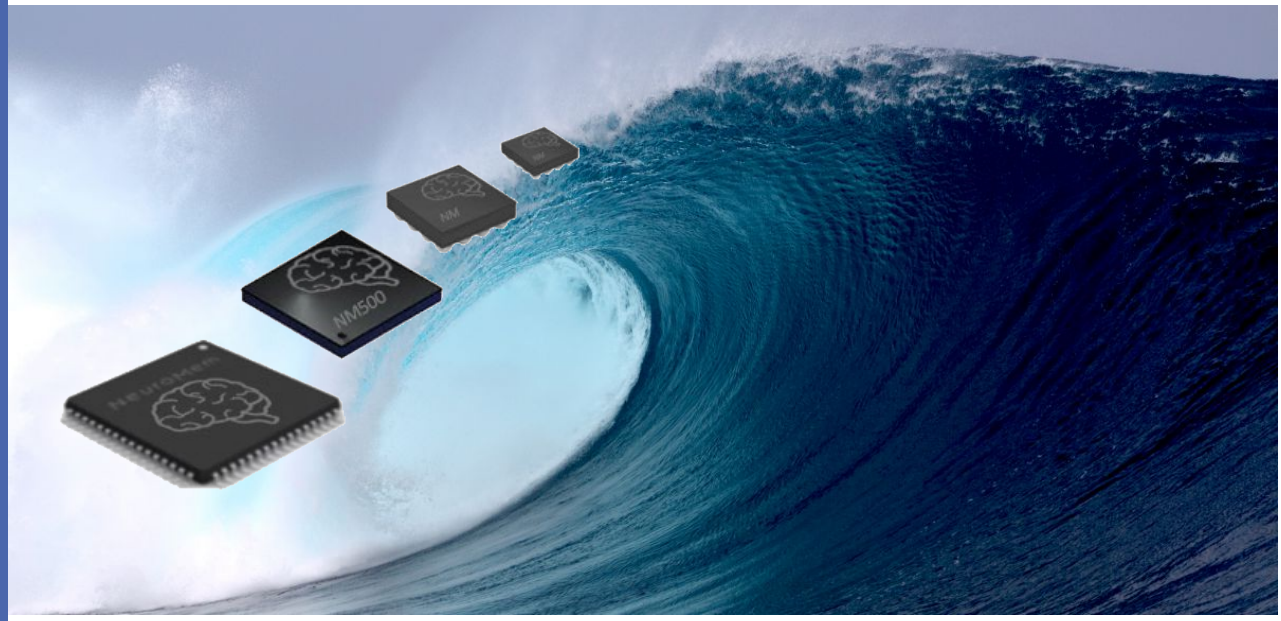
NeuroMem,
digital neuromorphic chip

Adaptive,

Responsible,

Explainable AI

GENERAL VISION

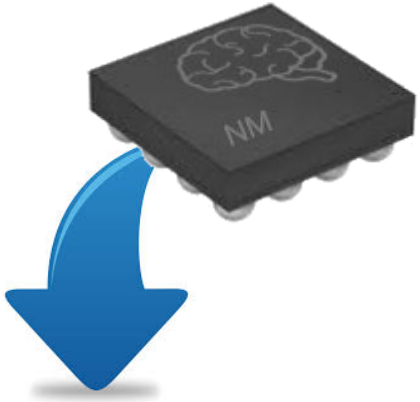


- Pattern recognition accelerator
- Adaptive incremental learning
- Traceability
- Learned patterns reside in chip (privacy and accountability)
- Scalability
- Low Cost

NeuroMem NN, a fine balance

Between Shallow Learning…

Preprocessing
Segmentation
Morphology transformations
Complex and specific features
Final classification

