

The Path Forward and Alternatives of Computational Linguistics

Chengqing Zong

Outline

- ➡ **1. Historical Review of CL**
- 2. The Path Forward**
- 3. The Alternatives**

Start of CL/NLP

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March 4, 1947



Warren Weaver
(1894-1978)

Dear Norbert:

I was terribly sorry, when in Cambridge recently, that I got unavoidably held up by several unexpected jobs, and did not get a chance to see you.

One thing I wanted to ask you about is this. A most serious problem, for UNESCO and for the constructive and peaceful future of the planet, is the problem of translation, as it unavoidably affects the communication between peoples. Huxley has recently told me that they are appalled by the magnitude and the importance of the translation job.

Recognizing fully, even though necessarily vaguely, the semantic difficulties because of multiple meanings, etc., I have wondered if it were unthinkable to design a computer which would translate. Even if it would translate only scientific material (where the semantic difficulties

I have wondered if it were unthinkable to design a computer which would translate.

been coded in some strange symbols. I will now proceed to decode."

Have you ever thought about this? As a linguist and expert on computers, do you think it is worth thinking about?

Cordially,

Warren Weaver.

Professor Norbert Wiener
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

WW:AEB



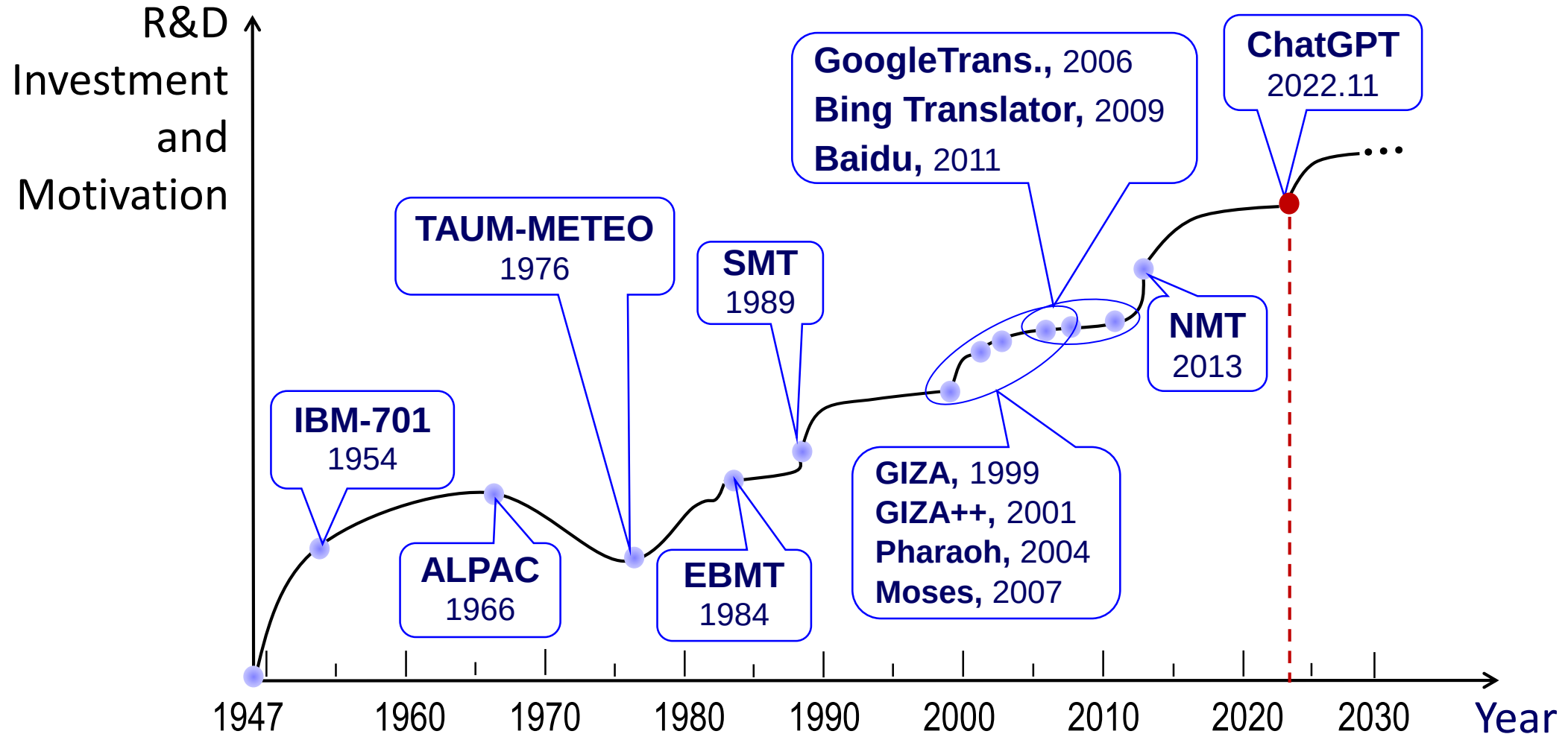
Norbert Wiener)
(1894-1964)

