



Analysis of the Influence of **Artificial Intelligence Technology** on the Development Path of **Vocational Education** ——A Case Study of Accounting industry in China

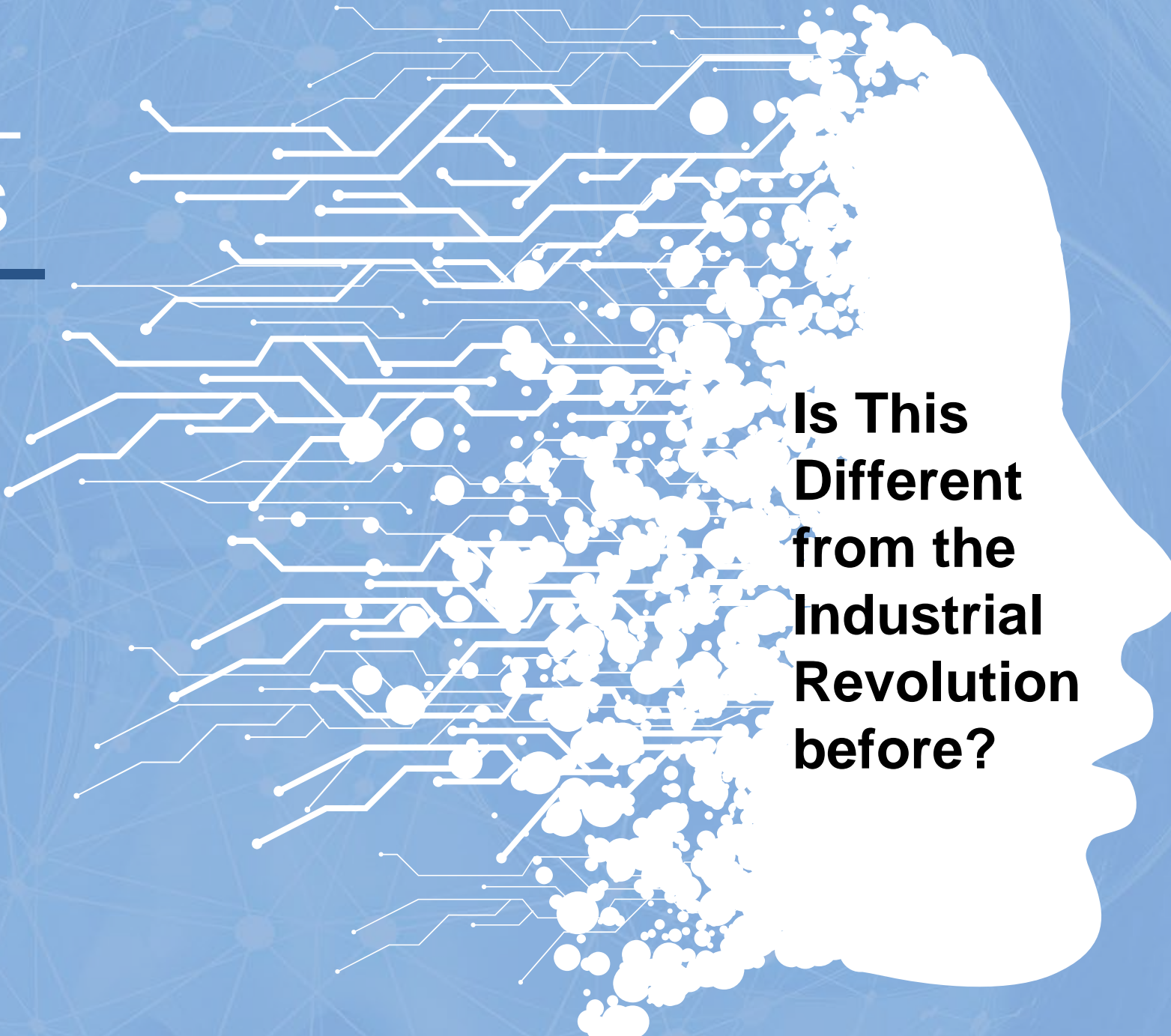
ARTIFICIAL ARGUMENTS

Pessimism:

AI will displace most (all?)
human occupations
——Larry Summers (2016) and
Bob Gordon (2016)

Optimistic:

AI is a kind of “Creative
Destruction” will create more
jobs
——Mokyr (2017)