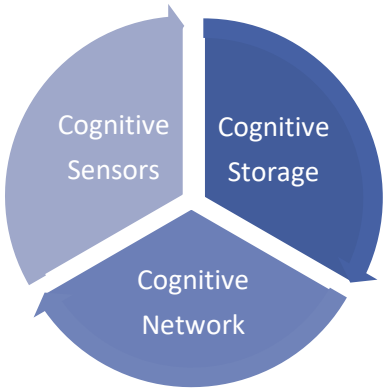


… and Deep Learning

No feature extractions
Numerous layers of NN
Separation between learning and inference
Black box engine
Compute intensive hardware

Simple feature extractions
Intrinsic Learning + Recognition (RBF & KNN)
Learn from few examples, not data bases
Deterministic latencies
Knowledge traceability
Low-power scalable architecture
Chip and IP on the shelf

Wide Range of Applications

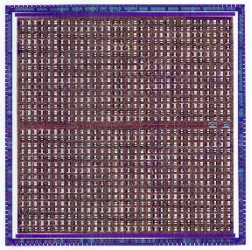


Technology in demand	Numerous applications	Across many industries
Machine learning	Video & Image analytics	Aerospace
Edge Intelligence	Signal and audio analytics	Automotive
Data Analytics	Scientific analytics	Consumer electronics
Predictive maintenance	Text & packet analytics	Environment
Failure analysis		Healthcare
Novelty detection		Industrial
		Other

NeuroMem IP instantiation

Intellectual Property

- NeuroMem® IP for ASIC
- NeuroMem® IP for FPGA
- NeuroMem IP cycle accurate simulation



Silicon proven with multiple licenses and tape-outs

1993 — Invented jointly with IBM
ZISC36, 36 neurons

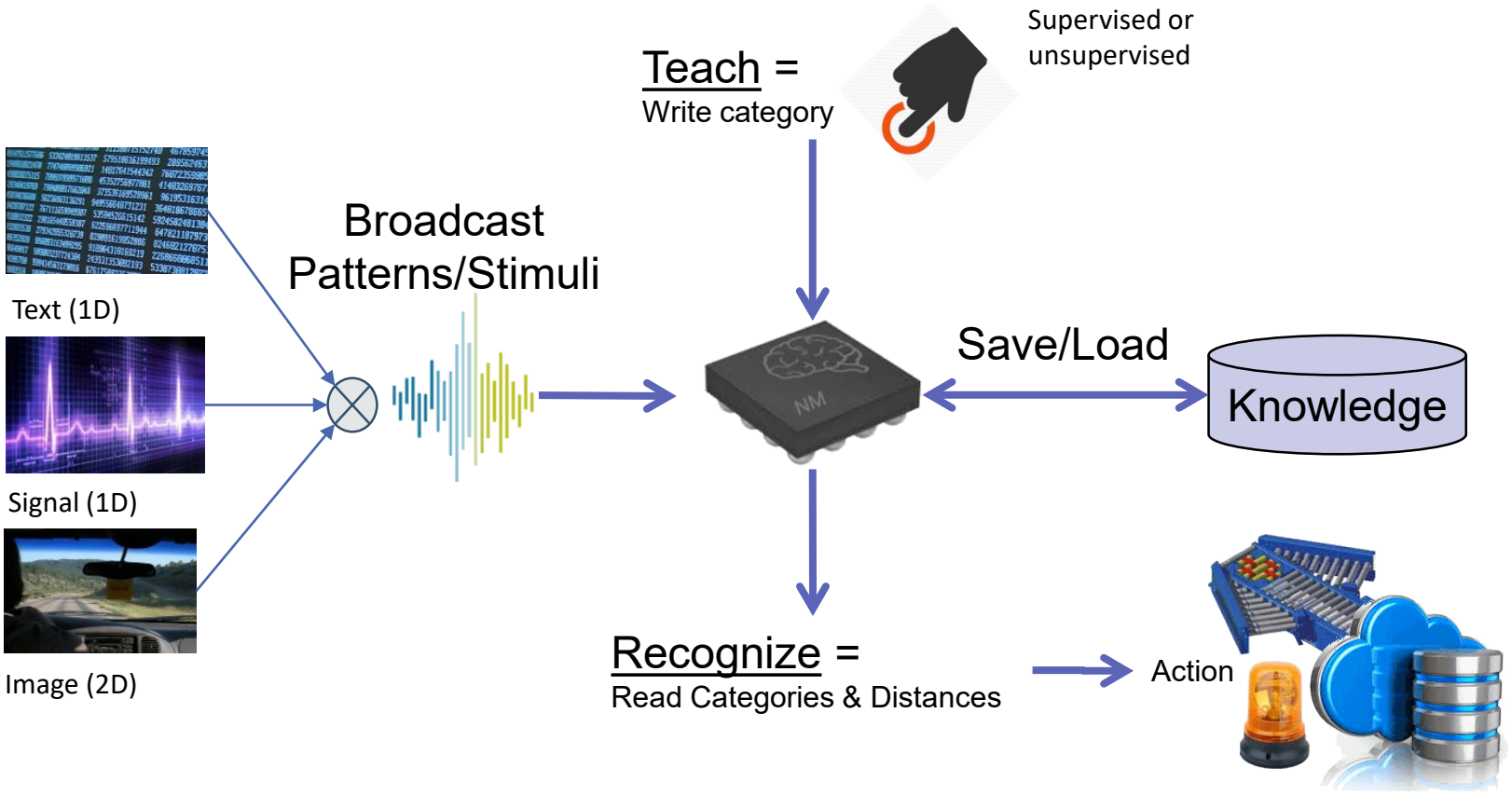
2007 — Improved by General Vision
CM1K, 1024 neurons