**“Translation”
July 1949**

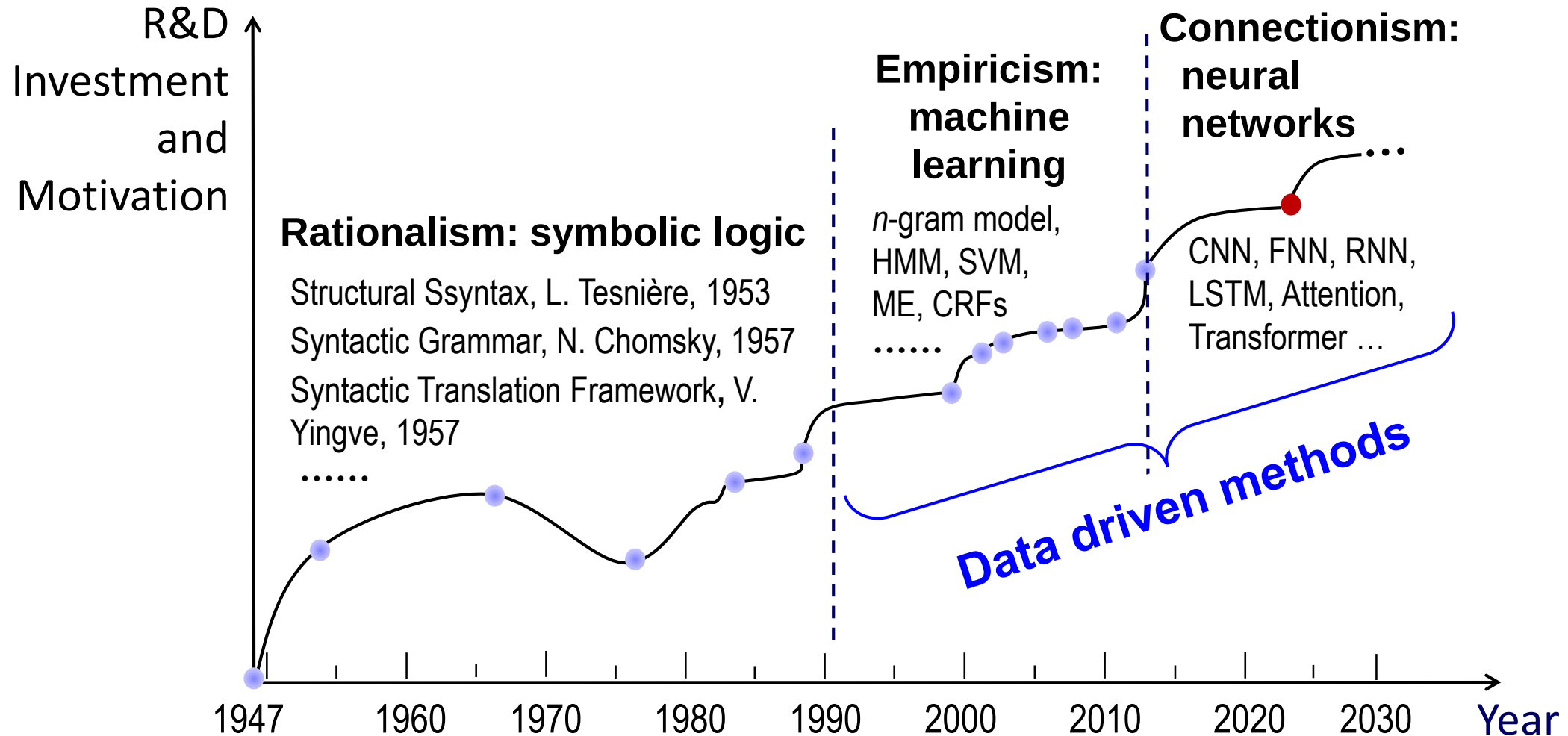
Proposal of Related Terms

- Natural Language Understanding (NLU), 1956
- Association for Machine Translation and Computational Linguistics (AMTCL), 1962
- International Committee on Computational Linguistics (ICCL), 1965
- ALPAC Report and Computational Linguistics (CL), 1966
- AMTCL was changed into ACL (Association for Computational Linguistics), 1968.
- Natural Language Processing (NLP), 1970/80s
- Human Language Technology (HLT), 1980s

