AI IMPLEMENTATION ON A MPU

Yves GRILLET - Future Electronics

Vertical Segment Manager for Embedded Solutions

2023 April 23rd

FUTURE ELECTRONICS

YOUR TRUSTED PARTNER IN DESIGN SUPPORT

Engineering Tomorrow's Ideas

Strong Engineering Power • Technically Capable Across The System • Trained, Certified and Equipped • Global Suppliers Contacts and Ecosystem

Agenda

- What is AI?
- Hardware requieremements for the MPU
- Software needs and typical process
- What AI could offer into your application
- Available SoM Hardware

FUTURE ELECTRONICS

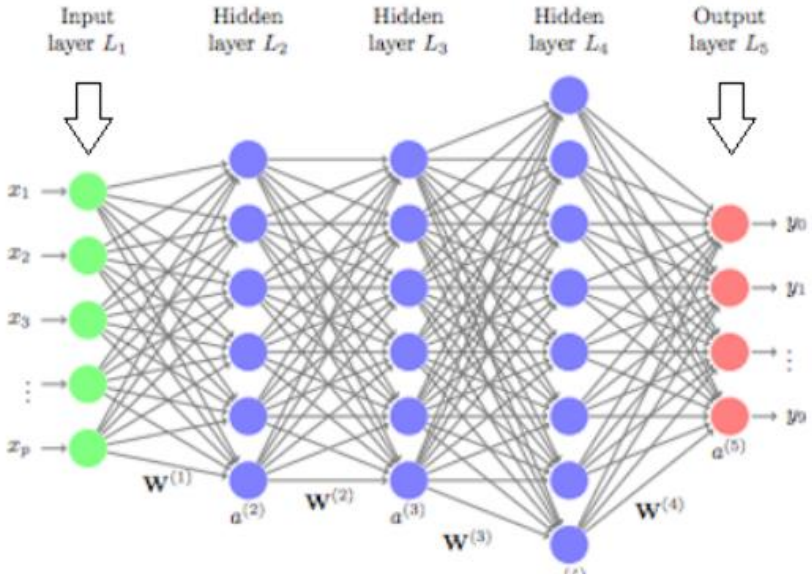
AI

AI is the data interpretations to extract data signatures

The challenge :

- The technology progress gives us a huge quantity of data to manipulate

  High speed Data conversion, Image resolution, 3D sensors, Storage capacity, Technology shrink, the communication BW
- It requires CPU DMIPS to extract deep signatures by using matrix data manipulation in Real time
- It requires to develop Models and have Dataset to fine tune and validate a Model

