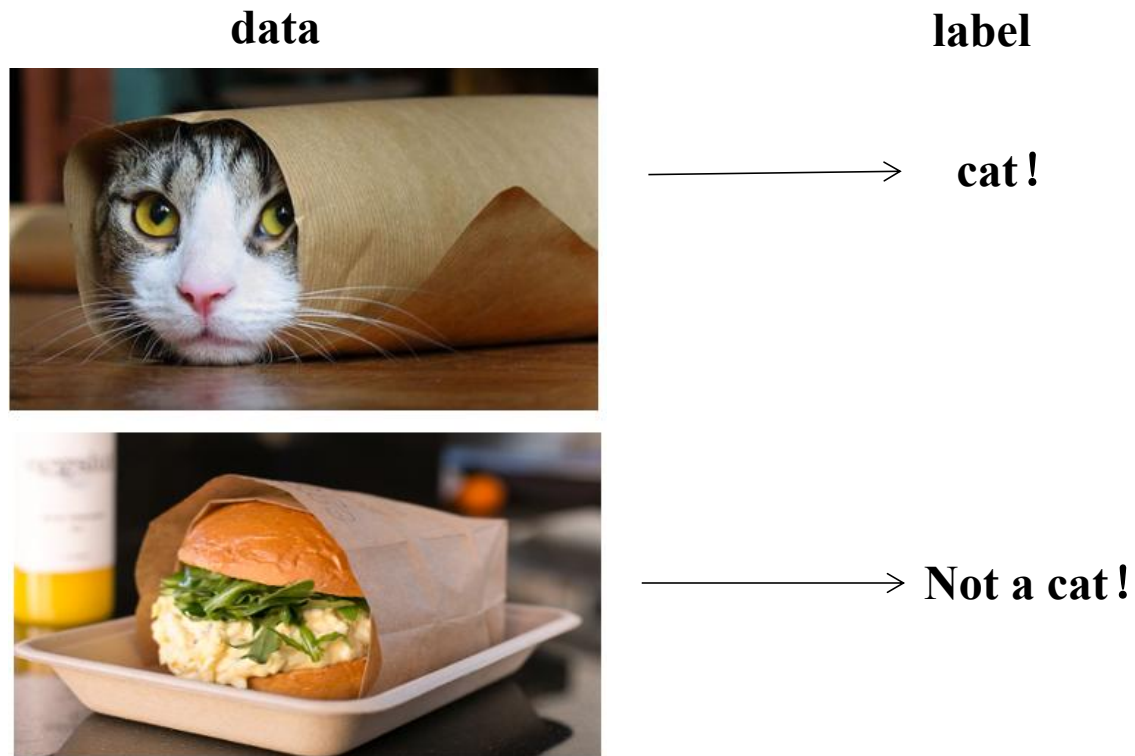
VSM is typically responsible for converting various formats of **(un)structured data** (numbers, text, images, audio, video) into vectors. These vectors are then input into machine learning programs for processing. Once the data is transformed into VSM, the machine learning program feeds it into algorithms to generate models through computation.

[illegible]