Different Stages of Development



Different Methods

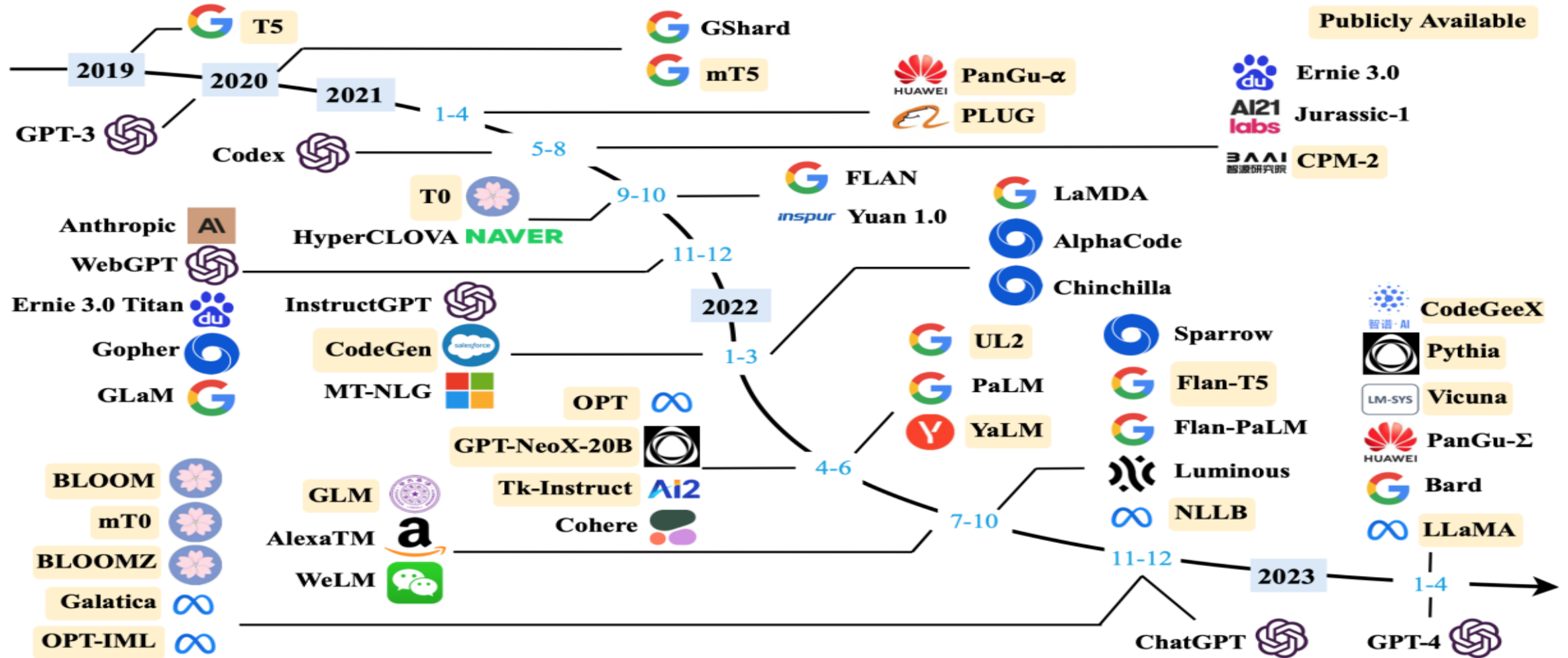


The Arrival of LLMs Era



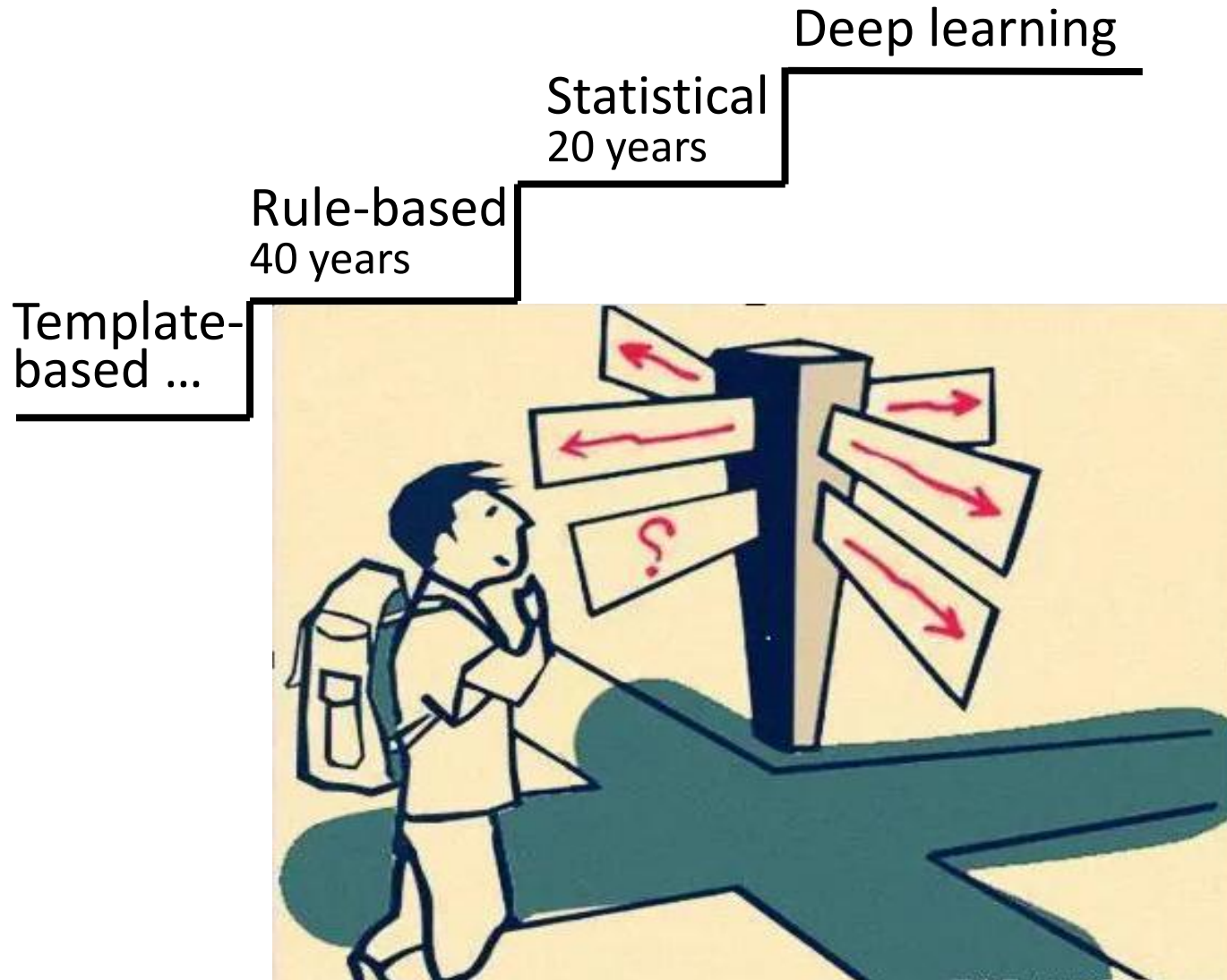
- **ChatGPT** (GPT-3.5), Nov. 29, 2022, OpenAI
 - GPT-4.0, March 14, 2023
 - Sora, Feb. 15, 2024
 - GPT-4o (Omni), May 13, 2024
 - o1-preview, o1-mini, Sept. 12, 2024
 - o3, o3 mini, Dec. 20, 2024
 -
- **DeepSeek**, Jan. 5, 2024
 - DeepSeek-R1, Jan. 27, 2025
- **Grok 4**, July 10, 2025, xAI

War of LLMs



Wayne Xin Zhao et al., A Survey of Large Language Models, <http://www.paperreading.club/page?id=158688>

How Can We Survive?