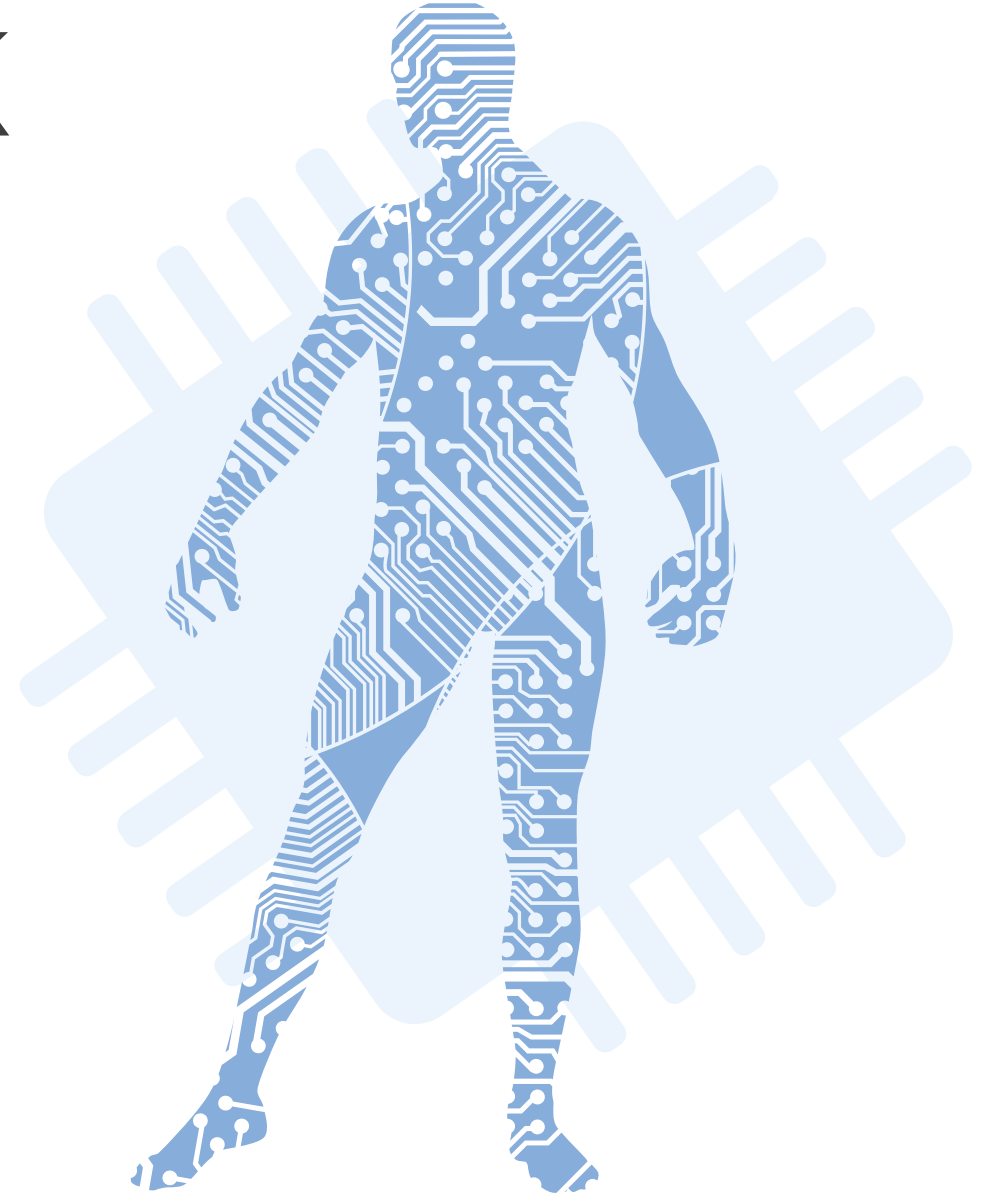
**Is This
Different
from the
Industrial
Revolution
before?**

THE FRAMEWORK

01 The Definition
The Ontology of AI.

02 The Influence
The Epistemology of AI

03 The Solution
The Methodology of AI





The Definition

Three High-tide of AI Development

1970s-1990s

The power of AI had developed to a point where focusing **on real-world applications seemed possible**

Sponsors of AI research were required by the **government**.