● Basic Principles of Big Data + Machine Learning

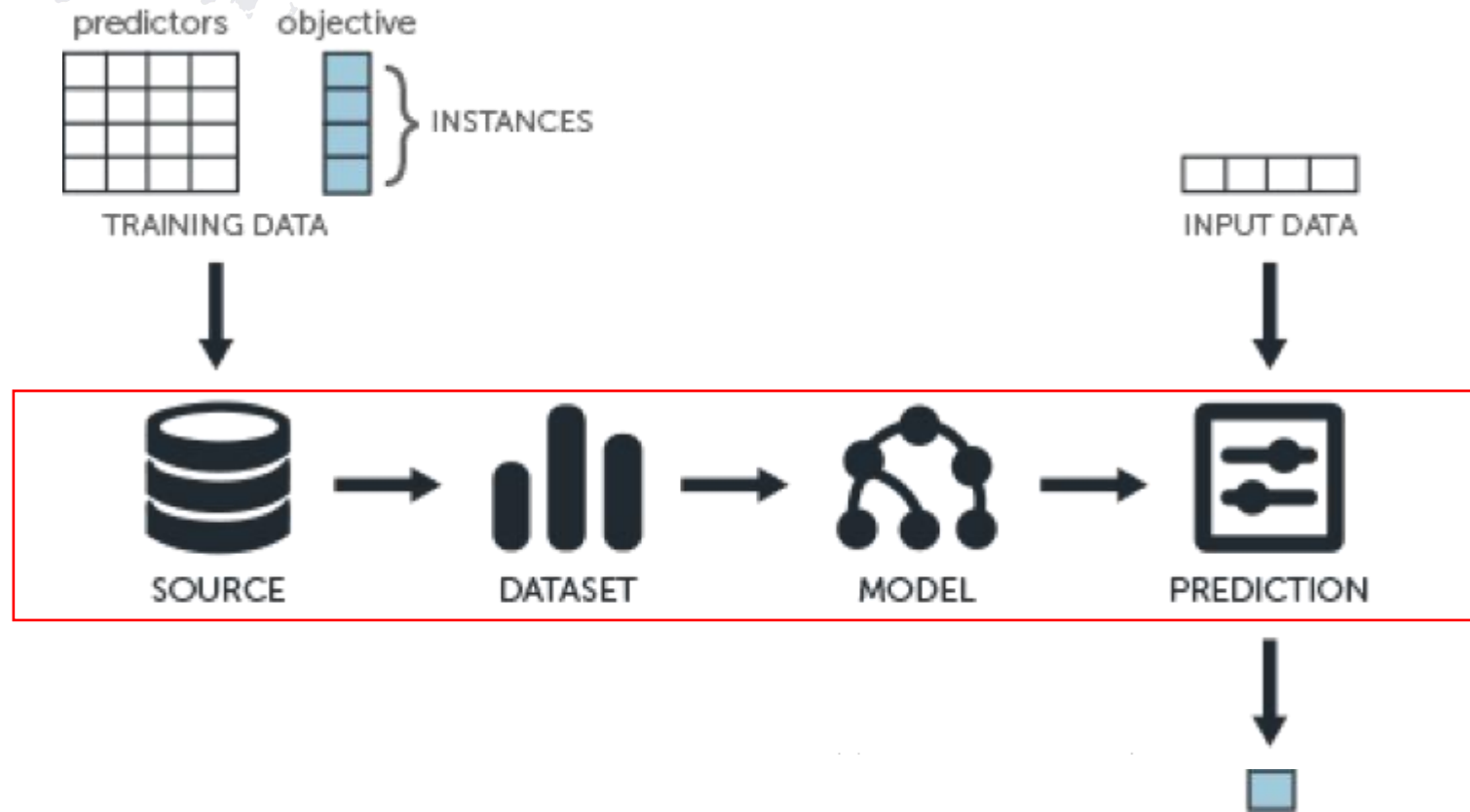
Labeling in supervised learning

Labeling images, which are divided into two categories: cat or not a cat.



