ARTIFICIAL INTELLIGENCE

INSTRUKTUR (Pertemuan 1-5)

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ASEP SHOLAHUDDIN

(Dosen Teknik Informatika Unpad)

	Hari ke-1	Hari ke-2	Hari ke-3	Hari ke-4	Hari ke-5
Minggu I	**Live Session** • "Overview of Artificial Intelligence • Python Programming Basics-1" • "Python Programming Basics-2 • Python Programming Basics Experiment-1" **Activity**: Live Session by Lecturer	**Online Course:** AI Overview 1.1 AI Overview 1.2 Technical Fields and Application Fields of AI 1.3 Huawei's AI Development Strategy 1.4 AI Disputes 1.5 Future Prospects of AI **Activity:** Self-paced Learning at https://talent.huaweiuniversity.com/portal/courses/HuaweiX+EBG2020CCHW1100087/about **Live Session:** • Diskusi dan tanya jawab materi online course • Persiapan Lab Practice **Activity**: Live Session by Lecturer	**Lab Practice:** • Configuring the Windows Experiment Environment • Installing Anaconda • Changing the conda and pip command source • Installing Tensor Flow • Compiling Test Scripts in Real Time • Anaconda Virtual Environment **Activity:** Lab session, monitored by Lecturer **Tools**: Atlas 200DK **Live Session:** Diskusi dan tanya jawab sesi Lab Practice **Activity**: Live Session by Lecturer	**Live Session** • "Python Programming Basics-3 • Python Programming Basics Experiment-2" **Activity**: Live Session by Lecturer	**Online Course:** Machine Learning 2.1 Machine Learning Definition 2.2 Machine Learning Types 2.3 Machine Learning Process 2.4 Other Key Machine Learning Methods 2.5 Common Machine Learning Algorithms 2.6 Case study **Activity:** Self-paced Learning at https://talent.huaweiuniversity.com/portal/courses/HuaweiX+EBG2020CCHW1100087/about **Live Session:** Diskusi dan tanya jawab materi online course
Tes kompetensi	Chapter 1 quiz		Result of Lab practice	Chapter 2 quiz	
Total jam pembelajaran: 26 JP (1 JP = 45 menit	**Live Session 2JP** Self-paced learning 2JP	**Live Session 2JP** Self-paced learning 4JP	**Live Session 2JP** Self-paced learning 4JP	**Live Session 2JP** Self-paced learning 2JP	**Live Session 2JP** Self-paced learning 4JP

MATERI HARI INI

- OVERVIEW AI
- PYTHON BASIC-1
- PYTHON BASIC-2
- PYTHON EXPERIMENT-1

Video Youtube contoh AI

- https://www.youtube.com/watch?v=VOC3huqHrss&t=25s

AI Overview

Foreword

- Mankind is welcoming the fourth industrial revolution represented by intelligent technology. New technologies such as AI, IoT, 5G and bioengineering are integrated into all aspects of human society; driving changes in global macro trends, such as sustainable social development and economic growth. New kinetic energy, smart city upgrading, industrial digital transformation, consumer experience, etc.
- As the world's leading provider of ICT (information and communications) infrastructure and smart terminals, Huawei actively participates in the transformation of artificial intelligence and proposes Huawei's full-stack full-scenario AI strategy. This chapter will mainly introduce AI Overview, Technical Fields and Application Fields of AI, Huawei's AI Development Strategy, AI Disputes, Future Prospects of AI.

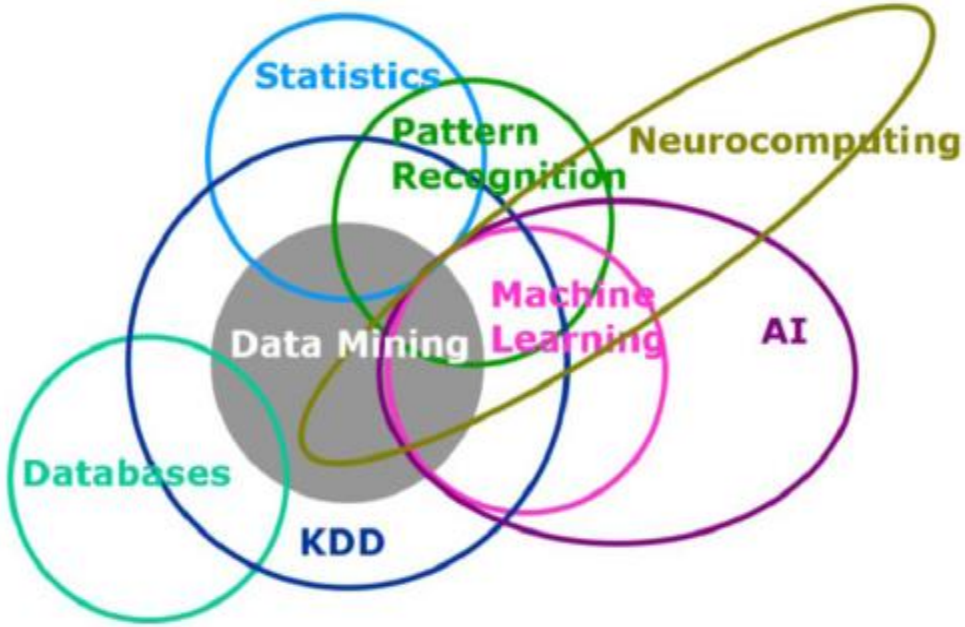
Objectives

Upon completion of this course, you will be able to:

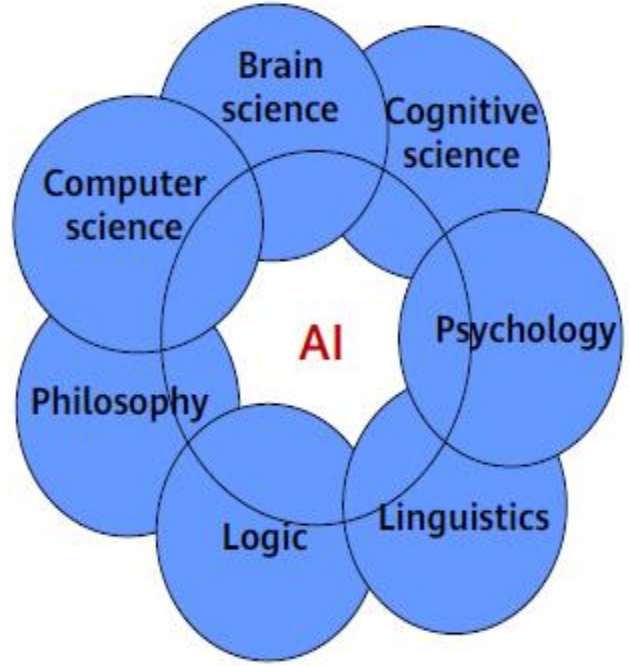
- Understand basic concepts of AI.
- Understand AI technologies and their development history.
- Understand the application technologies and application fields of AI.
- Know Huawei's AI development strategy.
- Know the development trends of AI.