2012 — Licensed to Indian DOD
FPGA IP for Xilinx

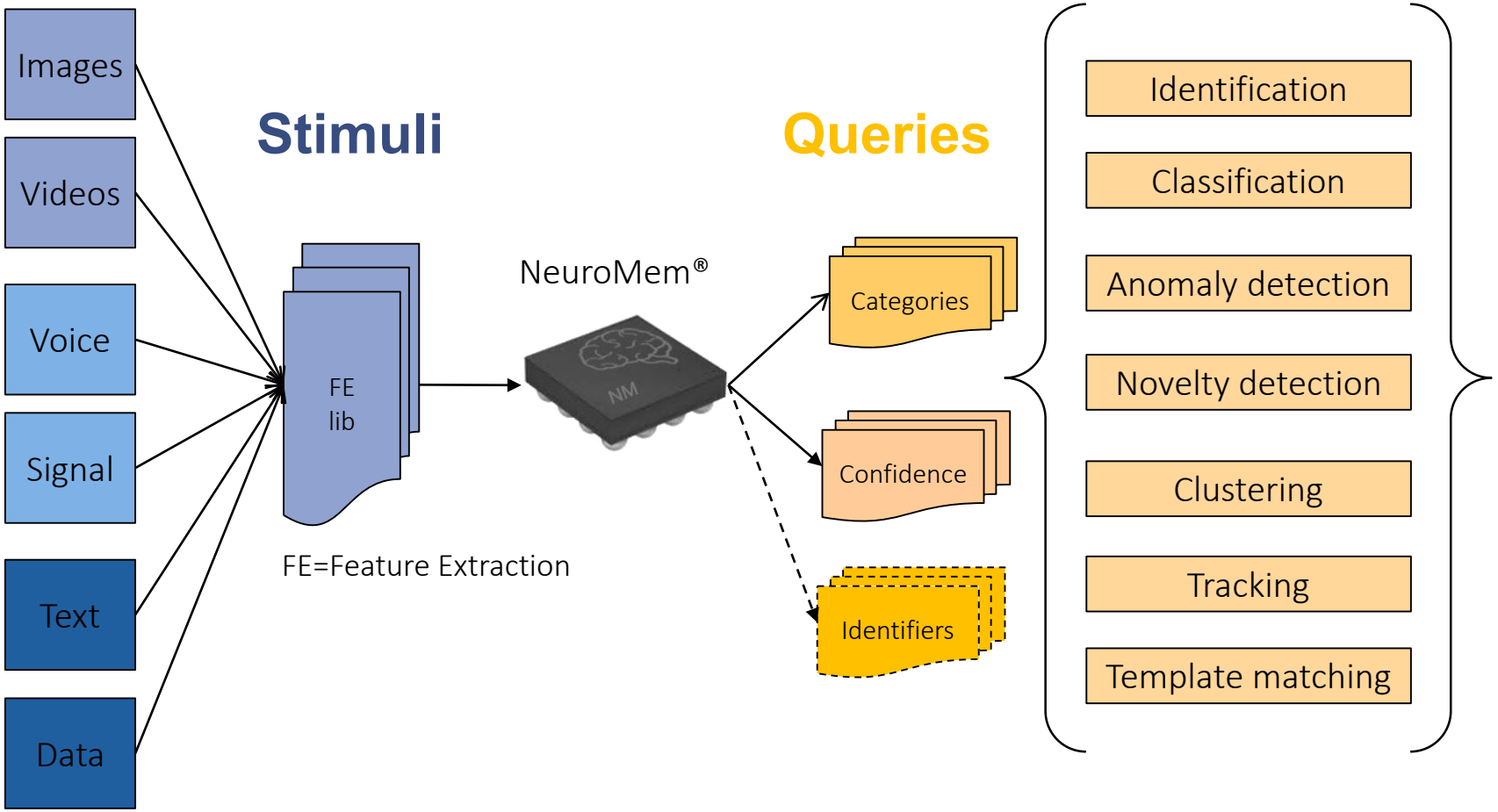
2015 — Licensed to Intel
QuarkSE has 128 neurons