(Manual) data annotation: labeling

Ready, let's train to get the model

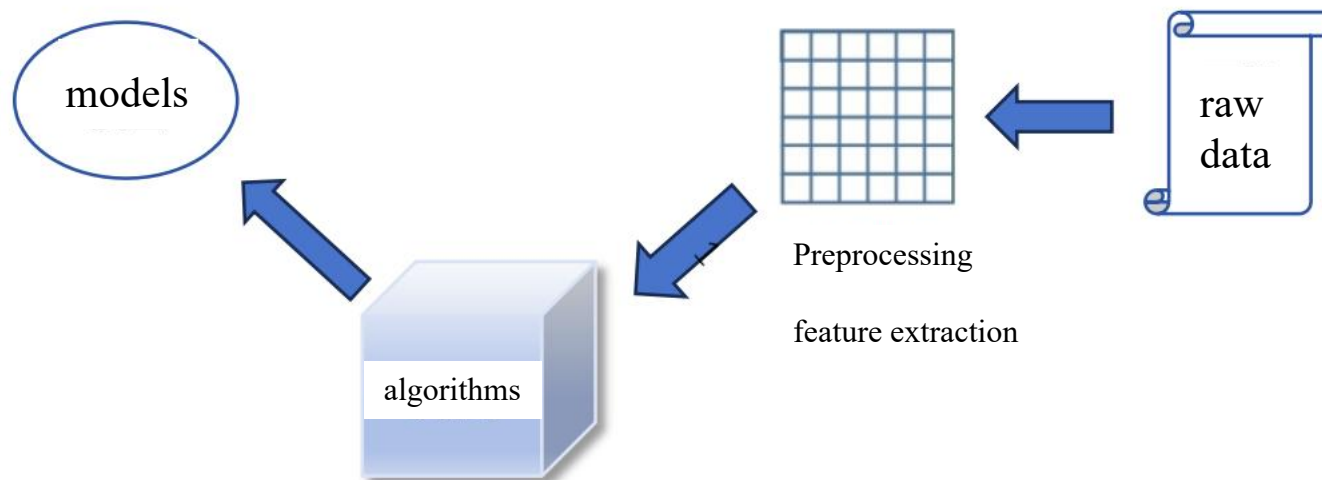


A model (Model) is the function $y=f(x)$ and the outcome of machine learning.

This learning process is called training (Train). Training refers to the process of calculating the specific values of each parameter based on the specified specific type of $f(x)$ and combined with training data.

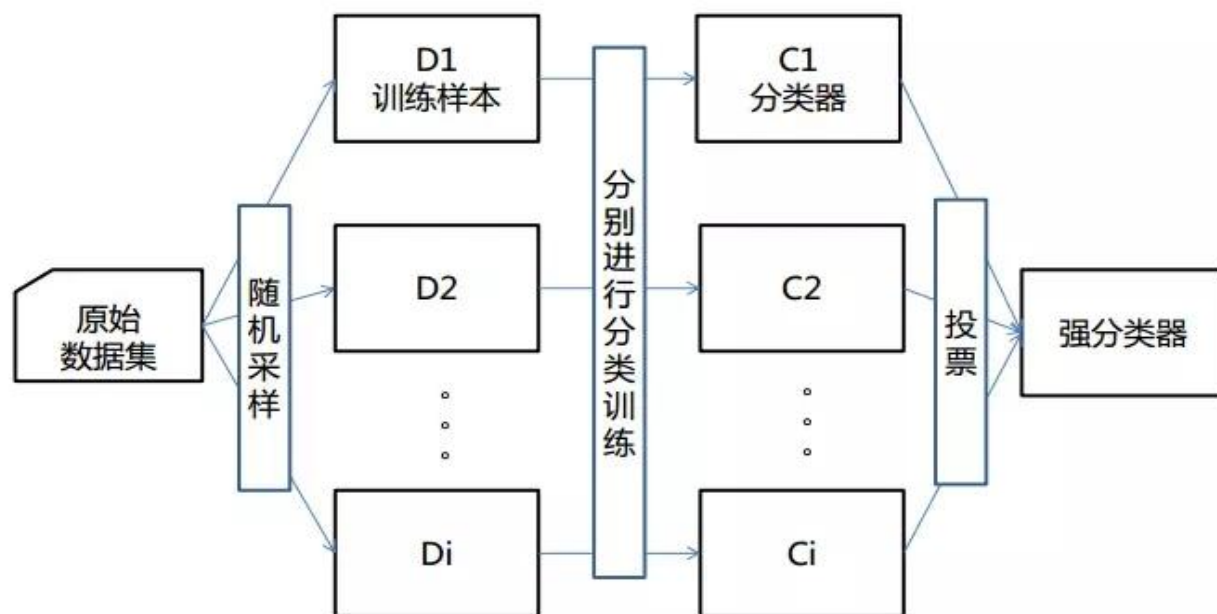
The training process requires computation based on certain rules. These rules are what we call algorithms.

Three elements of machine learning: big data, algorithms, models.



Algorithms generate models by performing computations (computing power and electric power) on big data .

