



The integration of Artificial Intelligence and Machine Learning technologies on Edge devices is something that is now made possible thanks to the technological advancement of microprocessor solutions thanks to which it is possible to have integrated or instantiated in FPGA or connected on the bus a co-processor in able to accelerate neural networks and therefore to implement decision-making algorithms directly on the edge. DAVE Embedded Systems has acquired over time confidence with these technologies and is now able to support customers not only in the hardware integration of these solutions but also in the actual design and construction of connected edge devices capable of exploiting the technologies. machine learning to make decisions and continuously improve their decision-making algorithms.



> MODEL DESIGN

From concept to definition, DAVE Embedded Systems is able to support and assist the customer in the choices and ways in which to build a Machine Learning project. Building the model requires

understanding the physical problem, understanding which technique is best suited and then researching not only ready-made datasets but also how to carry out the subsequent training and test phases to measure the accuracy of the model.



> MODEL DEPLOYMENT

DAVE Embedded Systems is able to integrate Machine Learning solutions on edge devices taking into consideration all the fundamental aspects for the correct field deployment of these solutions.

Building the dataset around new or pre-trained algorithms, improving it and increasing it even artificially to improve learning up to designing the integration procedures on the edge are part of the services offered by DAVE Embedded Systems.



> CONTINUOUS LEARNING

The results of a Machine Learning algorithm can be greatly improved if a feedback mechanism is built that can continuously re-train the algorithm based on new data. In order to guarantee the continuous improvement of the model, it is necessary to continue to collect data from the field to be used to refine the algorithm itself and thus improve the predictive results in a tangible way. DAVE Embedded Systems is able to assist customers in this process of implementing a feedback system that heavily uses IoT services to be implemented.





> MODEL DESIGN

Below are the services included in the standard package. Depending on the project specifications, the list can be modified accordingly:

- > Model specification
- > Model design based on existing techniques
- > Dataset research and/or creation
- > Dataset artificial generation
- > PoC concept for model validation Model deployment strategy definition



> MODEL DEPLOYMENT

The features typically required for deploying the model on the edge are listed below:

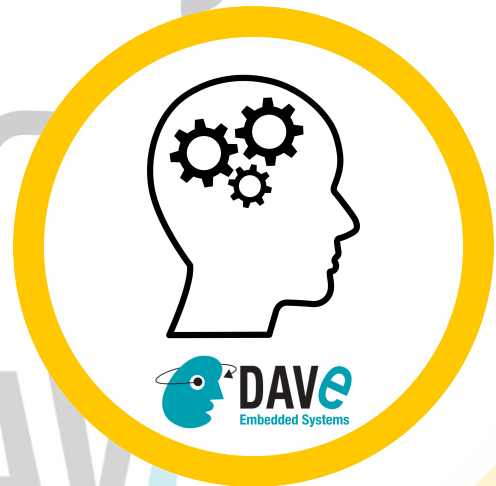
- > Design of APIs :or model integration on embedded system
- > MCU and MPU support to Machine Learning accelerator
- > Integration of ML algorithms on internal Neural Processing Unit
- > FPGA development for NPU acceleration
- > External ML engine integration with MPU or MCU architecture
- > Solution deployment for mass production integration



> CONTINUOUS LEARNING

For optimal performance of Machine Learning solutions it is necessary to integrate a feedback system to continuously improve the performance of the solution itself.

- > Edge design integrating IoT solutions
- > Remote update of both Edge system and Machine Learning subsystem
- > Remote data collection for dataset expansion
- > On-premises machine for continuous model training



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