What Is AI?

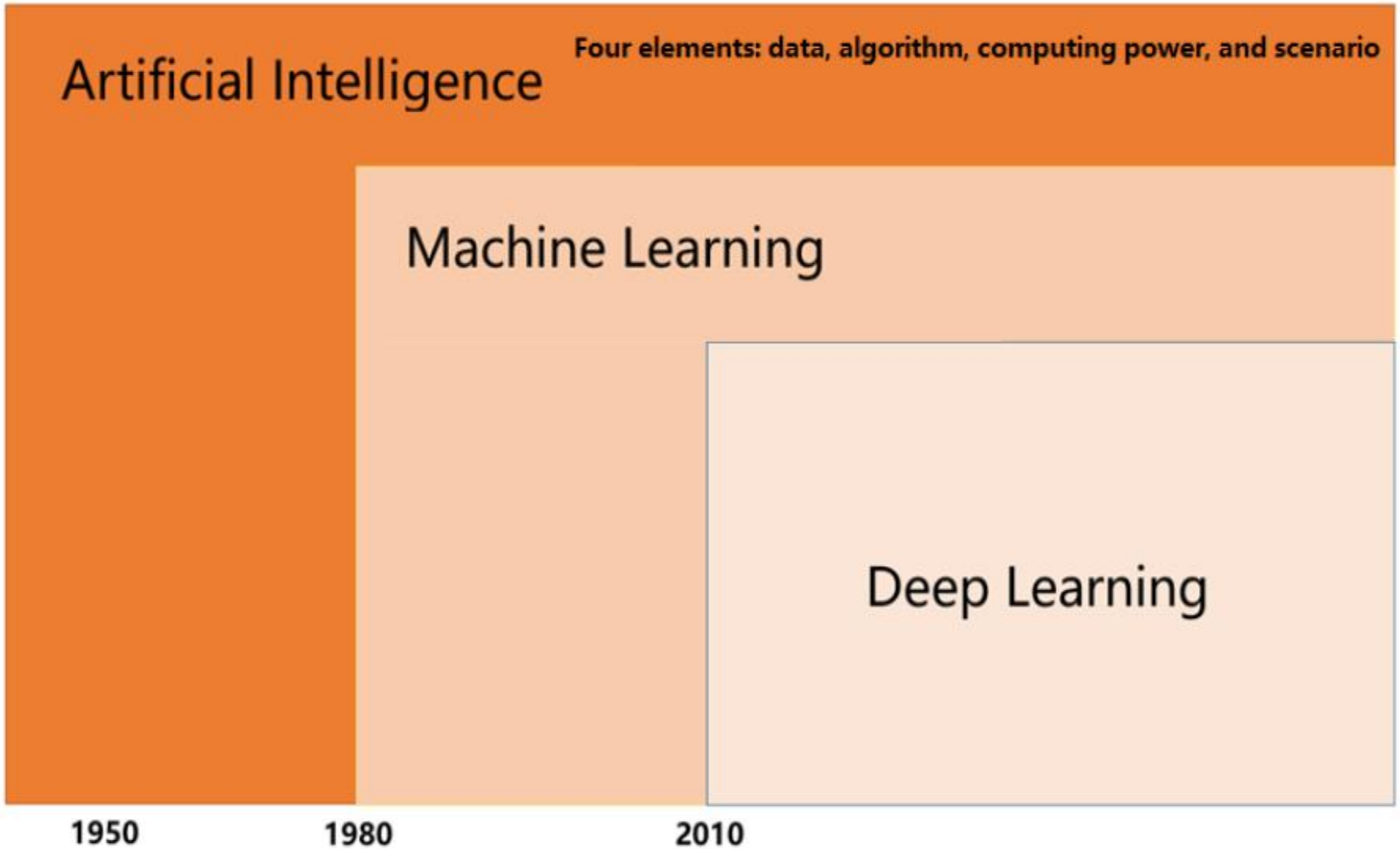
- Artificial Intelligence (AI) is a new technical science that studies and develops theories, methods, techniques, and application systems for simulating and extending human intelligence. In 1956, the concept of AI was first proposed by John McCarthy, who defined the subject as "science and engineering of making intelligent machines, especially intelligent computer program". AI is concerned with making machines work in an intelligent way, similar to the way that the human mind works. At present, AI has become an interdisciplinary course that involves various fields.