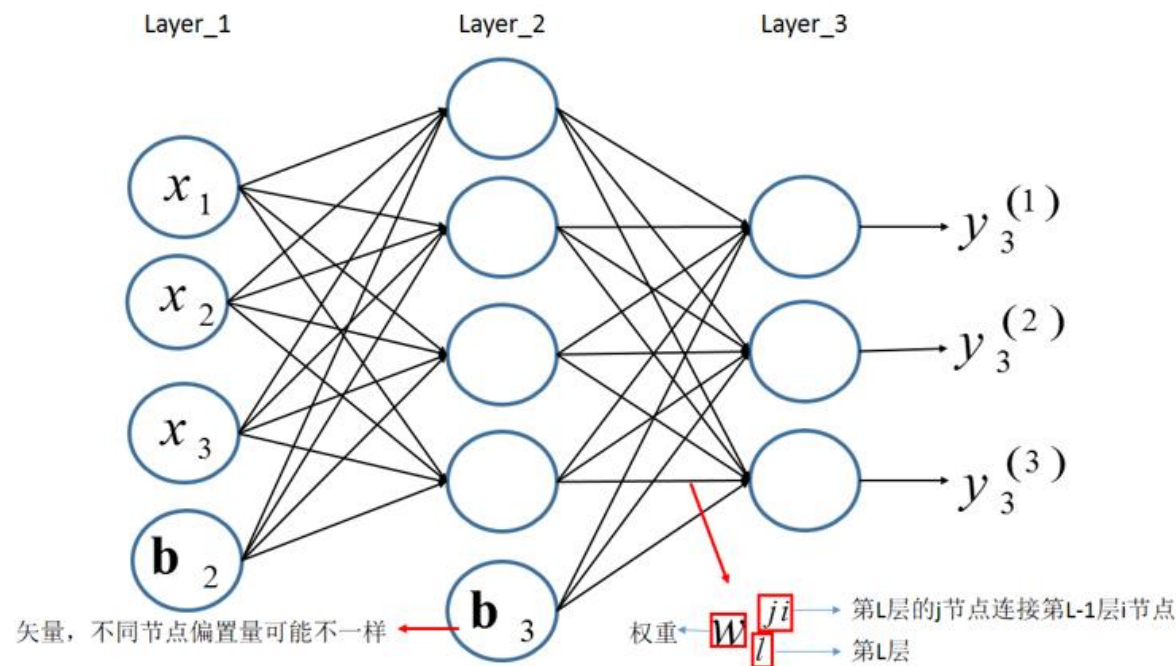
- To achieve better prediction, machine learning will do whatever it takes—even **abandoning interpretability**.
- For example, instead of using full-sample regression (classification), it randomly samples from raw samples and features, obtains regression (classification) results from N samplings, and then takes the average (or voting).



- This is the so-called "ensemble algorithm", with the representative algorithm being Random Forest.

