INTRASOFT INTERNATIONAL

EU-IoT

AIOT: AI BEYOND CLOUD, GPU & TPU

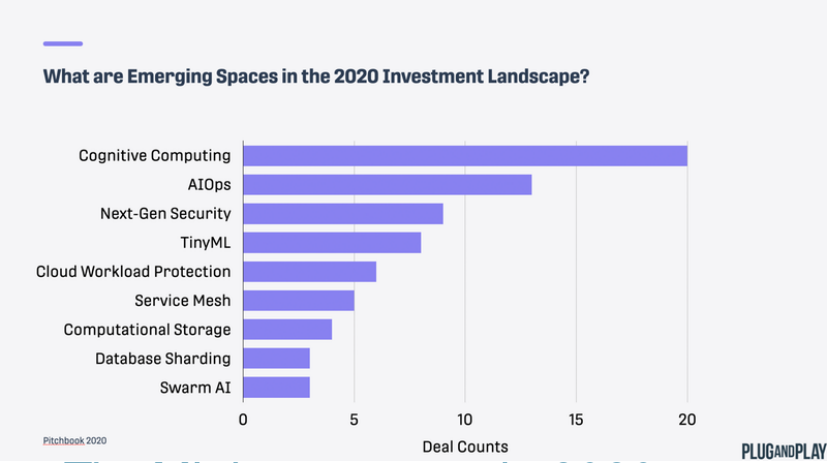
John Soldatos, Intrasoft International

IoT and Edge: Instruments, Priorities and Partnerships, On-Line, February 25th, 2021

EMBEDDED MACHINE LEARNING & TINYML

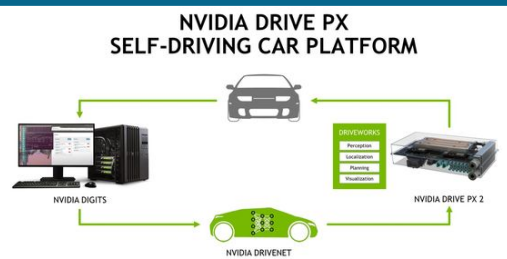
AI need not always run on the Cloud

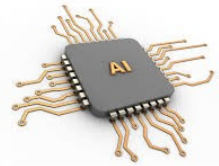
- Embedded- TinyML -AIoT: Alternative Form of Machine Learning and AI at the Far Edge
  - Concept: Embed AI (e.g., DL algorithms) on small pieces of hardware: Train the networks on the devices and shrink their size
- Benefits:
  - Make use of large amounts of data from unconnected devices.
  - Significant savings on bandwidth, energy, and storage resources.
  - Opportunities for faster and low-latency data processing.
  - Facilitate real-time control applications and boosts timely decisions.
  - Privacy Benefits



TinyML investments in 2020
Source: PitchBook 2020

Cloud AI (32 GB, TFLOPS/s) → Smart Phone AI (4GB, GFLOPs/s) → TinyML (<500KB, MFLOPs/s)





EMBEDDED ML & TINYML APPLICATIONS

Providing Value in Industrial Use Cases

Intelligent Asset Management and Industrial Maintenance

- ML directly on data collection devices or microcontrollers inside the machinery
- Timely and accurate insights about the status of the assets.

Quality Management and Zero Defect Manufacturing

- Asset Level Information about Defects in Real-Time
- New Quality Management Knowledge

Occupancy Monitoring and Facilities Management

- Improved Sustainability of Smart Buildings
- Timely Monitoring of Assets & Occupancy

Cattle Monitoring

- Sensor placed in the animal, obviates the need for (short-range) IoT connectivity everywhere in large areas
- Optimal Transfer of Data and Increased Energy Autonomy

Crises Management (e.g., Earthquakes, Wildfires)

- Timely detection of Earthquake waves providing more opportunities for effective mitigation
- Robust Detection of Wildfires without a need for ubiquitous connectivity + Improved Energy Autonomy of the Sensors

EMBEDDED ML AND TINYML CHALLENGES

It is not an easy way out

- Selection of the proper embedded device in-line with requirements
- Acquisition of adequate training data for embedded ML
- Implementation & Deployment of the proper ML model
- Integration with AutoML
- Integration with other forms of cloud/edge computing
- Skills & Competencies in IoT & ML (Talent Gap & Skills Scarcity)

THANK YOU FOR YOUR ATTENTION

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