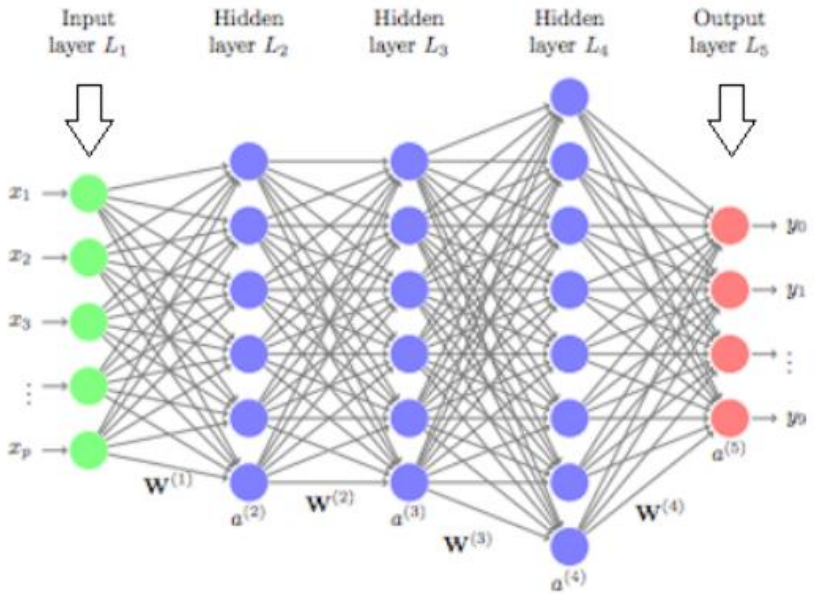


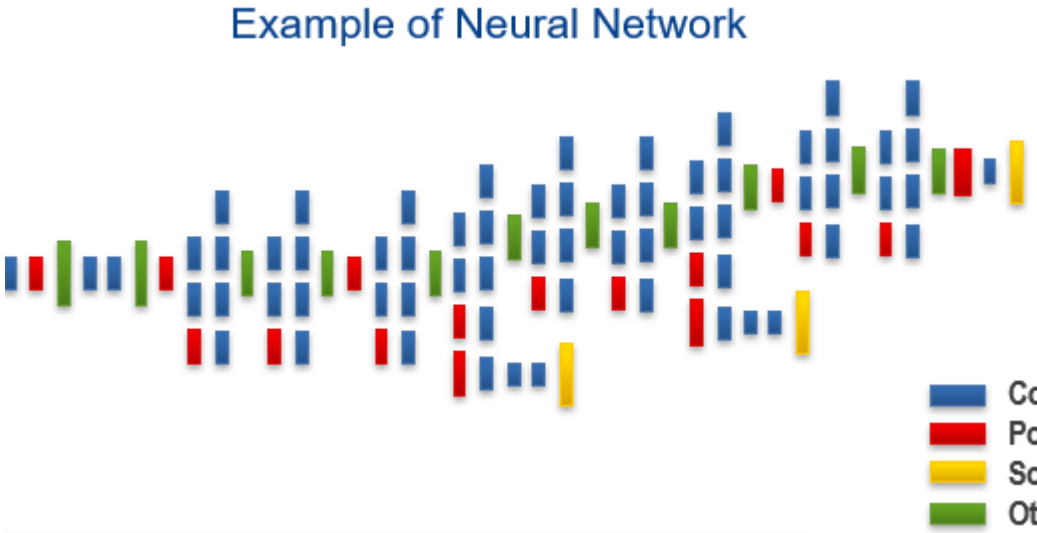
FUTURE ELECTRONICS

D&E EVENT
Het ontwerpen van innovatieve elektronica
Woensdag 19 april 2023
1931 Congrescentrum 's-Hertogenbosch

AI

- A model of data computation represent Millions of operations to be executed shortly for fast response time
- The operator types are sortable by few type





