



**software framework for runtime-Adaptive and secure
deep Learning On Heterogeneous Architectures**

Project Number 780788

Project Acronym ALOHA

D2.3	First release of the automated algorithm configuration tool		
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Brief description:

The purpose of this deliverable is to release a first version of the automated algorithm configuration tool. It contains standalone implementation of the single utilities, to be used as a reference for integration, use-case refinement and demonstrator preparation.



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1 Executive Summary

This document is aimed to be related to Deliverable *D2.3 - First release of the automated algorithm configuration tool* due at M12. This demonstrator consists in a set of tools, in a first usable standalone version, ready to be integrated in the overall ALOHA toolflow. During the development activities and for release purpose the code implementing the tools has been stored and shared using the <https://gitlab.com/aloha.eu> repository. The repository has been made accessible for project partners and for reviewers. To obtain access to the repository, please fill in the form available at <https://www.aloha-h2020.eu/project/get-involved>

1.1 Acronyms and abbreviations

Acronym	Meaning
DL	Deep Learning
DNN	Deep Neural Network
M	Month
RPI	Refinement for parsimonious inference
WP	Work Package

2 Demonstrator overview

Within WP2, several utilities have been developed and released as shown in the highlighted blocks of Figure 1. The overall macro tool developed in WP2 selects the algorithm configuration considering the target task, a set of use-case related constraints (security, performance and power) and the target architecture that will execute the DL inference.

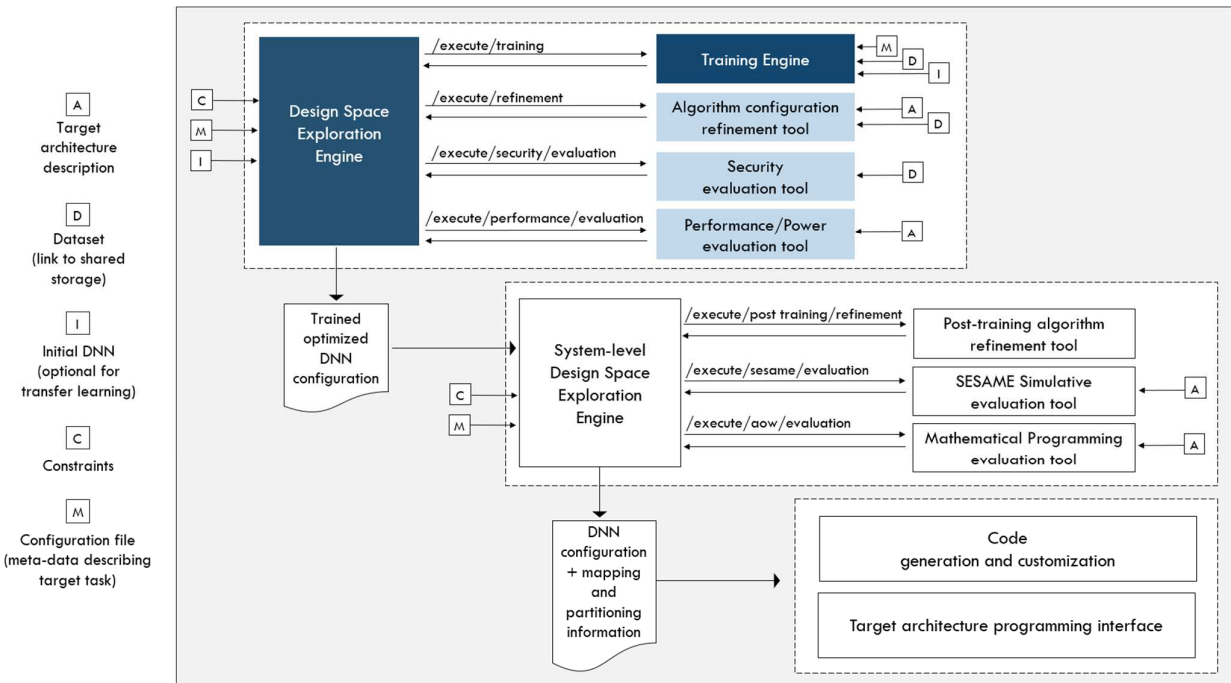


Figure 1: Overview of the ALOHA toolflow. The components related with the automation of the DL algorithm selection, configuration and training are represented as dark and light blue boxes.

Here follows a list of the related projects inside the repository. A description of the main features of each tool has been provided on Deliverable D2.1 at M9.

Table 1: WP2 tools

Tool description	Related task in DoA	Link to Gitlab project of tool components	Main contributor
DSE engine	T2.1	https://gitlab.com/aloha.eu/dse_engine	UvA/UL
Training engine	T2.1	https://gitlab.com/aloha.eu/training_engine	SCCH
Refinement for parsimonious inference	T2.3	https://gitlab.com/aloha.eu/rpi_engine https://gitlab.com/aloha.eu/nemo	ETHZ
Performance/power evaluation	T2.4	https://gitlab.com/aloha.eu/power_performance_evaluation	UvA/UL/UniCA
Security evaluation	T2.2	https://gitlab.com/aloha.eu/security_evaluation	PluribusOne

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Some other common functionalities are implemented by other utilities, that may be found as standalone projects in the repository.

Besides communicating with each other using the APIs defined within WP1, the tools produce graphical output to help a user in understanding the design process, see Figure 2, Figure 3 and a video about security evaluation available at <https://ibm.ent.box.com/s/yqesybpuzvi5kfszn4sdbupj7dr9dmtk>

A first preliminary integration has also been performed at this stage, allowing the tools to be invoked on a common use-case, implementing a complete algorithm evaluation that may be triggered by a web-based user interface, see Figure 4.