2017 — Licensed to nepes
NM500, 576 neurons

Simple IOs to a NeuroMem NN

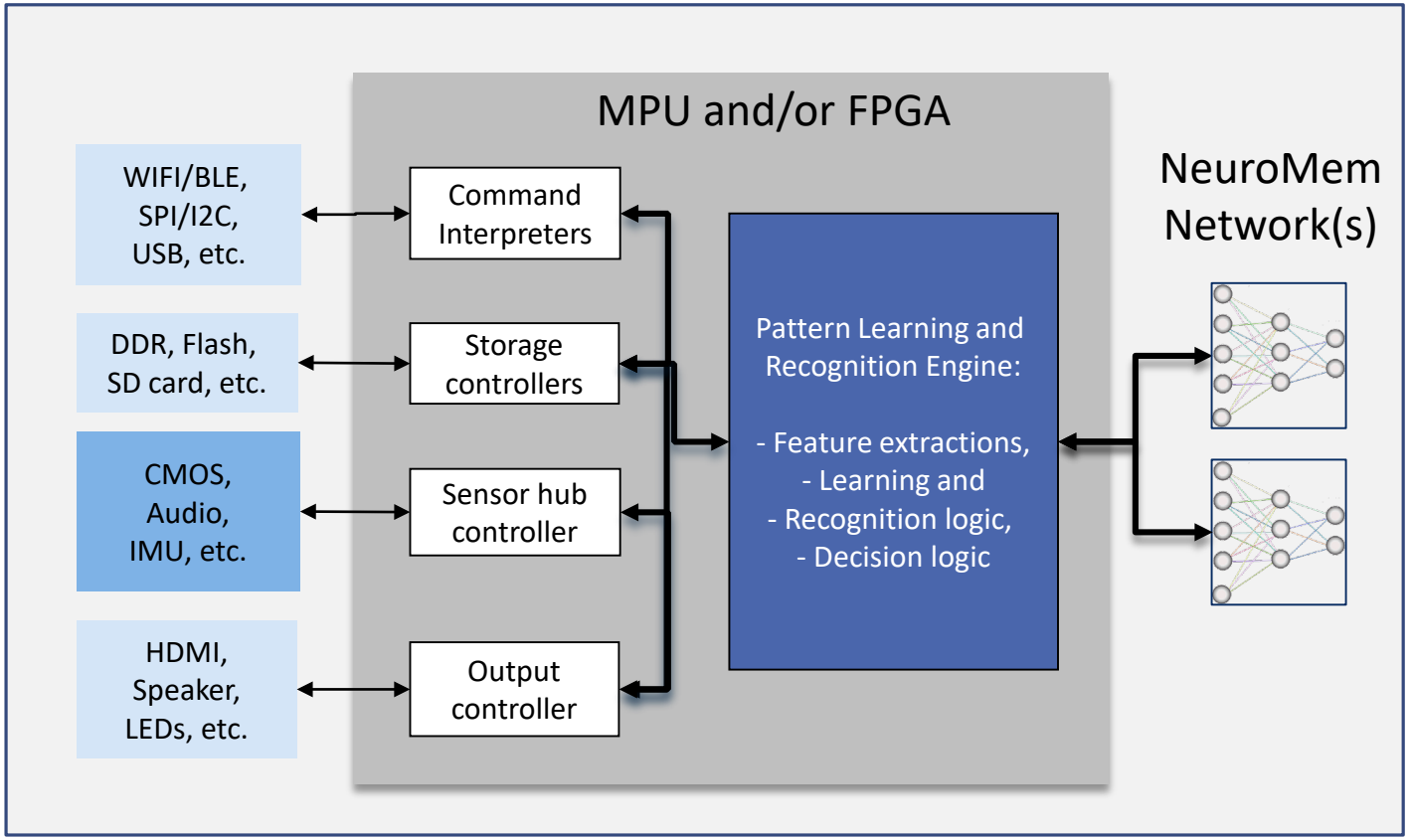


Use Models

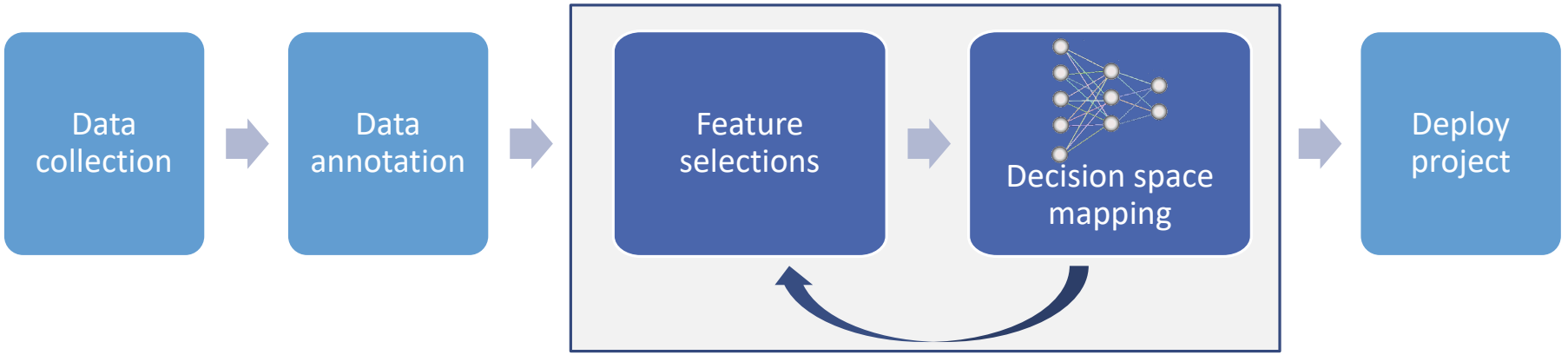

Images
Videos
Voice
Signal
Text
Data
Stimuli
FE
lib
FE=Feature Extraction
NeuroMem®
NM
Queries
Categories
Confidence
Identifiers
Identification
Classification
Anomaly detection
Novelty detection
Clustering
Tracking
Template matching