Identification of concepts related to AI and machine learning

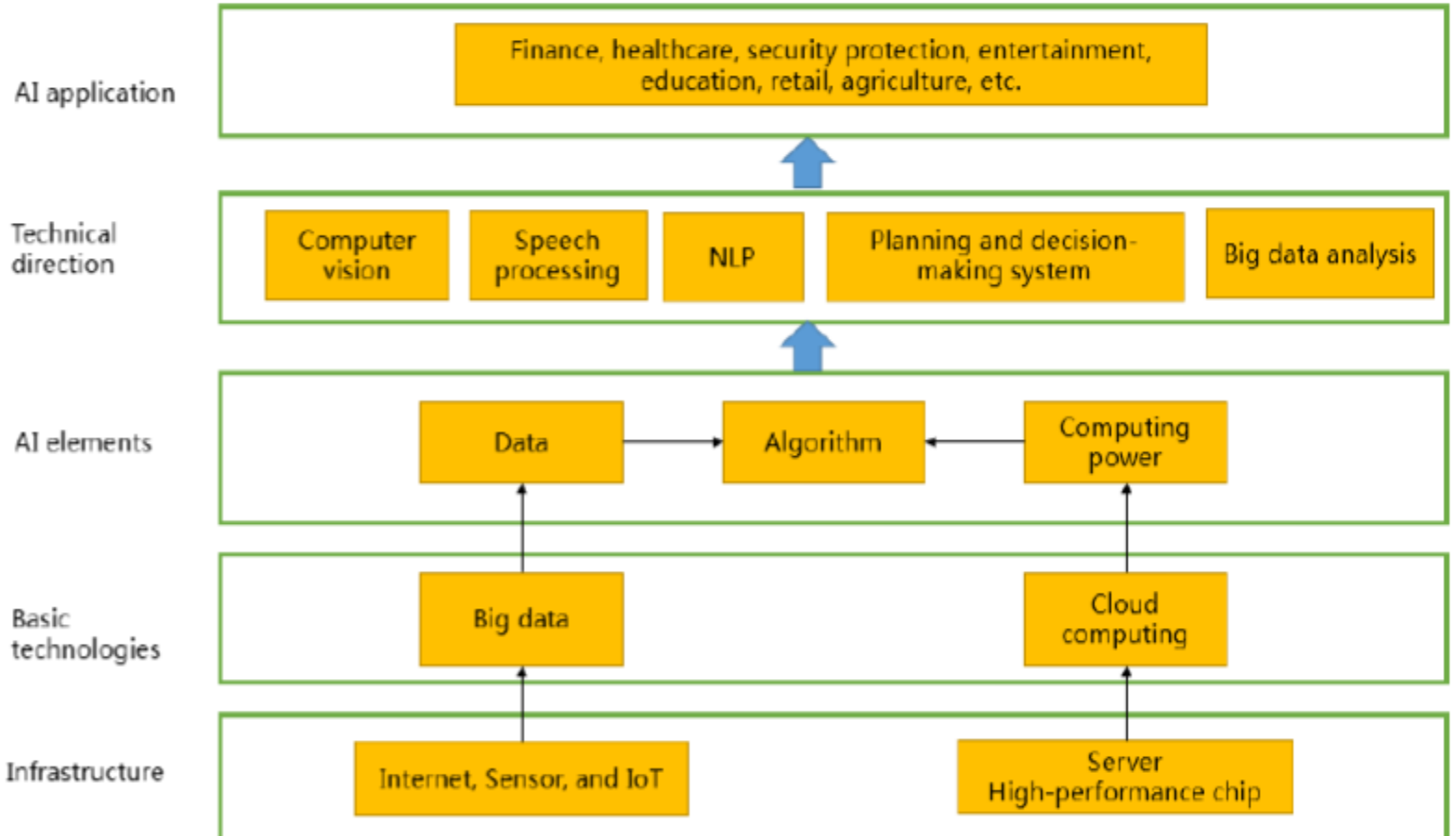


Relationship of AI, Machine Learning, and Deep Learning

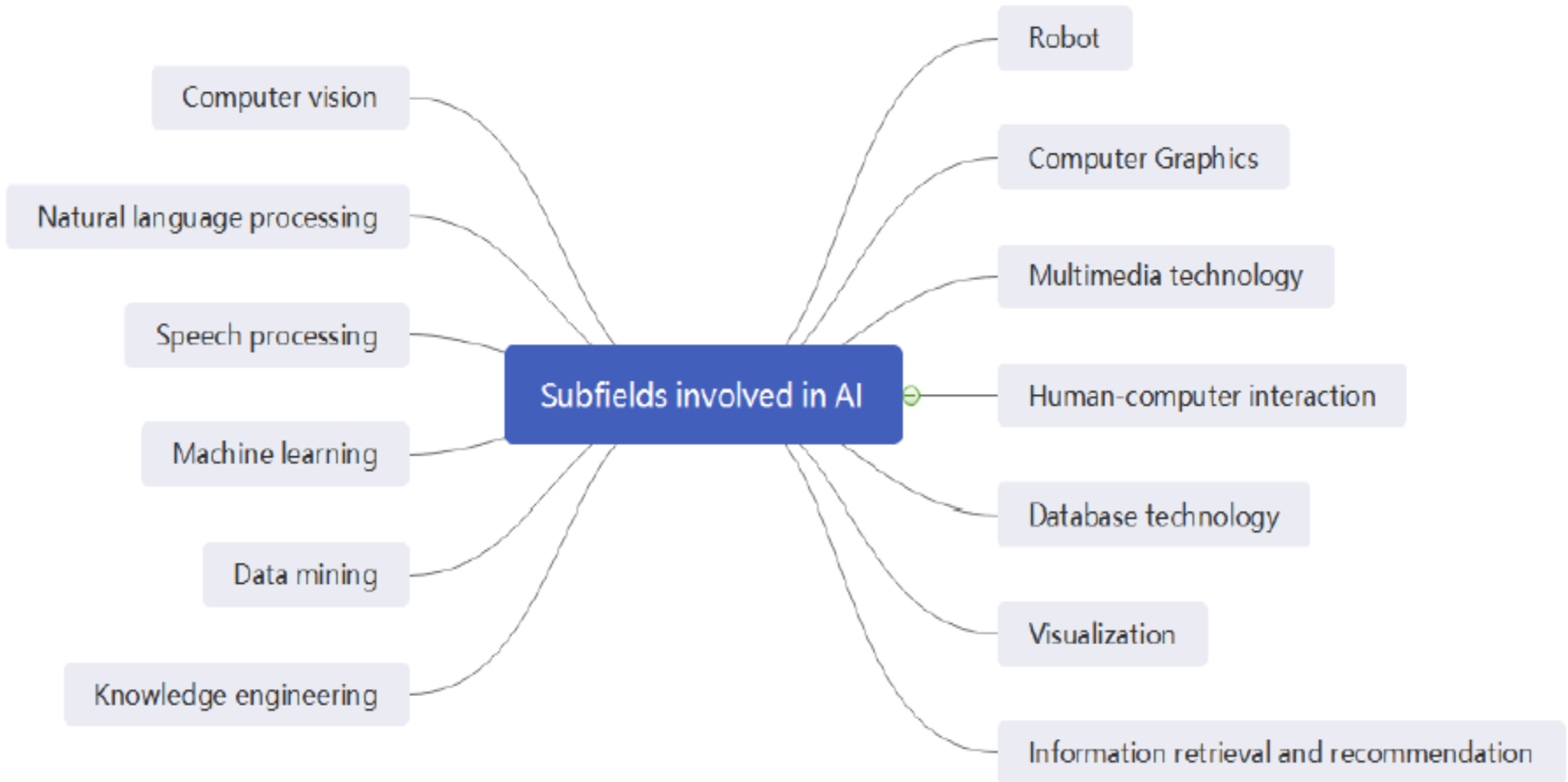


AI Industry Ecosystem

- The four elements of AI are data, algorithm, computing power, and scenario. To meet requirements of these four elements, we need to combine AI with cloud computing, big data, and IoT to build an intelligent society.