To be or not to be,
this is a question.

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Changes in Research Methods

Before 2017

- Machine translation
- Text classification/ Sentiment analysis
- Automatic summarization
- Human-computer dialogue system
- Information retrieval
- Automatic writing
- Speech technology
- **Machine learning (ML)**
- **Image processing (IP)**
- **Computer vision (CV)**

CL/
NLP

After 2017

Transformer
GPT/ BERT

LLMs

After 2023

The Future of CL/NLP



Predictable Conclusion 1

- ◆ With the goal of technology application, research in CL/NLP will expand from focusing on text and speech information processing to multimodal information.
 - Without any barriers to study CL/NLP
 - CL/NLP will easily collaborate with CV and other technologies
 - Many datasets and evaluation metrics will be reconstructed and proposed

Predictable Conclusion 2

- ◆ The cooperation between academia, including universities and research institutes, and companies will become increasingly close.
 - Poor universities and research institutes.
 - Wealthy companies

Predictable Conclusion 3

- ◆ The top-tier conferences related to information processing, including ACL, ICML, ICCV, etc., will tend towards homogenization and similarity
 - Similar or even repetitive work
 - No enough good human reviewers
 - Hard to organize large-scale conferences

Questions

- Have universities been forced to follow the LLM path?
- What else should they do besides training and delivering talents for the companies?
- Will the mission of CL/NLP be fulfilled by LLMs?

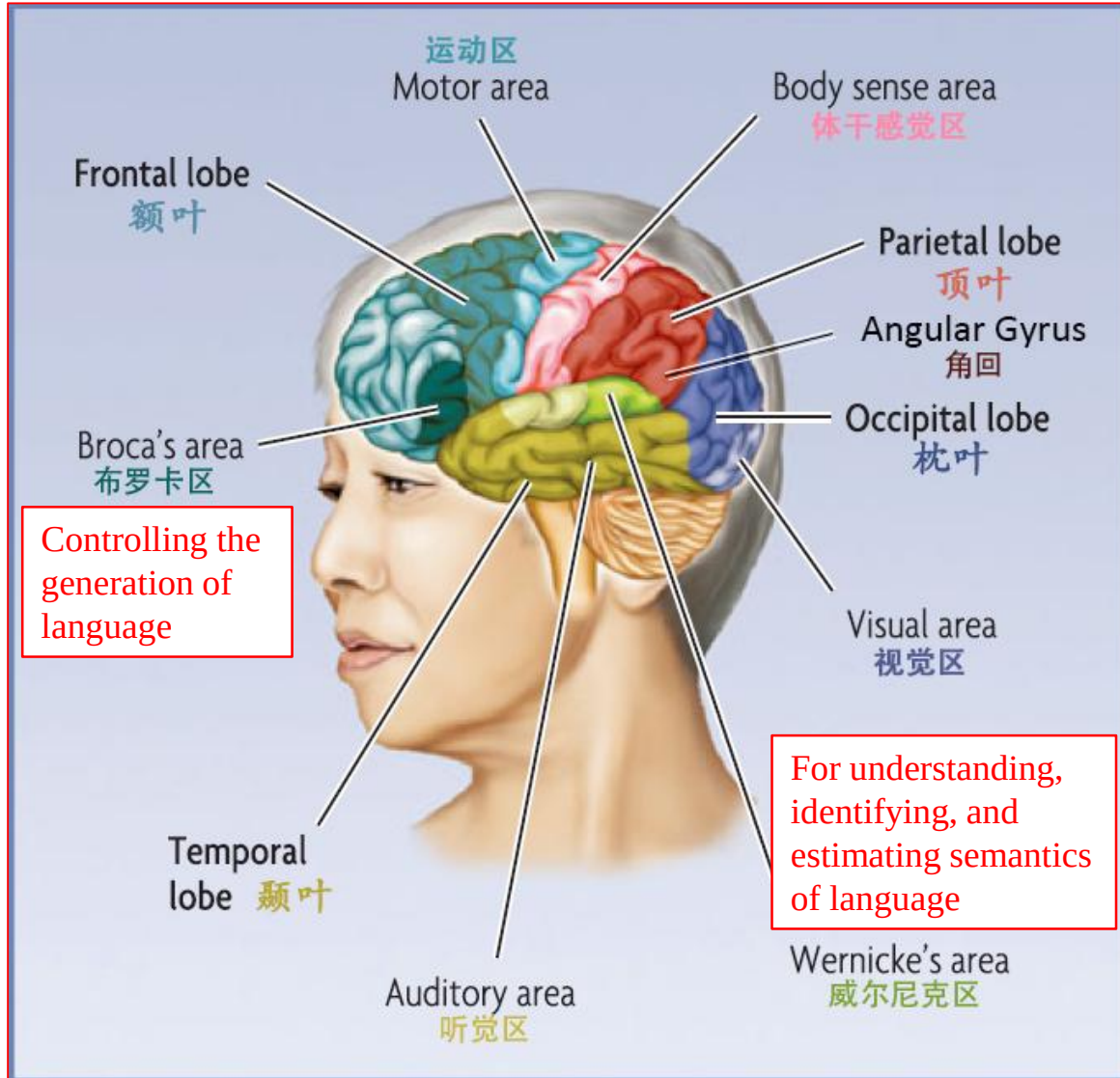
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Human Brain