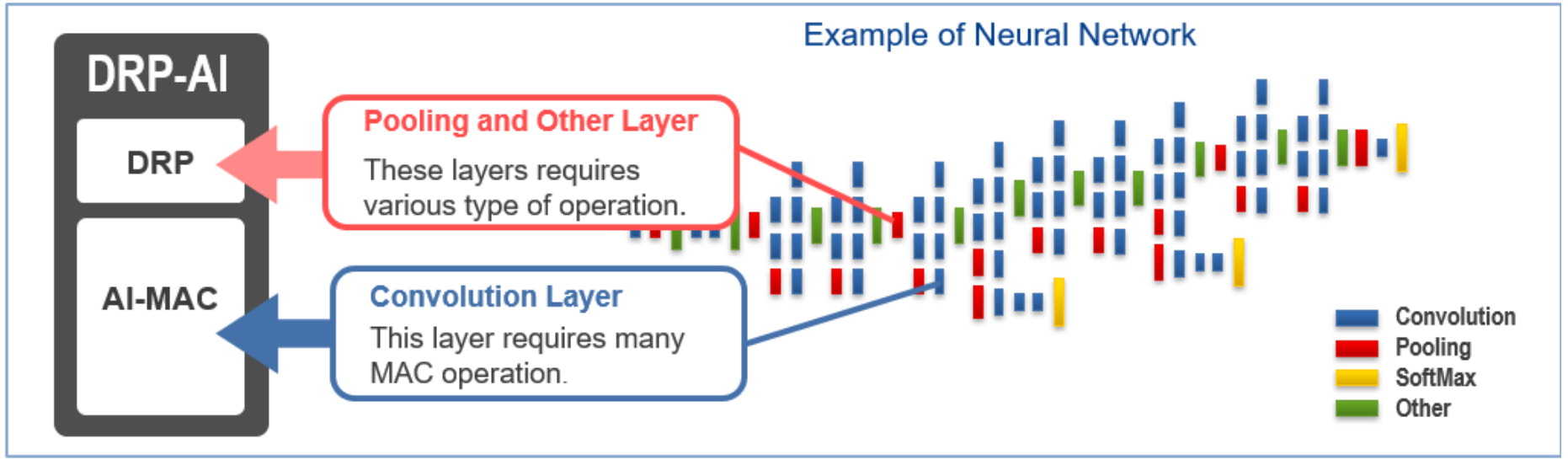
FUTURE ELECTRONICS

D&E EVENT
Het ontwerpen van innovatieve elektronica
Woensdag 19 april 2023
1931 Congrescentrum 's-Hertogenbosch

The Silicon Needs for AI computation

- You need Neuronal Hardware, FPU or GPU
- Critical points are the performance, Latency and Q of Data, Number of Subjects, Models used …

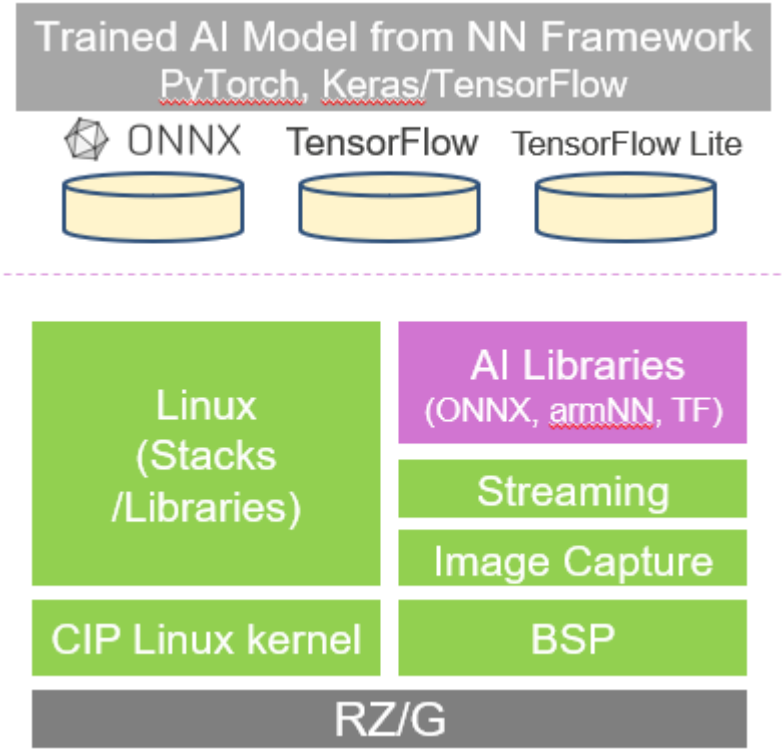
- DRP-AI is a dedicated Neuronal hardware
- It realizes high speed processing, and low power consumption
- DRP-AI optimized for AI inference



FUTURE ELECTRONICS
D&E EVENT
Het ontwerpen van innovatieve elektronica
Woensdag 19 april 2023
1931 Congrescentrum 's-Hertogenbosch