1950s-1960s

The idea of artificial intelligence was crystallized by **Alan Turing's** paper "*Computing Machinery and Intelligence*"
Specific knowledge about the problem being solved, as opposed to **the use of massive search in solving the problem**



2000 until now

Higher processes **similar to humans**, like visual perception, speech recognition, decision
The **deep learning technology** have allowed AI to expand rapidly. Applications **involving all the industries**.



WHAT IS AI?

Manufacturing intelligence? Humanlike intelligence?

The term **Industrie 4.0** stands for the fourth industrial revolution, the next stage in the organisation and control of the entire value stream along the life cycle of a product. This cycle is based on increasingly individualised customer wishes and ranges from the idea, the order, development, production, and delivery to the end customer through to recycling and related services. **Fundamental here is the availability of all relevant information in real-time through the networking of all instances involved in value creation as well as the ability to derive the best possible value stream from data at all times.**

——From the VDMA (the German Engineering Federation) and the ZVEI (the German Electrical and Electronic Manufacturers' Association) .

AI involves using methods based on the intelligent behaviour of humans and other animals to solve complex problems.

——From Ben Coppin

Thinking Humanly, Thinking Rationally, Acting Humanly and Acting Rationally.

——From Russell & Norwig

Definition of AI

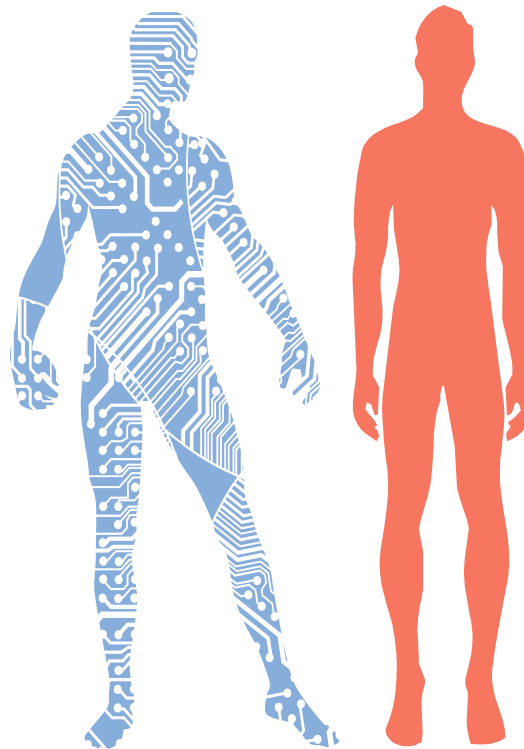
Weak AI

AI system can only **act** like it **thinks** and **has a mind**.

Sensing for things similar to what they know, and classifying them accordingly. Present a human-like experience, but that is all it is a simulation.



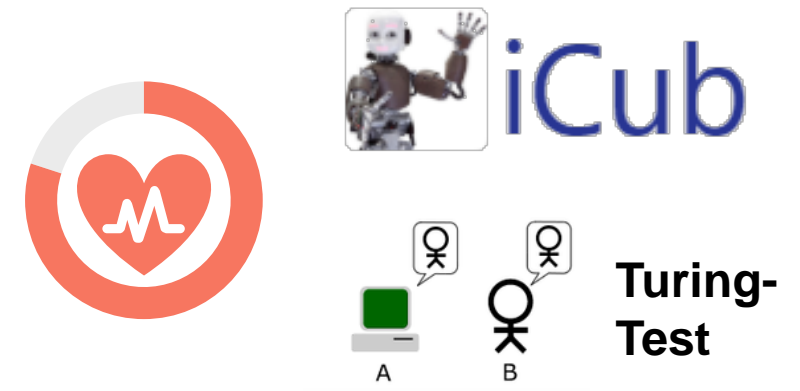
In 1980, John Searle coined the following statements