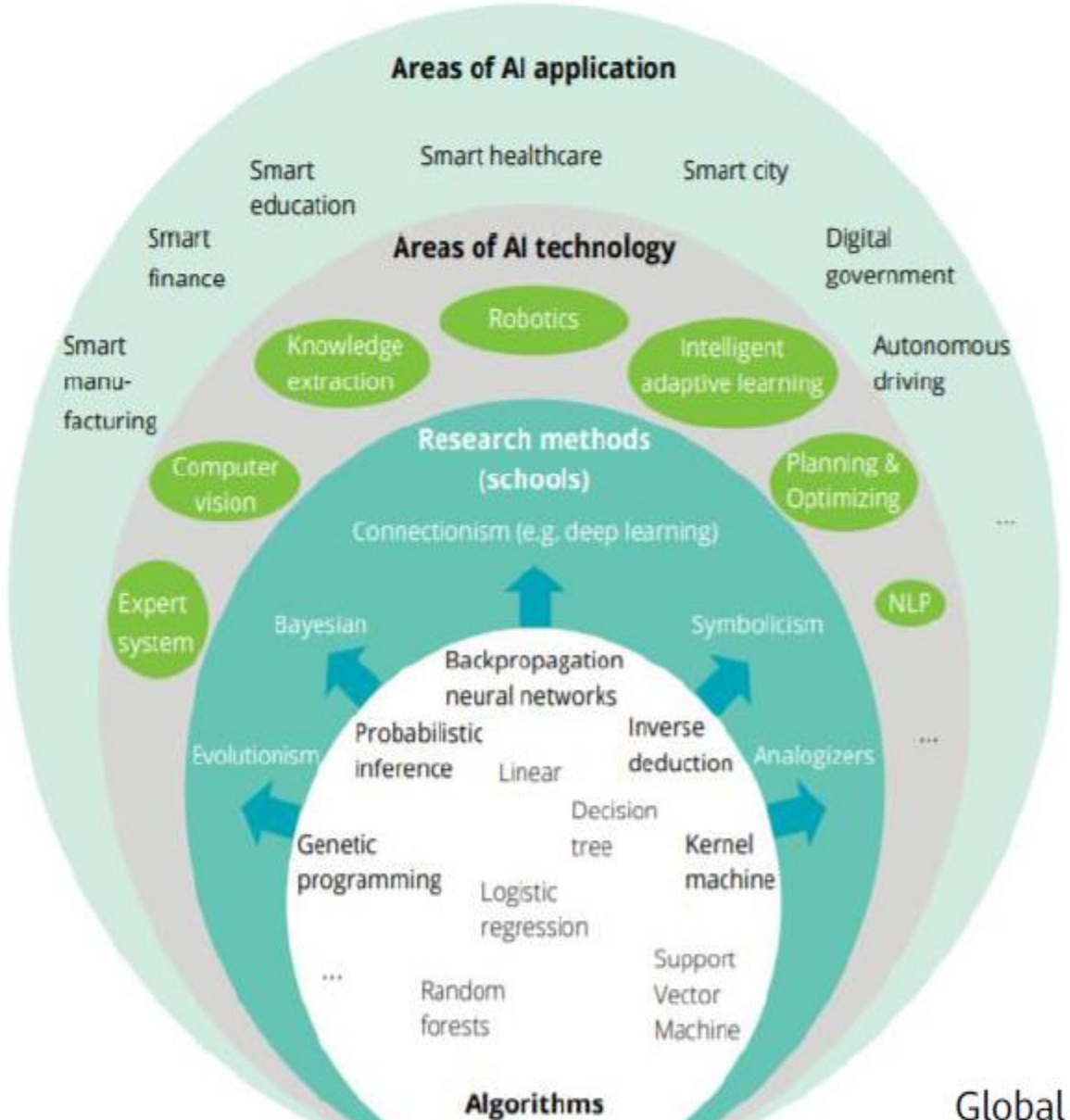


Sub-fields of AI



AI Development Report 2020

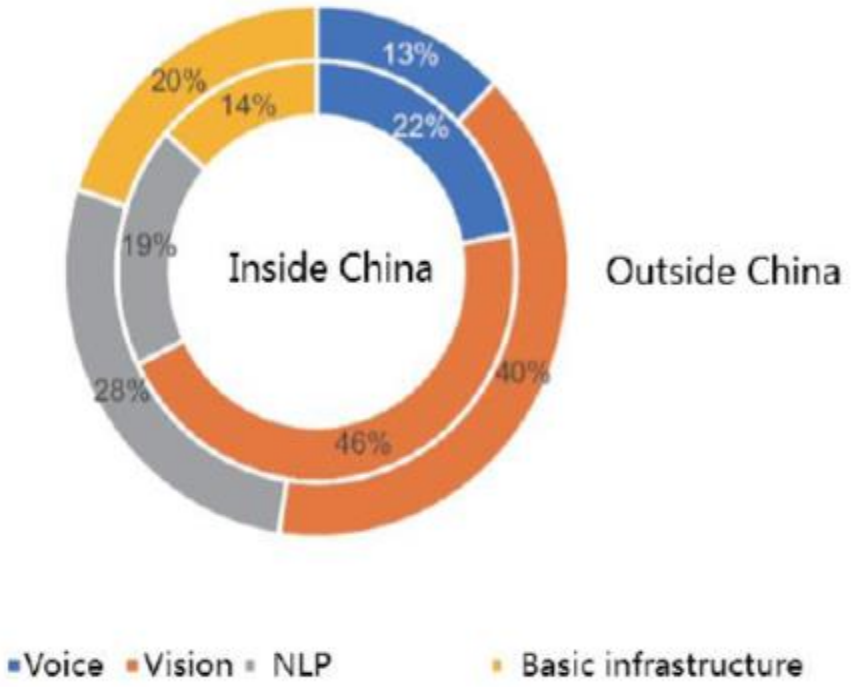
Technical Fields and Application Fields of AI



Global AI Development

Distribution of AI Application Technologies in Enterprises Inside and Outside China

- At present, application directions of AI technologies mainly include:
  - **Computer vision**: a science of how to make computers "see"
  - **Speech processing**: a general term for various processing technologies used to research the voicing process, statistical features of speech signals, speech recognition, machine-based speech synthesis, and speech perception
  - **Natural language processing (NLP)**: a subject that use computer technologies to understand and use natural language



Distribution of AI application technologies in enterprises inside and outside China

China AI Development Report 2018

Computer Vision Application Scenario (1)