The Software Needs - FPU

- *For FPU Case > AI Linux Library module*

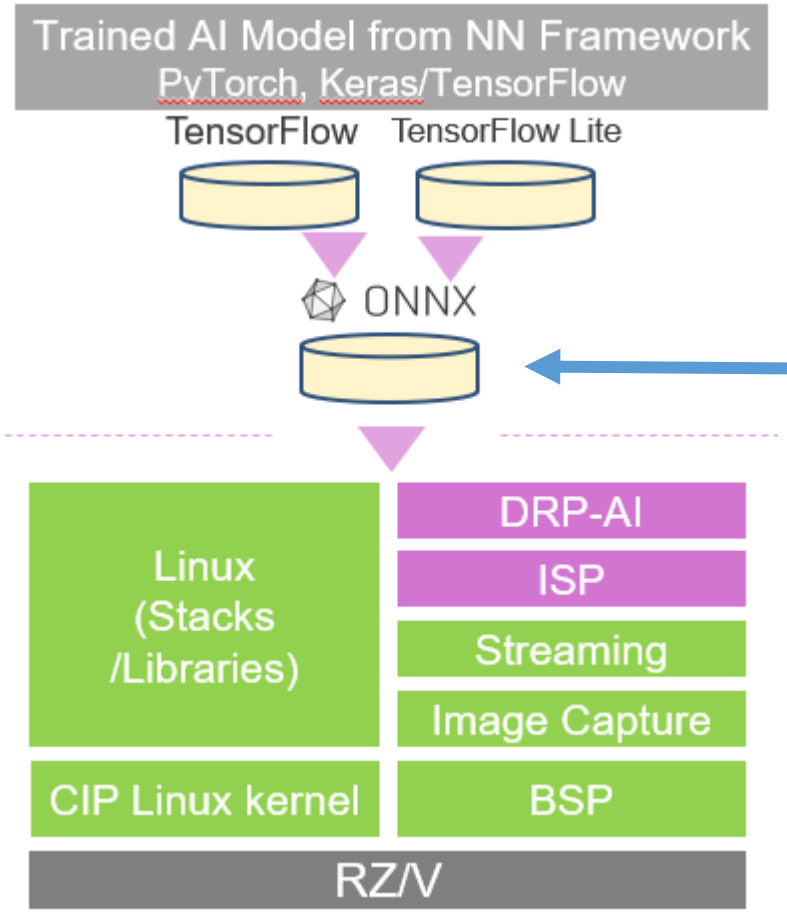


FUTURE ELECTRONICS

D&E EVENT
Het ontwerpen van innovatieve elektronica
Woensdag 19 april 2023
1931 Congrescentrum 's-Hertogenbosch

The Software Needs – NN Hardware

- *For NN Hardware Accelerator > Model convertors & Translator*



DRP-AI Translator

Graph Optimization

Output the optimized operation.
- Analyzes the structure of AI model
- Allocates to DRP and AI-MAC.

Pre/Post Processing Option

FP16 Quantization

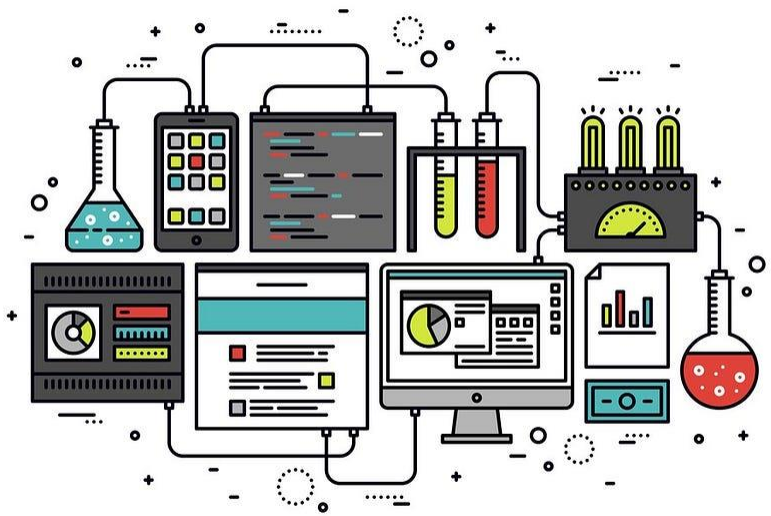
Maximize the throughput by quantization to FP16.