For Chinese speaker

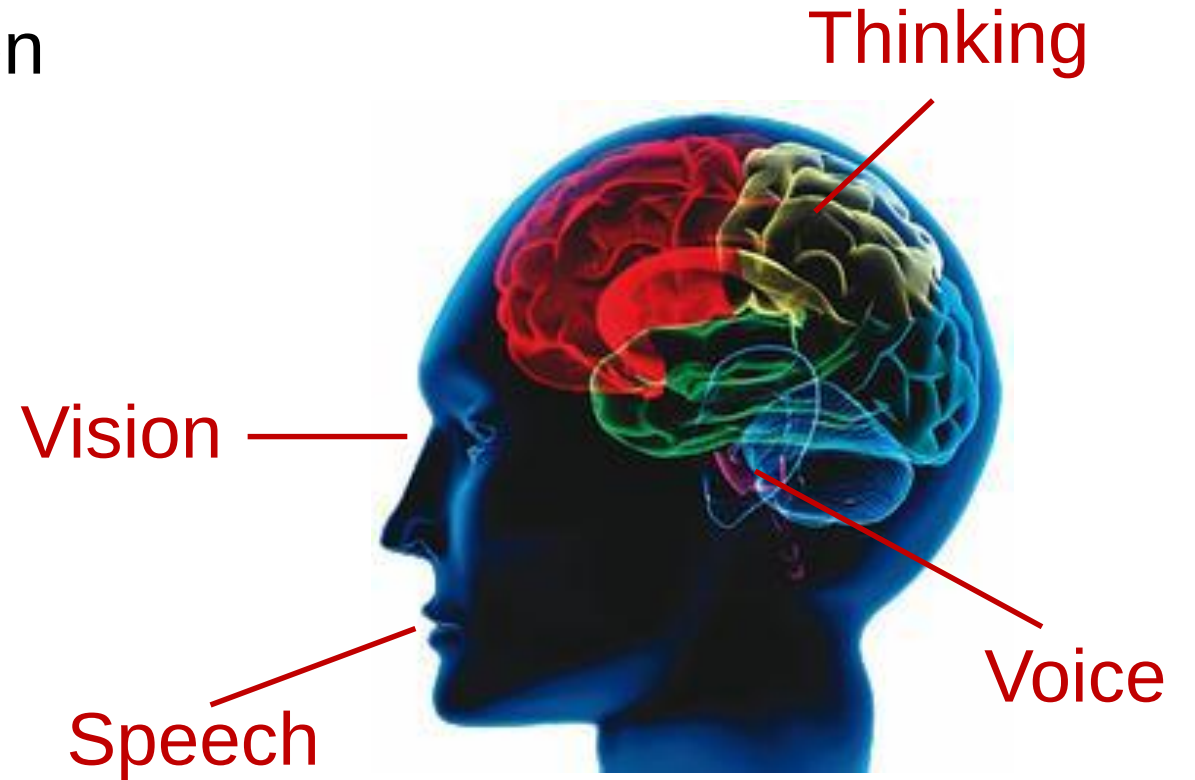
➤ 100 → 47%

➤ 2,500 → 97%+

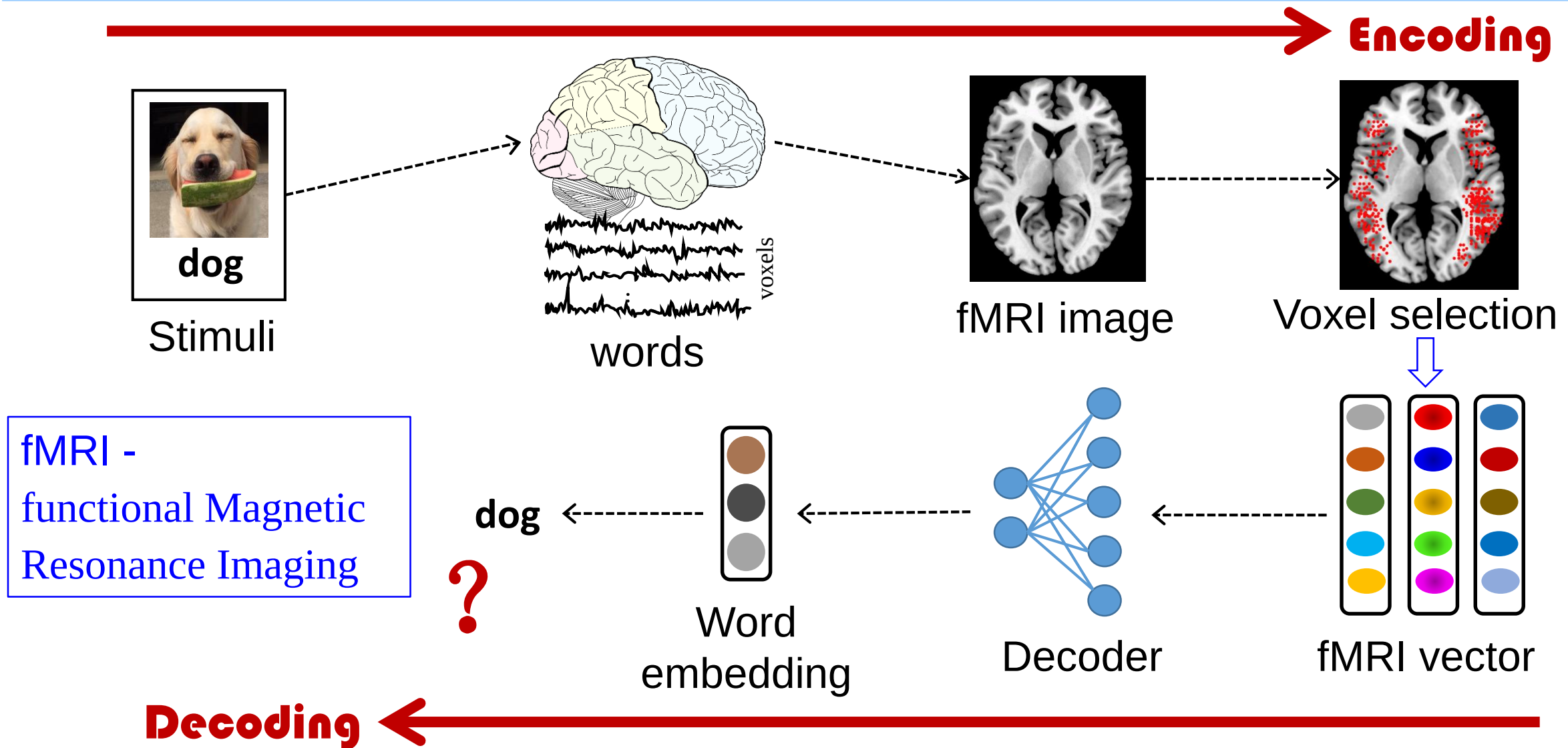
➤ 4,000 → 99%+

Green CL/NLP

- Strong language comprehension and generalization abilities
- Self-learning and self evolution capabilities
- **Lightweight, low-energy, green and environmentally friendly**



Brain Encoding and Decoding



My Suggestions

- Encourage innovative research that goes beyond LLMs;
- Retain one large-scale comprehensive conference while making other conferences more differentiated and distinctive.

Try to Find Another Path





Questions?