- Computer vision is the most mature technology among the three AI technologies. The main topics of computer vision research include image classification, target detection, image segmentation, target tracking, optical character recognition (OCR), and facial recognition.
- In the future, computer vision is expected to enter the advanced stage of autonomous understanding, analysis, and decision-making, enabling machines to "see" and bringing greater value to scenarios such as unmanned vehicles and smart homes.
- Application scenarios:

Electronic attendance

Traffic analysis

Computer Vision Application Scenario (2)

Action analysis

Authentication

Smart album

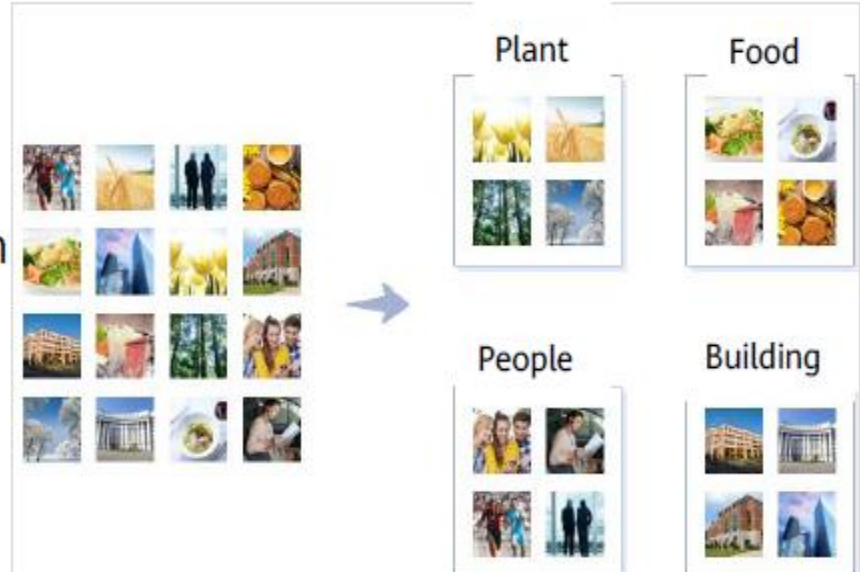
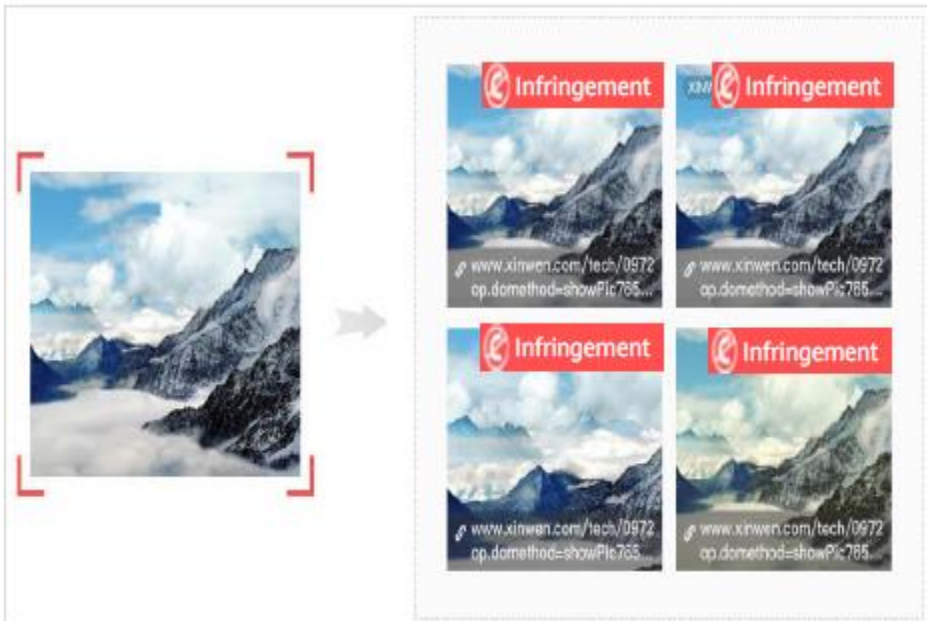


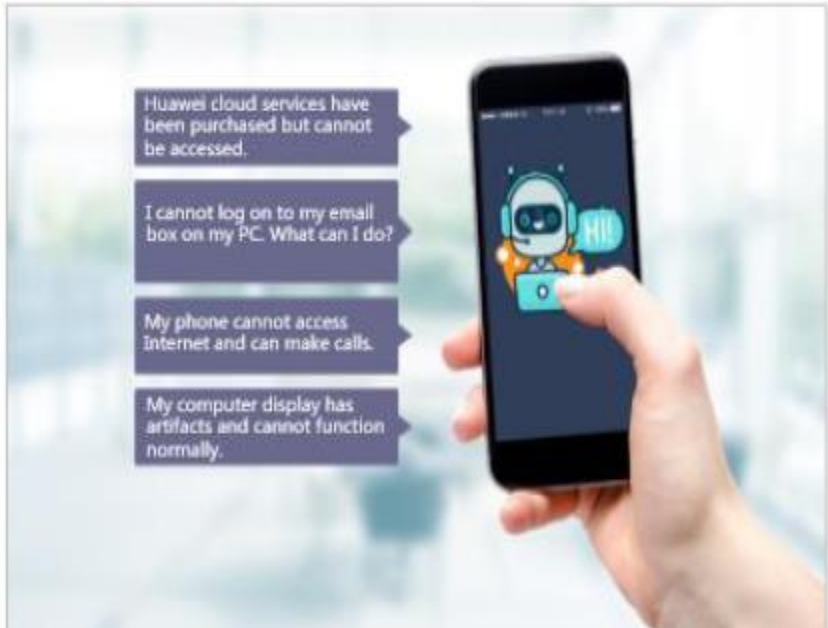
Image search



Voice Processing Application Scenario (1)

- The main topics of voice processing research include voice recognition, voice synthesis, voice wakeup, voiceprint recognition, and audio-based incident detection. Among them, the most mature technology is voice recognition. As for near field recognition in a quite indoor environment, the recognition accuracy can reach 96%.
- Application scenarios:

Question Answering Bot (QABot)



Voice navigation

Voice Processing Application Scenario (2)

Intelligent education

Real-time conference records

- Other applications:
  - Spoken language evaluation
  - Diagnostic robot
  - Voiceprint recognition
  - Smart sound box

NLP Application Scenario (1)