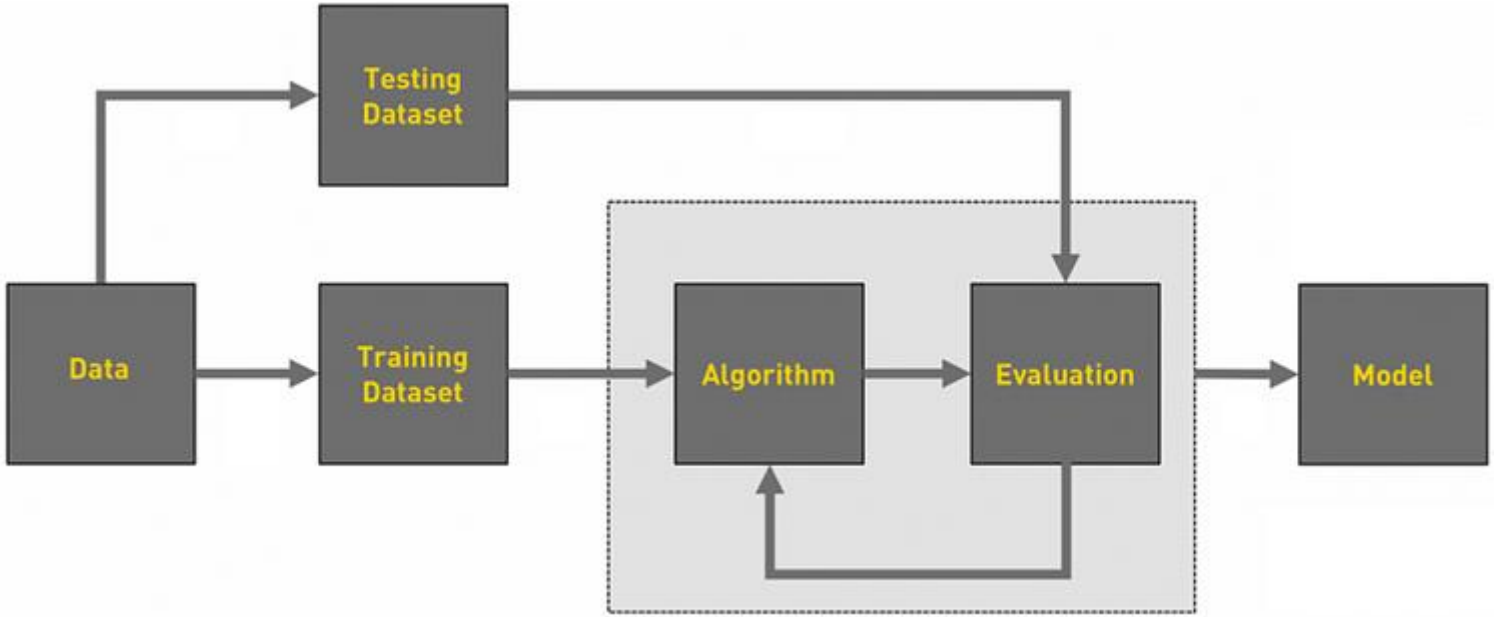
FUTURE ELECTRONICS

D&E EVENT
Het ontwerpen van innovatieve elektronica
Woensdag 19 april 2023
1931 Congrescentrum 's-Hertogenbosch

The Software Needs

- Open-Source trained model or need to be trained
- Optimized & custom model from 3rd Parties
- You need your Data set
- The Standard Training Process
- 80% of the subject for training, 20% for the validation





FUTURE ELECTRONICS

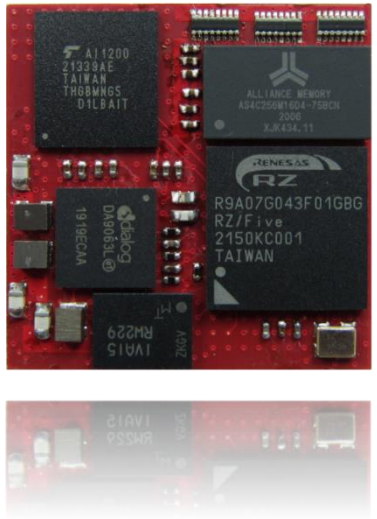
D&E EVENT
Het ontwerpen van innovatieve elektronica
Woensdag 19 april 2023
1931 Congrescentrum 's-Hertogenbosch