System Deployment

Typical NeuroMem Smart system architecture

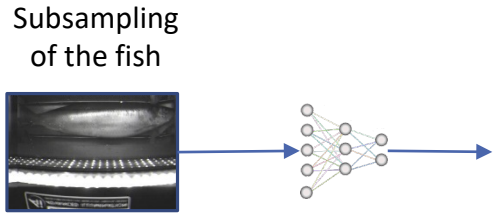


Application Deployment

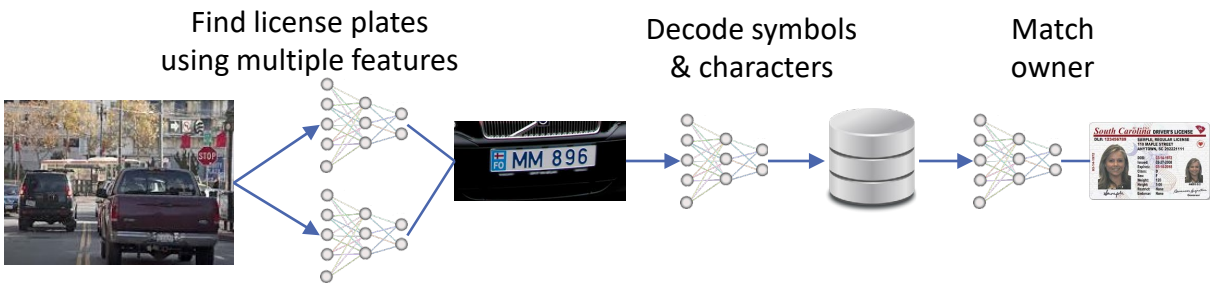


From a classifier to multi-experts system

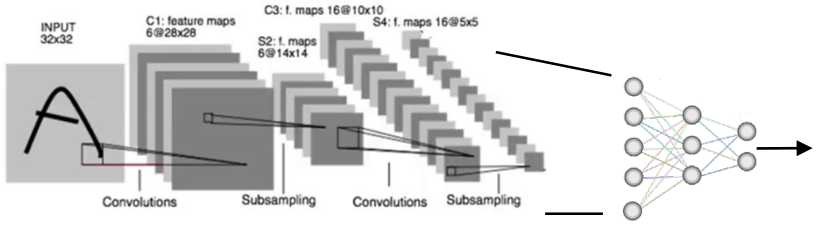
Single expert or NN



Combinatorial
experts or NNs



A Classifier
for DL/CNNs

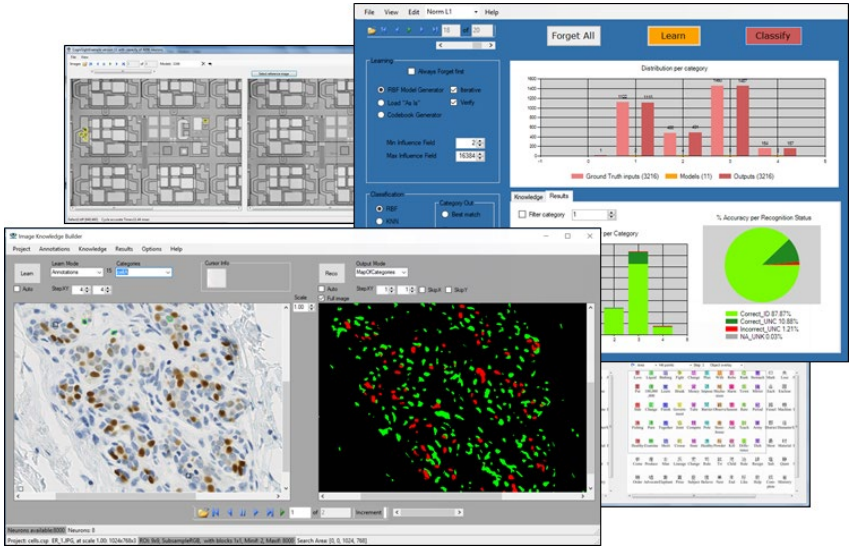


Tools from General Vision

Development Kits
- C/C++, C#, Python
- MatLab, LabVIEW
- ZYNQ

NeuroMem Knowledge Builder
- Agnostic to data types
- Output Knowledge and Dataset report