- The main topics of NLP research include machine translation, text mining, and sentiment analysis. NLP imposes high requirements on technologies but confronts low technology maturity. Due to high complexity of semantics, it is hard to reach the human understanding level using parallel computing based on big data and parallel computing only.
- In future, NLP will achieve more growth: understanding of shallow semantics → automatic extraction of features and understanding of deep semantics; single-purpose intelligence (ML) → hybrid intelligence (ML, DL, and RL)
- Application scenarios:

Public opinion analysis

Evaluation analysis

NLP Application Scenario (2)

Machine translation

Text classification

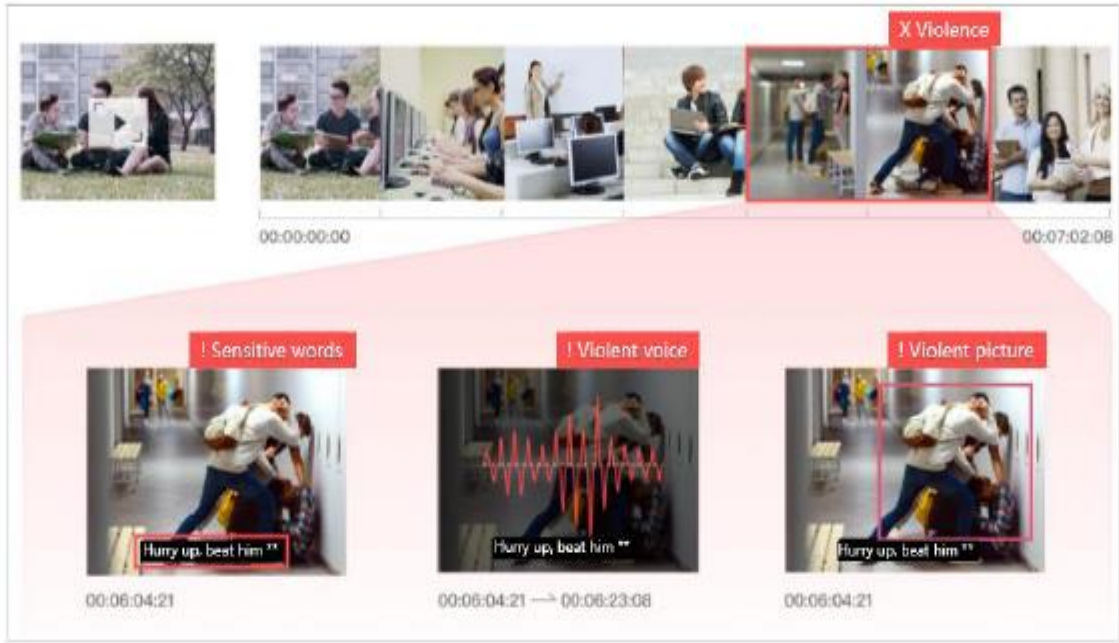
- Other applications:
  - Knowledge graph
  - Intelligent copywriting
  - Video subtitle
  -

AI Application Field - Intelligent Healthcare

- **Medicine mining:** quick development of personalized medicines by AI assistants
- **Health management:** nutrition, and physical/mental health management
- **Hospital management:** structured services concerning medical records (focus)
- **Assistance for medical research:** assistance for biomedical researchers in research
- **Virtual assistant:** electronic voice medical records, intelligent guidance, intelligent diagnosis, and medicine recommendation
- **Medical image:** medical image recognition, image marking, and 3D image reconstruction
- **Assistance for diagnosis and treatment:** diagnostic robot
- **Disease risk forecast:** disease risk forecast based on gene sequencing

AI Application Field - Intelligent Security

- Security protection is considered the easiest field for AI implementation. AI technologies applied in this field are relatively mature. The field involves massive data of images and videos, laying a sound foundation for training of AI algorithms and models. Currently, AI technologies are applied to two directions in the security protection field, namely, civil use and police use.
- Application scenarios:
  - **Police use:** suspect identification, vehicle analysis, suspect tracking, suspect search and comparison, and access control at key places
  - **Civil use:** facial recognition, ployment



AI Application Field - Smart Home

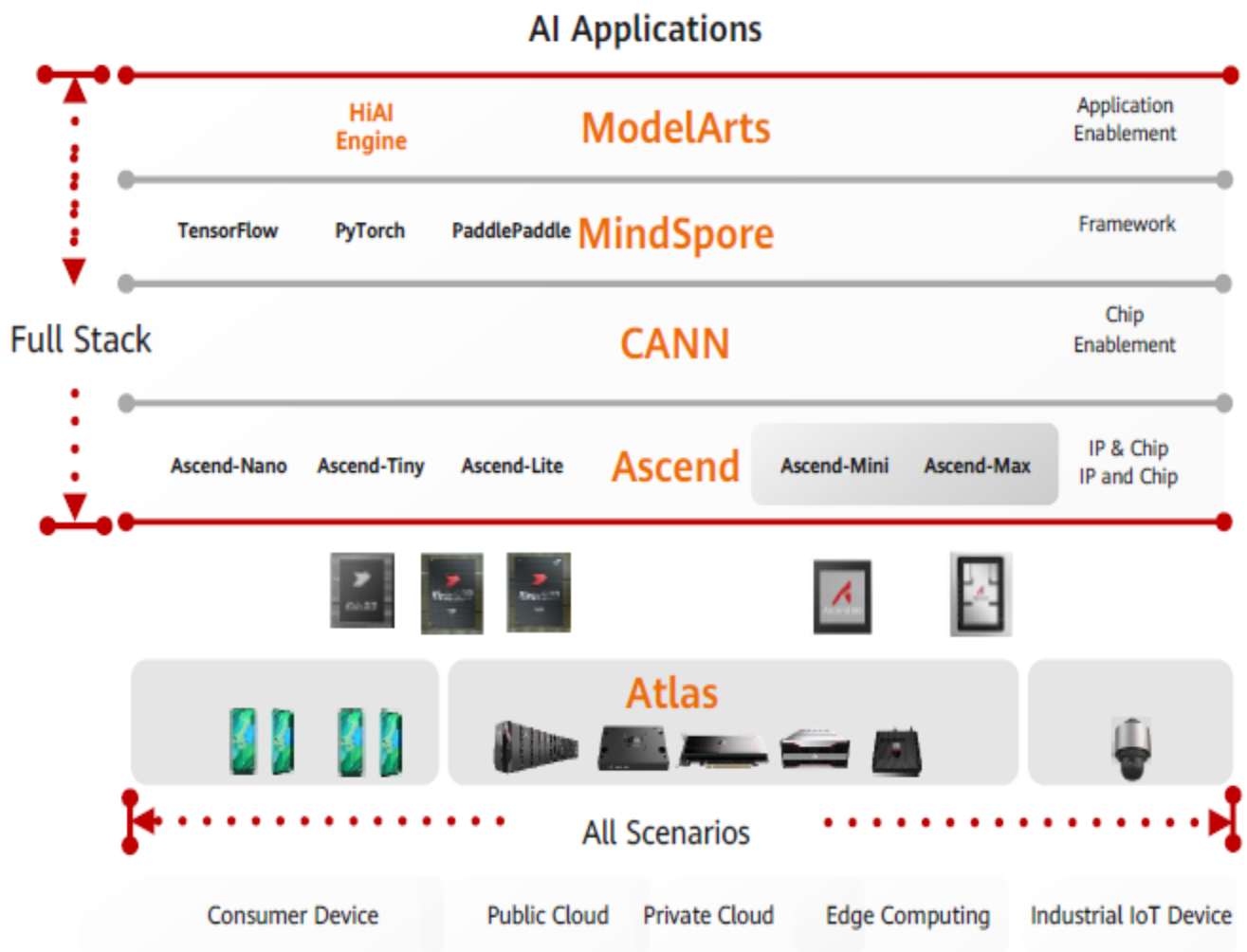
- Based on IoT technologies, a smart home ecosystem is formed with hardware, software, and cloud platforms, providing users personalized life services and making home life more convenient, comfortable, and safe.

