AI Disputes and Future Prospects

Thiago Alves Rocha
thiago.alves@ifce.edu.br

Algorithmic Bias

- Mainly caused by data biases.
- When we use AI algorithms for decision-making, the algorithms may learn to discriminate an individual based on existing data including **race and gender**.
- Even if factors such as race or gender are excluded, the algorithms can make **discriminatory decisions** based on names and addresses.
- Existing algorithms and data of some companies may also have discrimination problems. They are **not open**, and corresponding **regulatory measures are unavailable** in countries and institutions.

Privacy Issues

- The existing AI algorithms are all data-driven. In this case, we need a large amount of data to train models.
- Convenience brought by AI while technology companies like Facebook, Google, Amazon, and Alibaba are obtaining an **enormous amount of user data**
  - Various aspects of our lives including **politics, religions, and gender**.

In principle, technology companies can record each click, each page scrolling, time of viewing any content, and browsing history when users access the Internet.

Technology companies can know our privacy including where are we, where we go, what we have done, education background, consumption capabilities, and personal preferences based on our ride-hailing records and consumption records.

Artificially Generated Data

- Fake images **can be produced** with technologies such as generative adversarial networks (GAN), making it hard to identify whether images are true or not.
- A suspect provides fake evidence by **forging an image** in which the suspect is in a place where he has never been to or with someone he has never seen.
- A tool for **simulating voice** of human beings based on recording samples of minutes, may be used by criminals.
- **Household images** released on rent and hotel booking platforms may be generated through GAN.

Rising Unemployment

Human beings have always been seeking ways to improve efficiency, that is, obtain more with less resources.

- We used sharp stones to hunt and collect food more efficiently.
- We used steam engines to reduce the need for horses.
- Every step in achieving automation will change our life and work.

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Rising Unemployment

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- **Repetitive jobs that involve little creativity and social interaction**.

Jobs Most Likely to Be Replaced by AI	Jobs Most Unlikely to Be Replaced by AI
Courier	Writer
Taxi driver	Management personnel
Soldier	Software engineers
Accounting	HR manager
Telesales personnel	Designer
Customer service	Activity planner
...	...

Problems to Be Solved

Are AI-created works protected by copyright laws?

Who gives authority to robots?

What rights shall be authorized to robots?

Self-driving car dilemmas?

How to explain the solutions for high stakes decisions?

Future Prospects of AI

Development Trends

Framework: easier-to-use development framework.

Algorithm: algorithm models with better performance and smaller size.

Computing power: comprehensive development of device-edge-cloud computing.

Data: more comprehensive basic data service industry and more secure data sharing.

Scenario: continuous breakthroughs in industry applications.

Easier-to-Use Frameworks

Various AI development frameworks are evolving towards **ease-of-use** and continuously **lowering the threshold** for AI development.

TensorFlow 2.0

TensorFlow 2.0 integrates Keras as its **high-level API, greatly improving usability**.