Strong AI

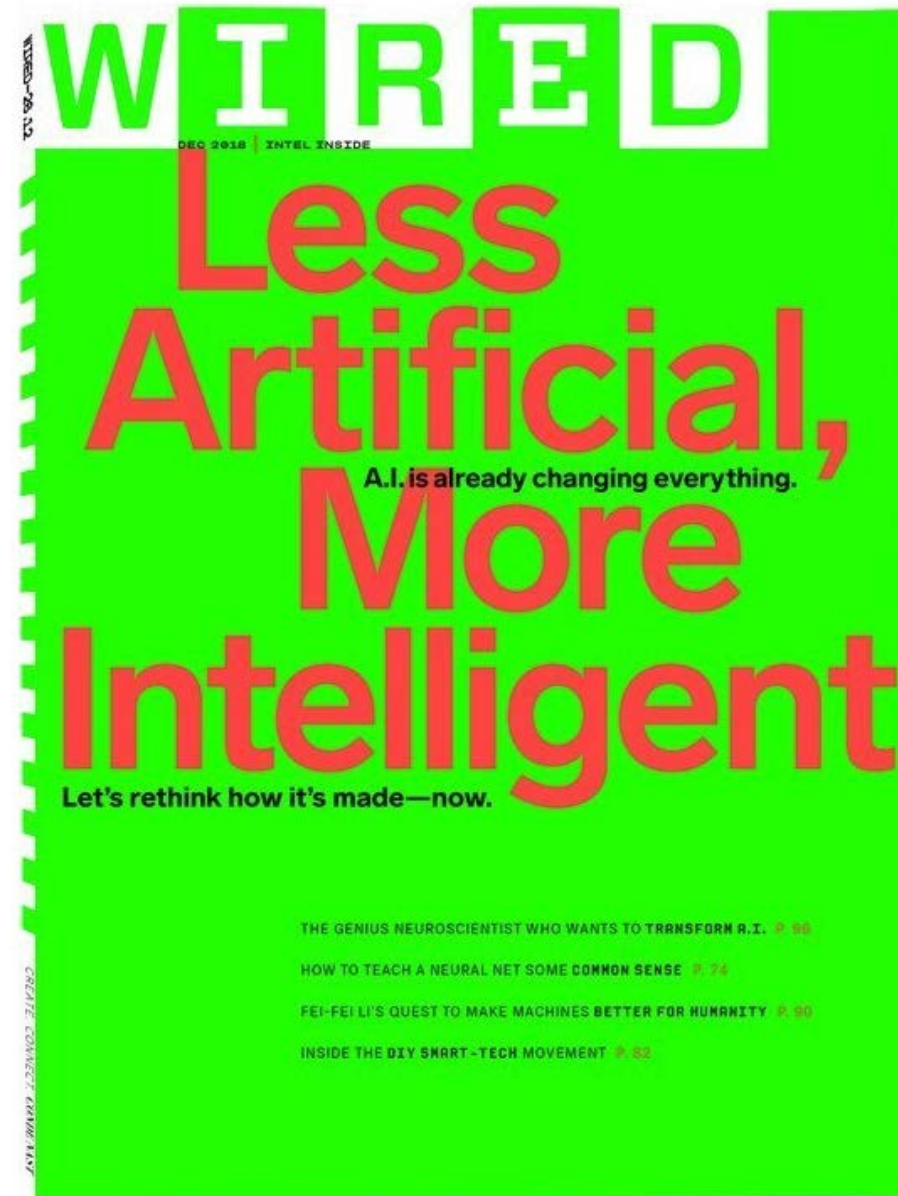
An AI system can **think** and have a **mind** (in the **philosophical definition of the term**)

a certain mindset of artificial intelligence development. the point where the machine's intellectual capability is functionally equal to a human's.



“More heretics argue that deep learning is hitting a wall. They say that, on its own, it’ll never produce generalized intelligence, because truly humanlike intelligence isn’t just pattern recognition.”

—————*How to Teach Artificial Intelligence Some Common Sense*



WIRED
December 2018.

BI

The Influence

Literature Review

Labour Economics

The first
industrial
revolution

- **Adam Smith** believes that technological advances can bring change of the workforce structure. Inspired by **the Luddites**, **David Ricardo** believes that the machines brought about by technological advances have crowded out workers.

The third
industrial
revolution

- In the 1970s, the increase in the supply of skilled labor in the United States and the rise in the skill premium occurred at the same time. Berman et al. (1998), Acemoglu (2002, 2003), have proposed the Skill-Biased Technological Change (SBTC), arguing that skill-biased technological advances have increased demand for highly skilled labor and reduced the need for low-skilled labor demand, which produce the wage inequality.