Control smart home products with voice processing such as air conditioning temperature adjustment, curtain switch control, and voice control on the lighting system.

Implement **home security protection** with computer vision technologies, for example, facial or fingerprint recognition for unlocking, real-time intelligent camera monitoring, and illegal intrusion detection.

Develop user profiles and recommend content to users with the help of machine learning and deep learning technologies and based on historical records of smart speakers and smart TVs.

Huawei's Full-Stack, All-Scenario AI Portfolio



Application enablement: provides end-to-end services (ModelArts), layered APIs, and pre-integrated solutions.

MindSpore: supports the unified training and inference framework that is independent of the device, edge, and cloud.

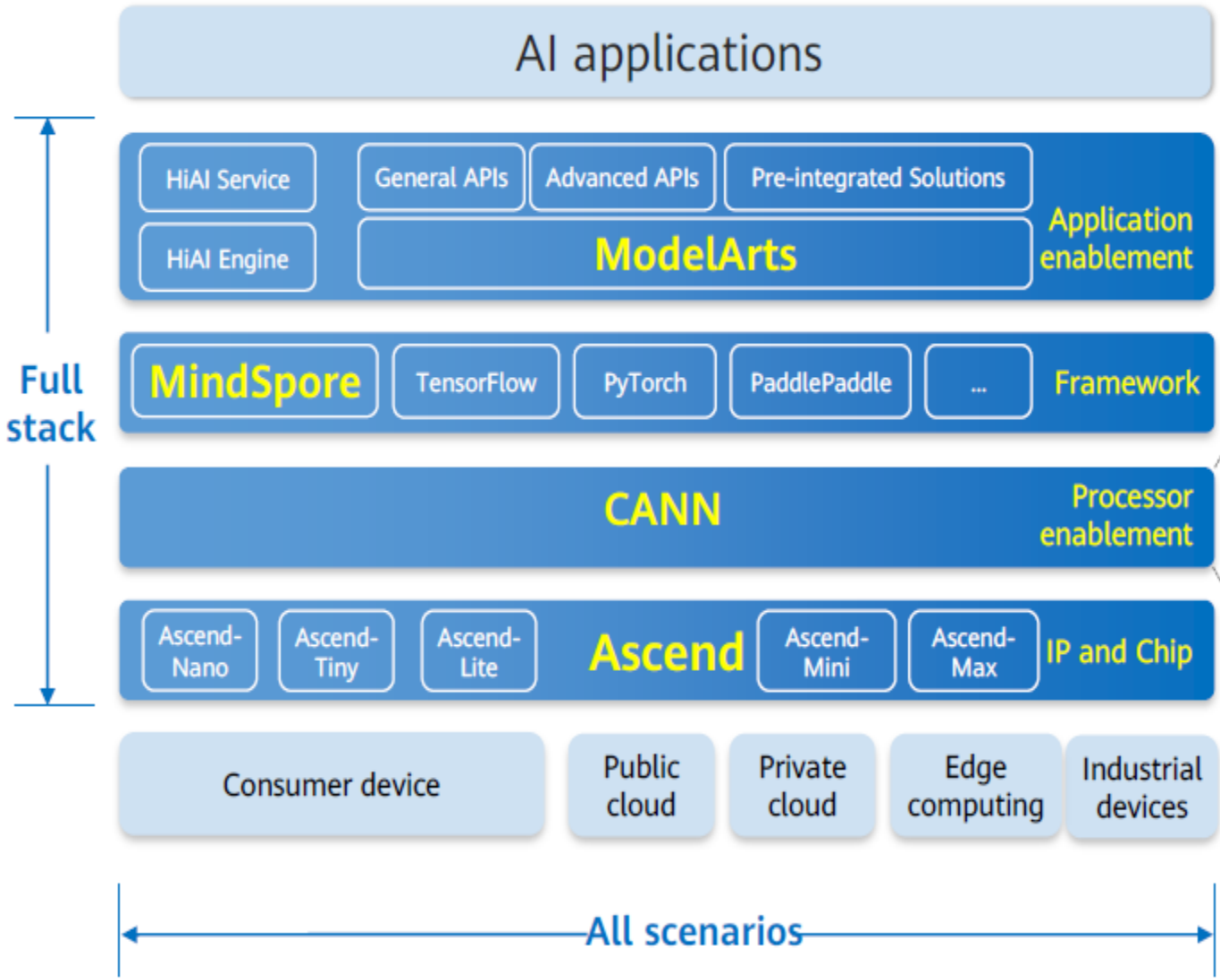
CANN: a chip operator library and highly automated operator development tool.

Ascend: provides a series of NPU IPs and chips based on a unified, scalable architecture.

Atlas: enables an all-scenario AI infrastructure solution that is oriented to the device, edge, and cloud based on the Ascend series AI processors and various product forms.

Huawei's "all AI scenarios" indicate different deployment scenarios for AI, including public clouds, private clouds, edge computing in all forms, industrial IoT devices, and consumer devices.