Image Knowledge Builder
- Image files
- Output Knowledge and Image report



Customers' Design Wins

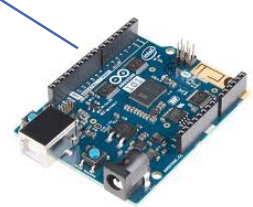
Nepes Future AI Business Unit
- NeuroShield, NeuroBrick, Brilliant, etc

NeuroTechnologijos NT Adaptive controller

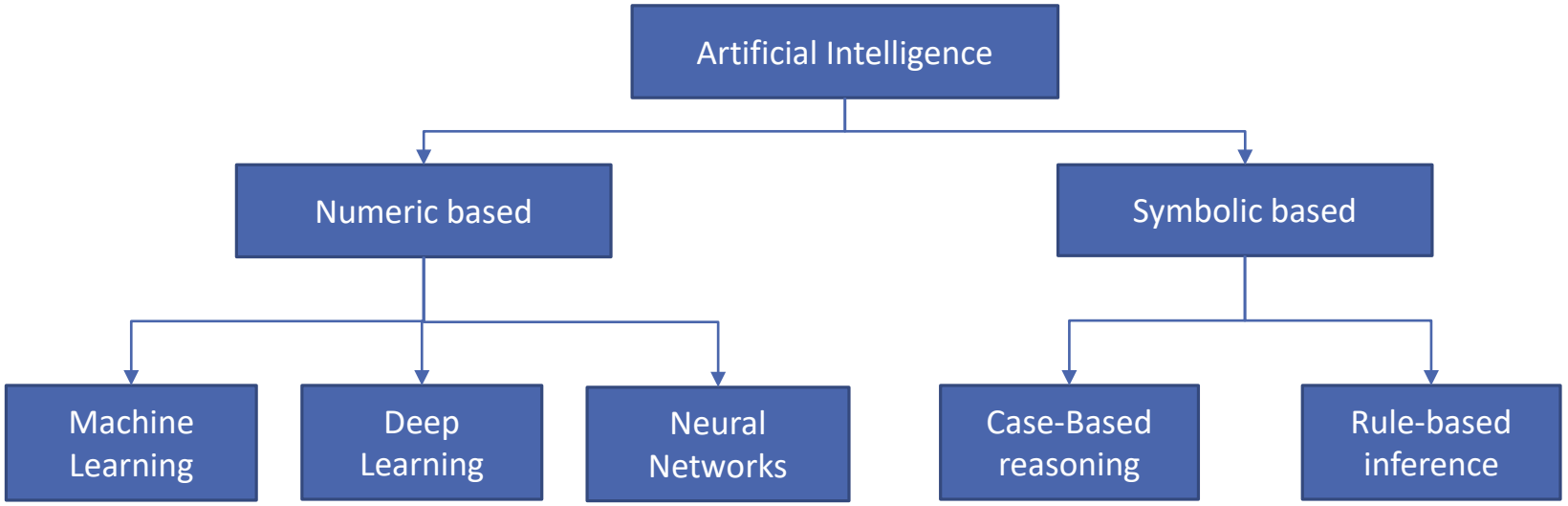
QuickLogic QuickAI module

Cogito Instrument cROI module

Intel Quark SE
- Curie module & Arduino/Genuino 101



NeuroMem in the AI landscape



Suitable when you have lots of data to train. “black boxes” that cannot explain how they arrive at their answers.

Reason through ambiguity and missing information
Explain how they arrived at their answers
Can make changes to their knowledge base in real-time.

NeuroMem Networks range of action