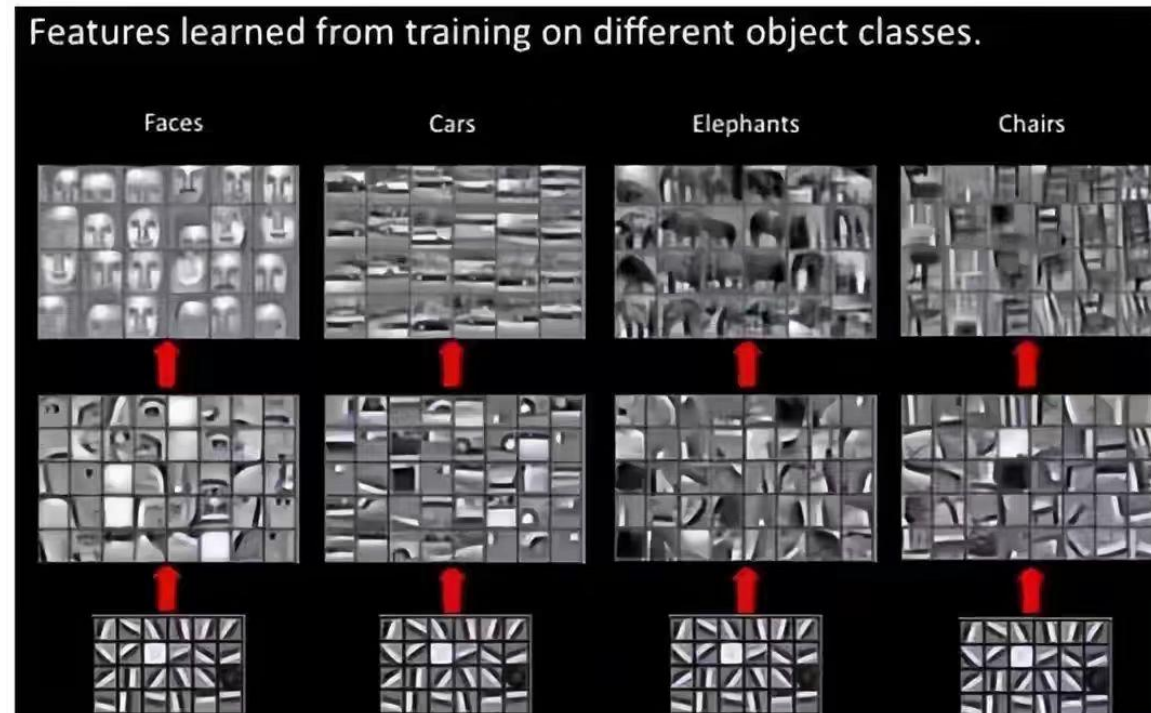
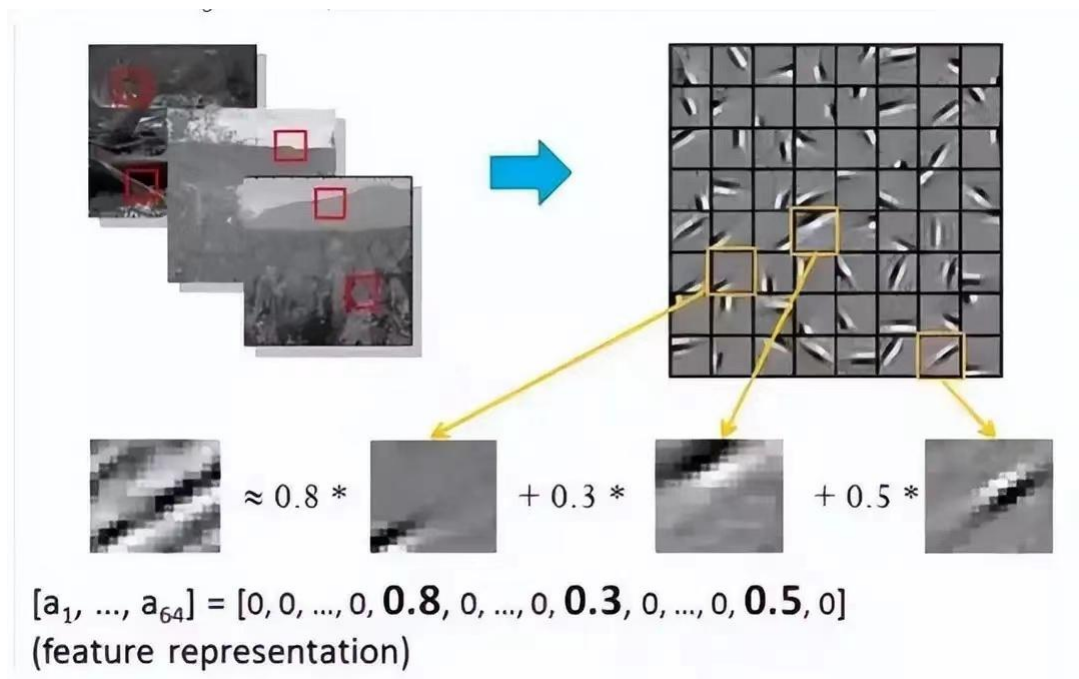
From machine learning to deep learning (Unsupervised feature learning)

- To automatically extract features and enhance generalization ability, machine learning algorithms can also adopt multi-layer nesting of algorithms.



- This is what is known as "deep learning" algorithms, with representative ones including "Deep Neural Networks" (DNN) and "Recurrent Neural Networks" (RNN).
- Abstraction, iteration, and layering: raw signals \rightarrow preliminary processing \rightarrow abstraction \rightarrow further abstraction

Deep learning



From Deep Learning to Large Language Models

Deep learning models are the means; feature learning is the purpose!