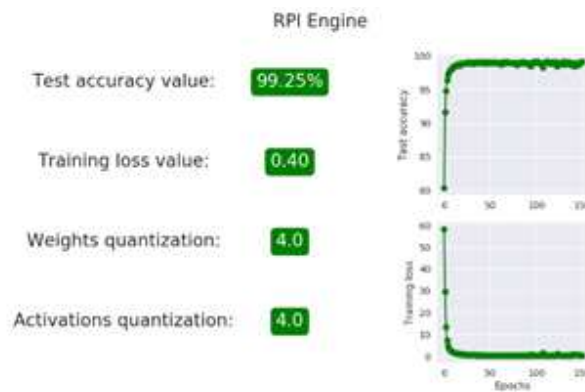


Figure 2: Graphical output of the Refinement for parsimonious inference tool

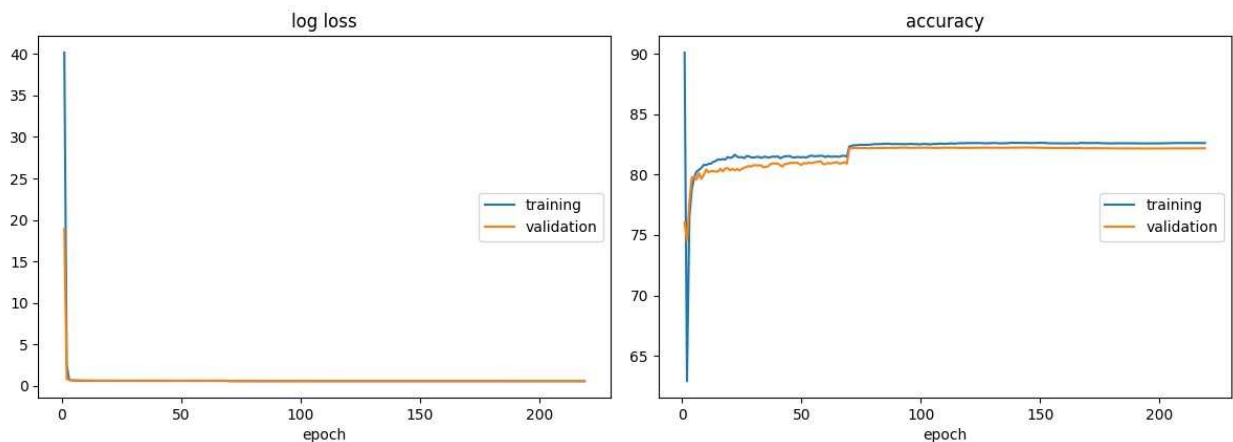


Figure 3: Graphical output of the Training engine

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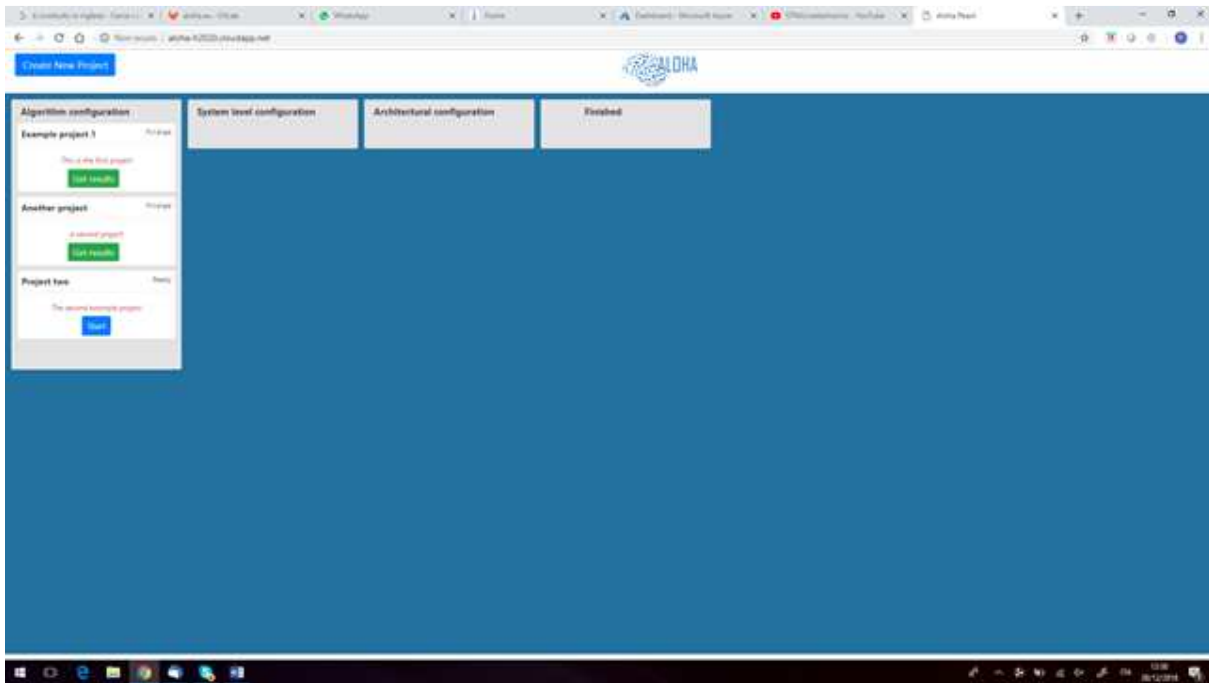


Figure 4: Demonstrator user interface