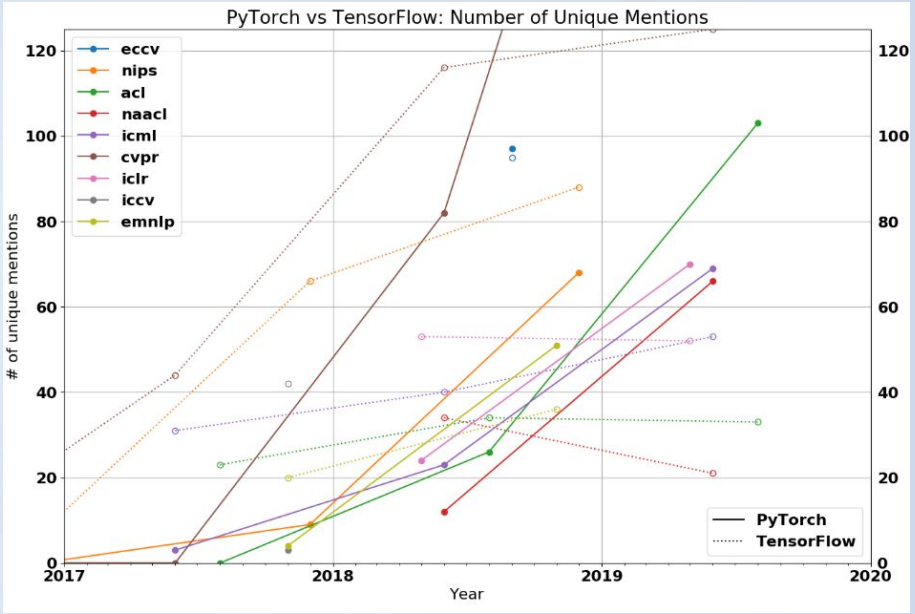
Pytorch vs Tensorflow

PyTorch is widely recognized by **academia** for its ease of use.

- PyTorch is more widely used than TensorFlow in academia.

TensorFlow supports **industrial deployment** better and still has a larger market share in enterprises.

- PyTorch shows a trend of continuous catch-up.



Comparison between PyTorch and TensorFlow usage statistics of top academic conferences

Algorithms with Better Performance

In the computer vision field, GAN has been able to generate high-quality images that **cannot be identified by human eyes**.

In the NLP field, models such as **BERT** and **GPT** are widely used in industrial scenarios.

In the reinforcement learning field, AlphaStar of the DeepMind team **defeated the top human player** in StarCraft II.

Smaller Deep Learning Models

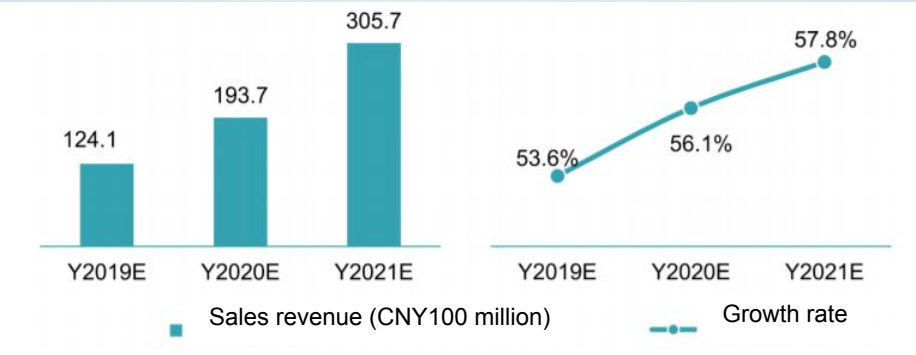
A model with better performance usually has a larger quantity of parameters, and a **large model** has **lower running efficiency** in industrial applications.

More and more model compression technologies are proposed to further **compress the model size** while **ensuring the model performance**, meeting the requirements of industrial applications.

- **Low-rank approximation**: multiple low-rank matrices to approximate the original weight matrix.
- **Network pruning**: remove relatively unimportant weights from the weight matrix.

Computing Power

The **scale** of **AI chips** applied to the cloud, edge devices, and mobile devices **keeps increasing**, further meeting the computing power demand of AI.