By constructing multi-layer machine learning models and utilizing vast amounts of training data, we can learn meaningful representations to ultimately enhance classification or prediction accuracy. For instance: character → word → sentence → topic → document.

1. For unlabeled data, employ unsupervised learning to extract features;
2. Generate hierarchical features via encoders, train each subsequent layer progressively;
3. Apply supervised fine-tuning;

However, word-by-word translation yields suboptimal results and is computationally inefficient.

The advent of the self-attention mechanism ("Attention Is All You Need") gave rise to Transformer-based large language models (e.g., DeepSeek, ChatGPT, BERT).

For the banking industry

Although developing new algorithms is technically demanding and well-compensated, pre-built machine learning models are often available, eliminating the need for custom coding.

For instance, programming languages like Python enable even non-experts to execute algorithms effortlessly.

The key for banks to survive in the digital era lies in big data (including collecting and governing data, feature learning and labeling)

Machine learning is often applied to unstructured data.

Data acquisition, parsing, and cleaning consume the majority of time (up to 99%).

Where does big data come from?

1. Behavioral Frequency Analysis

When was the last time you: Visited a bank branch? Purchased movie tickets? Bought coffee? Opened WeChat? Used Taobao? Scrolled through Douyin?

2. Traditional Banking Services **Low-frequency** interactions inherently limit big data generation.

3. **High-Frequency** Scenarios Only recurrent user interactions create viable big data ecosystems.

4. Non-Financial Contexts True big data emerges predominantly from non-banking domains.

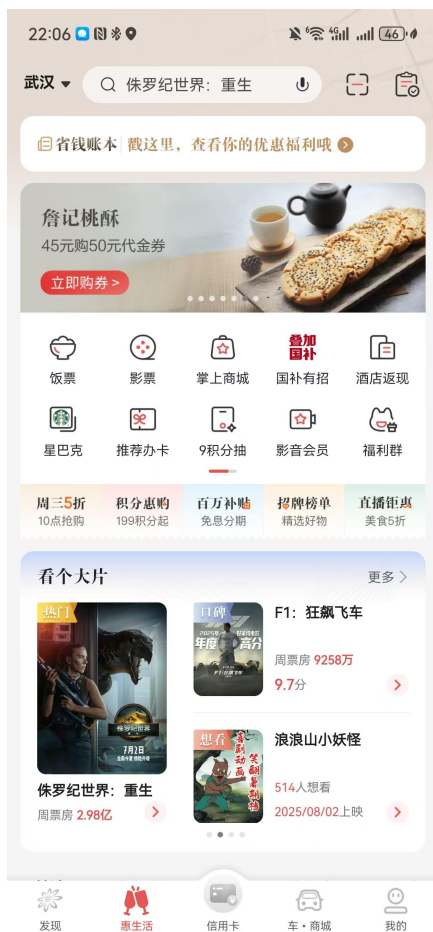


Where is the big data?

- As early as 2019, CMB was China's largest coffee retailer, selling 80,000 cups daily (Wu Gang). Additionally, it ranked as: China's 2nd-largest travel booking platform China's 3rd-largest movie ticketing platform.
- **CMB's Strategy: From Finance to Lifestyle, From Low-Frequency to High-Frequency,** Expanding and enriching non-financial scenarios to create a vibrant banking ecosystem。
- **Ping An:** Integrated Tech & Data-Driven Operations Headquarters-led tech support Internal data connectivity & collaboration Directly managed dedicated managers
- WeChat: Social platform ByteDance: Douyin (TikTok) platform Ant Group: Taobao platform JD.com: E-commerce platform;

Why do banks provide lifestyle services?