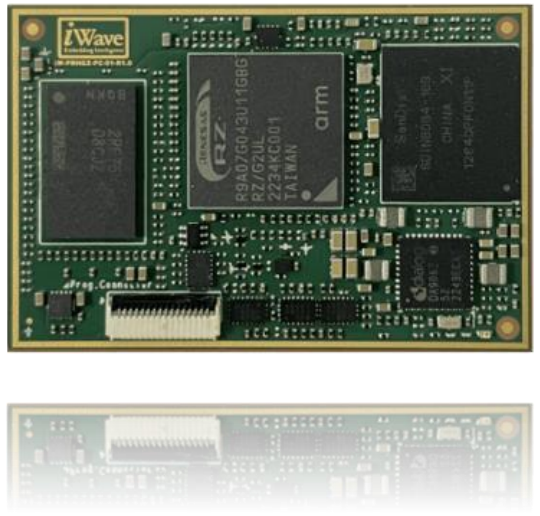
What AI could offer into your application

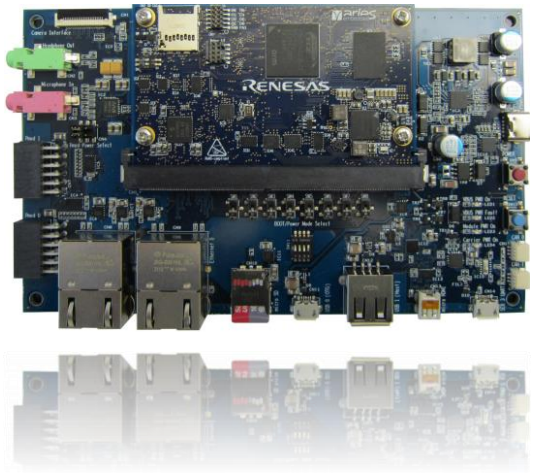
- Detect the Default in advance
- Default Material
- Preventive cancer detection in medical applications
- 3D security
- Flow Control on streets, shaping center, traffic light, Airport queueing …
- Financial Quotation/Annotation
- Reduce costs and improve efficiency in production
- Image segmentation
- Object position
- Autonomous machines
- Volume and material measurement

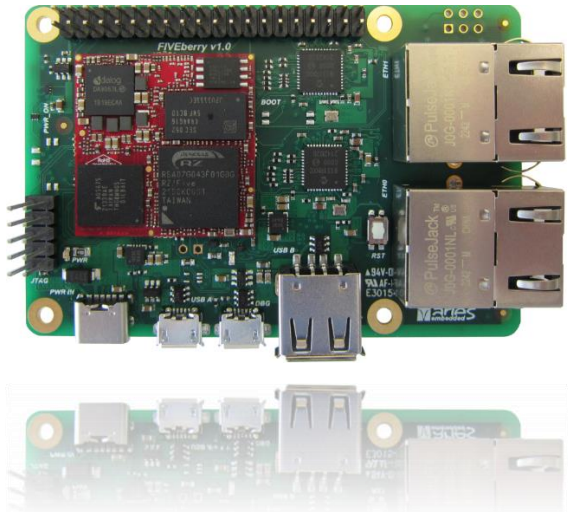
FUTURE ELECTRONICS

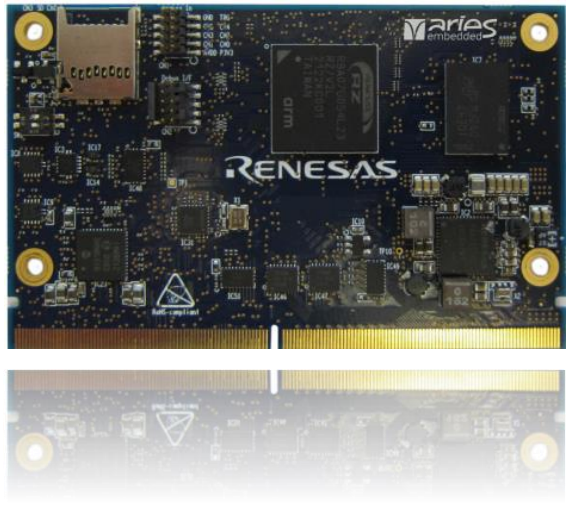
Available SoM Hardware for Fast Time to Market











FUTURE ELECTRONICS

D&E EVENT
Het ontwerpen van innovatieve elektronica
Woensdag 19 april 2023
1931 Congrescentrum 's-Hertogenbosch

FUTURE ELECTRONICS

Thank you!
Please visite our stand

For some Renesas hardware demos with AI technology