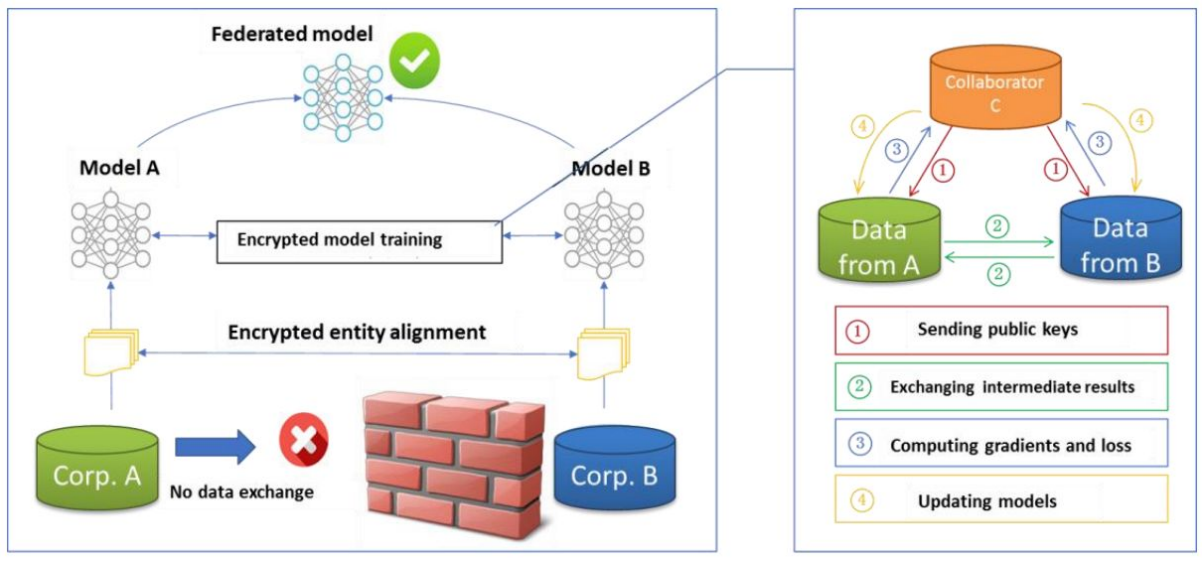


China AI Chip Industry Development White Paper 2020

Market Scale and Growth Prediction of AI Chips in China from 2020 to 2021

More Securing Data Sharing

Collaborative learning uses **different data sources** to train models, further breaking data bottlenecks while ensuring **data privacy** and **security.**



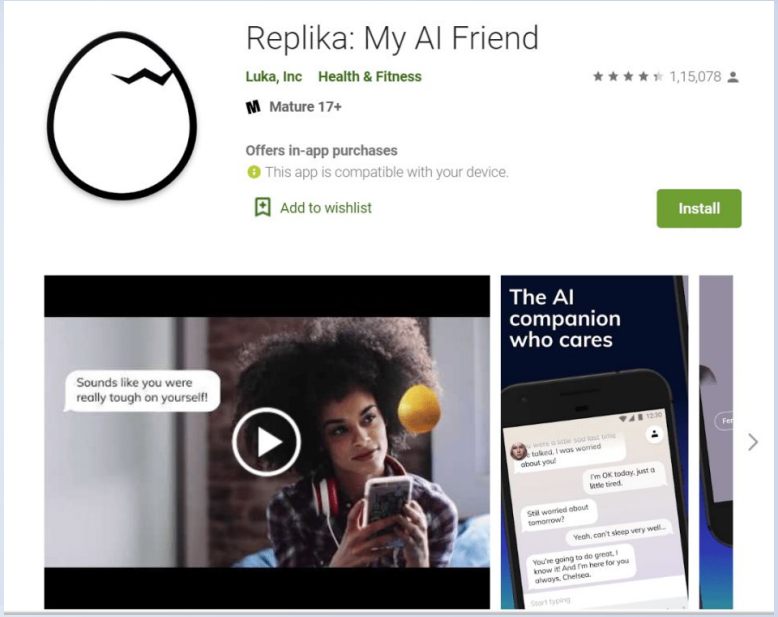
Continuous Breakthroughs

With the continuous exploration of AI in various areas, the application scenarios of AI will continuously increase.

Mitigating Psychological Problems

AI chatbots help alleviate **mental health problems** such as autism by combining psychological knowledge.

The figure comes from https://medium.com/syncedreview/2019-in-review-10-brilliant-ai-apps-60d690976ccb



Insurance and Loss Assessment

AI technologies help insurance companies optimize vehicle **insurance** claims and complete vehicle **damage assessment**.