Sociology

- some scholars believe automation is conducive to reversing the trend of alienation of workers in the assembly line and re-giving their sense of control (Blauner, 1964).
- More scientific knowledge in automation is embedded in labor, less workers need to know the principles and processes involved and automation is seen as part of the labor skillsization (Braverman, 1974), which is also observed Richard Sennett (1998) in a bakery

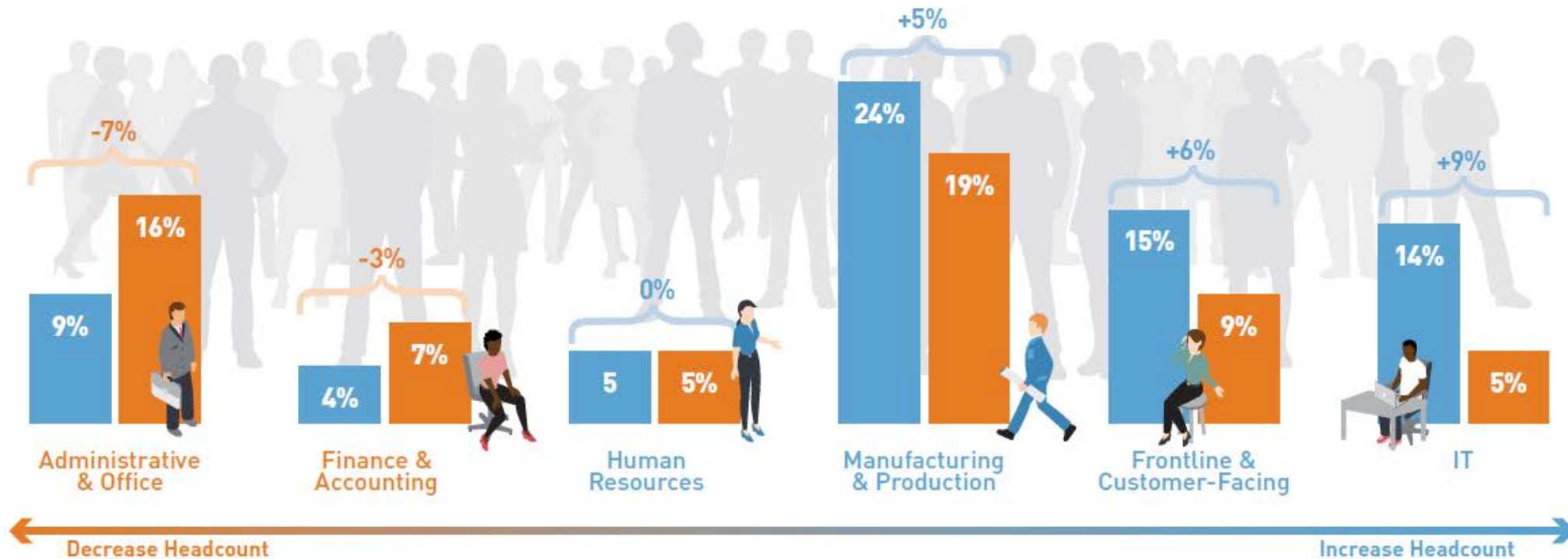


The Third Industrial Revolution Path

- In the second half of the 20th century, some scholars noticed that the demand structure of **the US** labor force changed: **self-disciplined and managerial labor is increasingly favored by the workplace** (Goldin et al., 1999; Auto et al., 1998). Bresnahan et al. (2000) argue that this change is attributed to the “Skills-Bias Technological Change” (SBTC), which makes high-skilled workers more widely available than low-skilled workers, but not all technological revolutions will increase technology. The need for labor. In Germany and other OECD countries, the demand structure of the labor force in the last 20 years of the 20th century also experienced **a decline in the demand for low-skilled labor and an increase in demand for highly skilled employees** (Bellmann et al., 1996; Kolle: et al., 2001; Machin). Et al., 1998; Kolling et al., 2002).
- **The rapid rise of IT in the 1990s** has caused people to rethink technical unemployment. Erik Brynjolfsson and Andrew McAfee (2013) found that the population threatened by computer advancement became a middle-income class. Because computers can't engage in **"brain labor"** such as product development and planning, they can't do **"physical labor"** such as nursing and construction. However, computers can improve the efficiency of data analysis, and transactional procedures, reducing the need for **"transactional labor."** **The labor of the middle-income class is reduced, and the labor of the low-income class and the high-income class is increasing.** This phenomenon is called the **“polarization”** of the labor market by the American labor economist David Autor (2013).