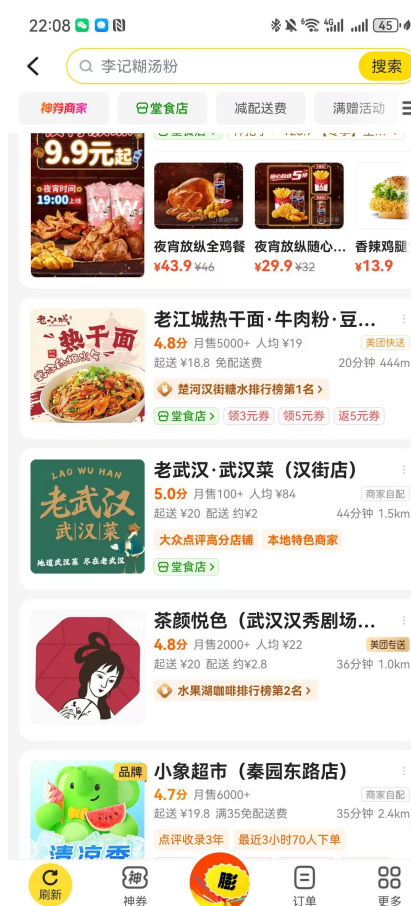
CMB



CCB



Meituan





Ant Group's prospectus

- Ant Group positions itself as a **technology company** that provides platforms and tools for its financial institution partners. Supported by intelligent business decision-making solutions, dynamic risk management solutions, and technological infrastructure, financial institutions offer credit, wealth management, and insurance services through Ant Group's platform。
- Leveraging the extensive reach of the Alipay platform, Ant Group is committed to building the "capillaries" of financial services, serving as a strong complement to the "aorta" of financial institutions' operations. Through its platform model, it helps financial institutions expand user reach, gain technical support, achieve more efficient resource allocation, and fulfill the social goals of inclusive and sustainable development.。



Ant Group's Letter to Investors

- Ant Group is neither a financial institution nor merely a mobile payment company, but a **technology firm** determined to leverage today's best technologies and resources to empower banks and financial institutions to better serve every consumer and every small and micro enterprise。
- Ant Group has now evolved into a technology company with three core pillars: digital payment, digital financial technology platform, and digital life services... Going forward, it will continue to invest in technology, allocate 0.3% of its annual operating revenue to public welfare initiatives, plant an additional 1 billion trees within 10 years to promote green development, and collaborate with more partners to continuously solve problems and create greater markets and opportunities through technological innovation。

Customer experience represents a goldmine of unstructured big data

Structured data, also known as row data, is suitable for logical expression and implementation through a two-dimensional table structure.

Unstructured data includes documents, images, audio, videos, etc., which are not suitable for representation in a two-dimensional table.。

Unstructured data related to customer experience includes:

- (1) Internal bank texts from WeChat, online banking, mobile banking, intelligent customer service, questionnaires, etc.;
- (2) Texts converted from voice recordings of bank hotlines via machine transcription;
- (3) External media such as WeChat, Weibo, Toutiao, Douyin, and online forums.。

A goldmine of unstructured big data

Unstructured big data empowers the digitalized full-lifecycle management of customers: (Who, When, Where, What, Why, How.)

- (1) Customer group tagging enables precise marketing for customer acquisition (e.g., mortgage and rental services).
- (2) Online-offline integration helps maintain active customers (focusing on high-frequency daily scenarios).
- (3) Emotional data generation facilitates identification and retention of customers (those at risk of churning).
- (4) Optimizing the experience loop and listening to the voice of customers. (Optimize the experience closed-loop)

The goldmine of unstructured big data

Leverage big data from Voice of Customer (VoC) to enhance customer experience, establish a closed-loop feedback mechanism, and end the mentality of "launching is the finish line."

- 1. Product Improvement:** Refine products, services, and processes based on customer suggestions and pain points related to our own offerings.
- 2. Competitive Innovation:** Draw inspiration from customer reviews of competitors' trending or newly launched products to drive R&D, formulate requirements, and execute targeted marketing strategies

Large Language Models and their applications and impacts in finance

Model Architecture: Parallel processing for long texts and self-attention mechanisms.

Training Data: Vast amounts of unstructured data (e.g., text) covering diverse domains.

Applications: Language generation and understanding.

Customer Service: Enhance query resolution, save time and labor, and improve user experience.

Robo-Advisory: Provide personalized investment advice based on user preferences; leverage text understanding and generative dialogue for better engagement.

Risk Management: Analyze financial texts to identify risks and provide insights, assisting professionals in decision-making.

Real-time Updates: How to ensure continuous learning?

Corpus Limitations: Address data biases and coverage gaps.

Ethics & Security: Navigate data privacy and ethical AI challenges.

From general-purpose models to specific domain models?