Full Stack — CANN

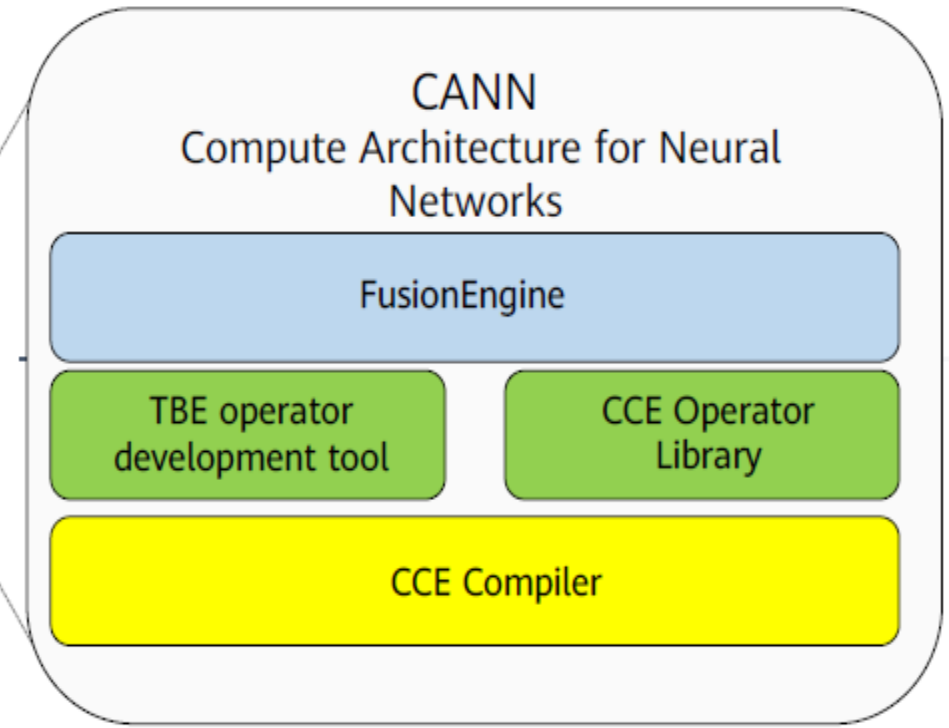


CANN:

A chip operators library and highly automated operator development toolkit

Optimal development efficiency, in-depth optimization of the common operator library, and abundant APIs

Operator convergence, best matching the performance of the Ascend chip



Atlas AI Computing Platform Portfolio

Internet, security, finance, transportation, power, etc.

Application Enablement

Atlas intelligent edge platform
Industry SDK/Container engine/Basic service repository

Atlas deep learning platform
Cluster management/Model management/Data pre-processing

Framework

MindSpore

TensorFlow/PyTorch/Caffe/MxNet

Framework Adapret

CANN

AscendCL

Graph engine for graph optimization

Operator/Acceleration/Communication libraries (BLAS, FFT, DNN, Rand, Solver, Sparse, HCCL)

Runtime

Driver

Common components

Unified O&M and configuration management subsystem

Safety subsystem

AXE toolchain (log/profiling/Mind Studio)

Chips & Hardware

Atlas 200
16 TOPS INT8

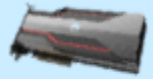
Atlas 300 inference accelerator card
64 TOPS INT8

Atlas 500
16 TOPS INT8

Atlas 800 AI inference server
512 TOPS INT8

Atlas 900
256–1024 PFLOPS FP16

Atlas 200 developer kit



Atlas 300 training card
256 TFLOPS FP16

Atlas 800 AI training server
2 PFLOPS FP16

Ascend 310

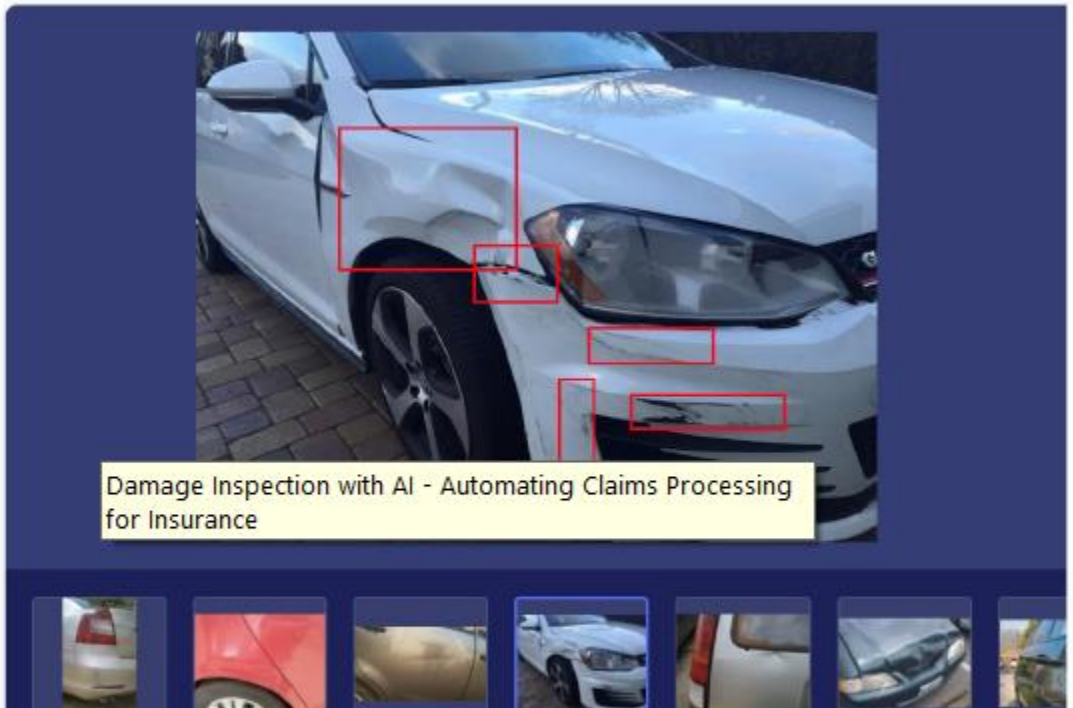
Da Vinci Architecture

Ascend 910

Automatic Vehicle Insurance and Loss Assessment

- AI technologies help insurance companies optimize vehicle insurance claims and complete vehicle insurance loss assessment using deep learning algorithms such as image recognition.

Vehicle Damage Assessment

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Summary

- This chapter introduces the definition and development history of AI, describes the technical fields and application fields of AI, briefly introduces Huawei's AI development strategy, and finally discusses the disputes and the development trends of AI.

THANK YOU

https://pynative.com/basic-python-quiz-for-beginners/