86% of employers plan to maintain or increase headcount due to **artificial intelligence and other technology relative to**

Functions Likely to See the Largest Increase and Decrease in Headcount in the Next Two Years



From World Bank *The Future of Jobs Report 2018*

HYPOTHESIS:

The growth of service robots will result in a reduction in accounting positions

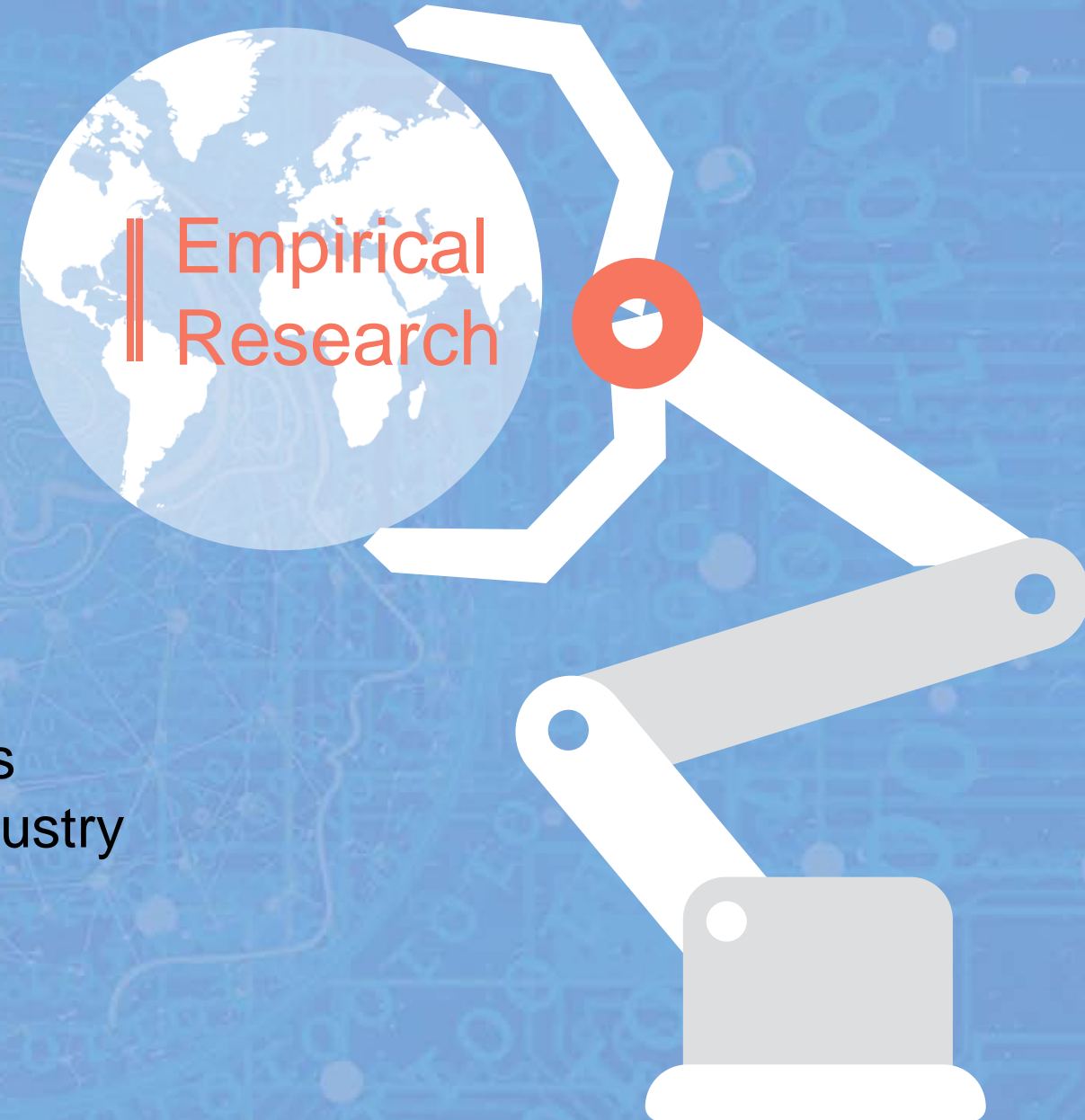
DATA RESOURCES:

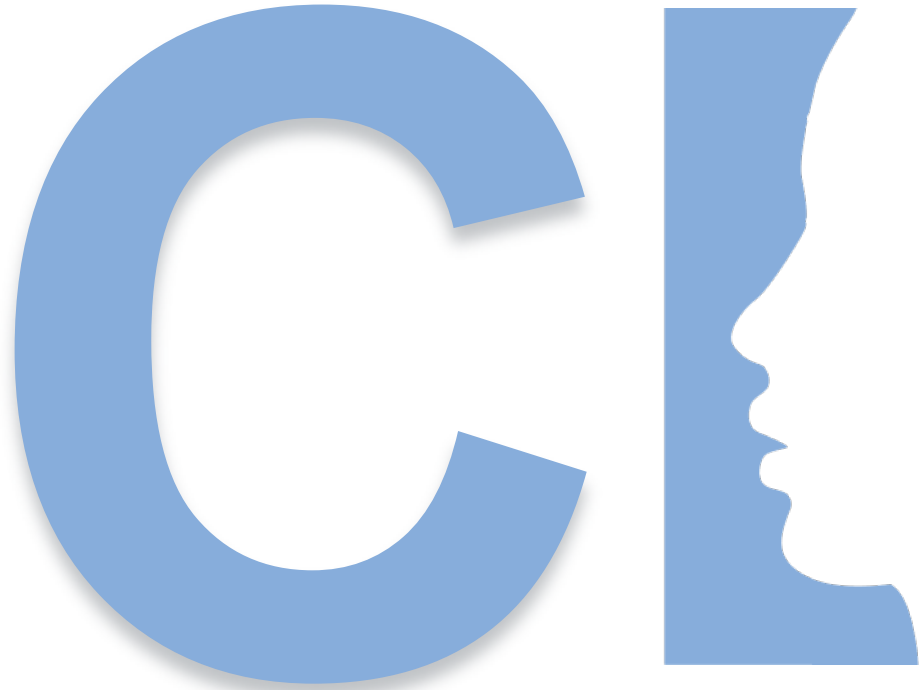
- ACCOUNTING YEARBOOK OF CHINA
- STATISTICS FROM INTERNATIONAL FEDERATION OF ROBOTICS

CONSTRUCTED VARIABLE:

The amount of 2007-2016 Service Robots

The amount of 2007-2016 Accounting industry employment



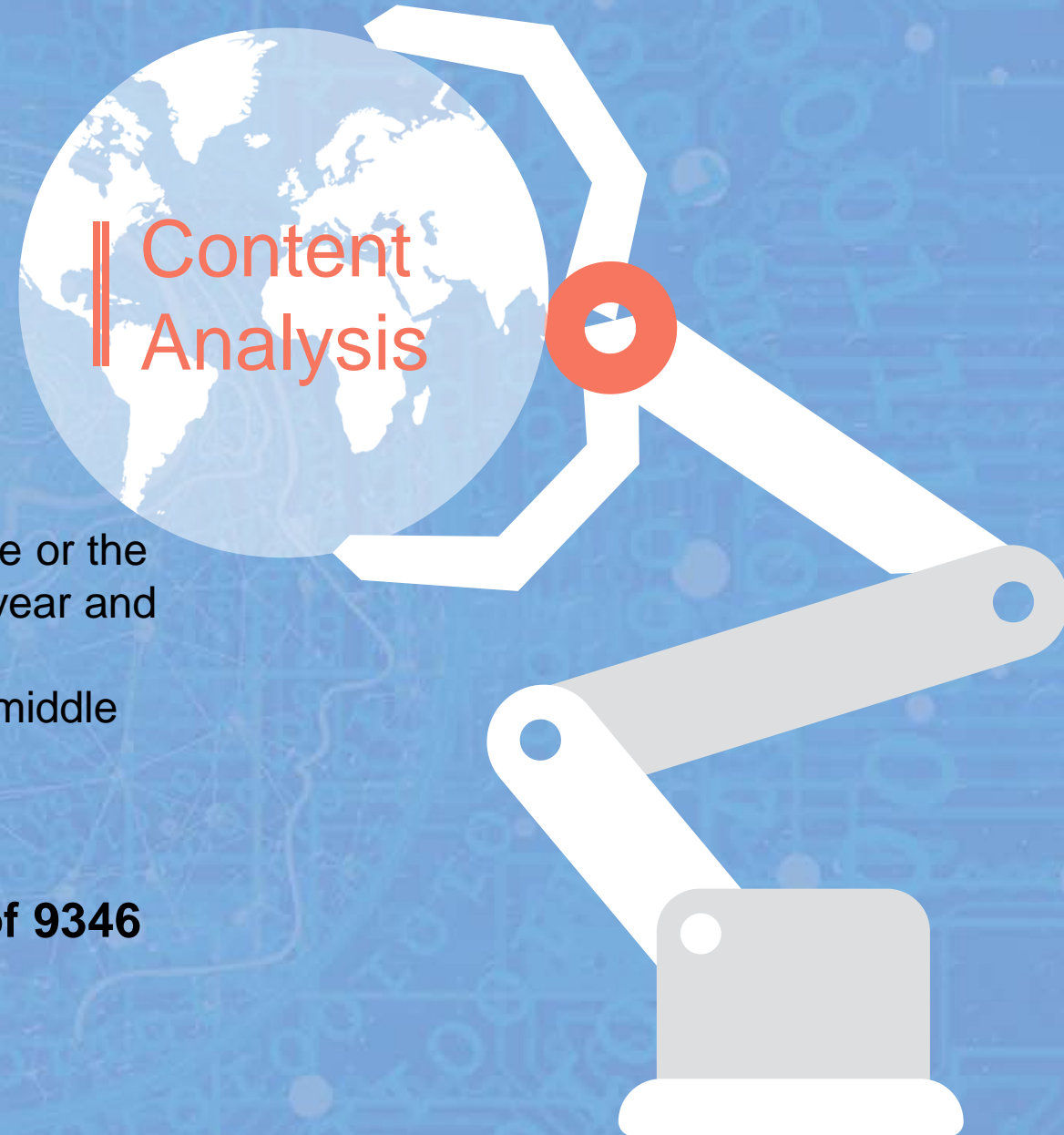


The Solutions

DATA RESOURCES:

前程无忧 (JOBS) : <https://www.51job.com/>

智联招聘 (Zhaopin) : <https://www.zhaopin.com/>



DATA CAPTURE:

STEP1:SEARCH ONLINE

- SEARCH KEYWORD: accounting.
- WORK EXPERIENCE: for the first time into the workplace or the first change of workers, no experience, less than one year and 1-3 years,
- ACADEMIC QUALIFICATIONS : high school/secondary/middle Technical and junior colleges,
- JOB TYPES: full-time
- No set in work place, salary, company nature, etc.

The search time is December 2018, and a total of 9346 jobs are retrieved.

DATA CAPTURE:

STEP2:FETCH the JOB DESCRIPTION

Use **python** to run **selenium** to fetch all the information about job description

STEP3:TEXT MINING

Use **NLPIR** to run

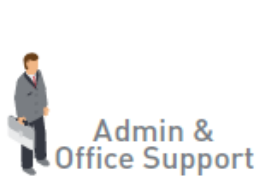
TF-IDF (term frequency–inverse document frequency)

The TF-IDF value increases proportionally to the number of times a word appears in the document and is offset by the number of documents in the corpus that contain the word, which helps to adjust for the fact that some words appear more frequently in general.

WORDS		FREQUENCY
1	Invoice	1233/9346
2	Accuracy	946/9346
3	Analytical	673/9346
4	Communication	623/9346
5	Adaptability	579/9356



The Research of World Bank



Most Valued Soft Skills by Function

1	Collaboration	Communication	Problem Solving	Problem Solving	Customer Service	Communication
2	Communication	Collaboration	Customer Service	Collaboration	Communication	Problem Solving
3	Problem Solving	Problem Solving	Collaboration	Communication	Problem Solving	Collaboration

Hardest to Find Soft Skills by Function

1	Problem Solving	Leadership	Communication	Communication	Communication	Problem Solving
2	Communication	Communication	Problem Solving	Problem Solving	Problem Solving	Communication
3	Leadership	Management	Organization	Collaboration	Customer Service	Organization



The Conclusion



Adv-Soft skills

people skills, social skills,
communication skills,
character or personality traits
etc



individual- Service industry

Nursing, Pension service etc



Multi-Hard skills

Computing skills, Digital skills,
Mobile application skills etc



physical- High-tech industry

smart device repair, Software
testing etc



Thank You

Suggestions are welcomed