

Software for Edge Compute AI Payload Processor

The CogniSAT-HCS Software is the runtime host controller that brings edge acceleration to Earth Observation, enabling persistent real-time insights

Part of the CogniSAT™ platform, the CogniSAT-HCS Software is a runtime host controller that enables AI System Developers to bring the power of Computer Vision (CV) and Artificial Intelligence (AI) compute acceleration to their on-orbit applications. The full feature set of the edge computer on the CogniSAT™ flight hardware is used for the deployment of applications to process data on board satellites in a fast and power efficient manner.

- Leverage hardware optimized ISP and Computer Vision kernels via drag and drop
- Receive feedback on network performance via NN supervision module

Widely Adaptable for AI and Computer Vision Deployments

Flexible and Integration Ready

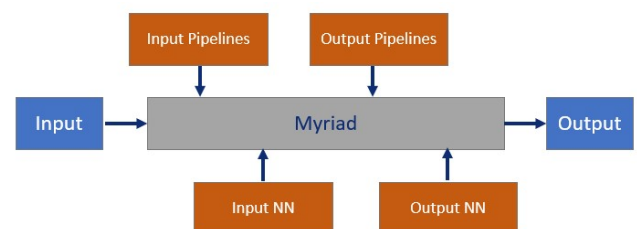
The CogniSat-HCS Software facilitates the deployment of a Linux based application that uses the Myriad VPU for both Neural Network inference and Image Processing transformations. The software supports both Ethernet (100MBPS & Gigabit) and USB2.0/3.0 as the primary control and data interface to the processor, enabling data rates sufficient to handle many CV and AI applications at near-streaming throughput.

Efficient Neural Network Inference

Common NN training frameworks (e.g., TensorFlow, PyTorch, Caffe) can be used for Neural Network (NN) model development and training, with the model subsequently targeted to the Myriad device. The CogniSAT-HCS Software leverages the broad range of pre-qualified models and layers available within Intel's OpenVINO™ toolkit. Pre-trained OpenVINO™ models can be used with transfer learning, or can be deployed directly, via the CogniSAT-HCS Software.

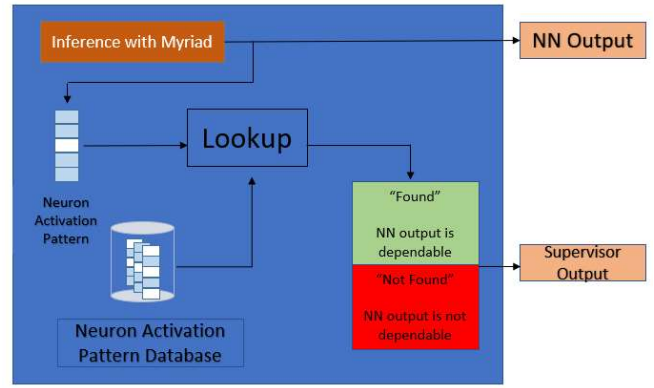
Customisable CV and ISP Pipelines

Custom Computer Vision (CV) pipelines can easily be deployed using the CogniSAT-HCS Software. The software library supports application-specific CV and ISP pipelines that utilise a combination of the power-efficient processor streaming hardware blocks and software filters implemented on the vector engines. Deployment to CogniSat-HCS running on the processor involves the transfer of only a single configuration file, and runtime updates enable the updating of pipelines without requiring application re-compile or system reboot. Multiple CV and NN stages can be executed in a single flow on-device, enabling NN pre- and post-processing, and chaining of NNs.



Operational Paradigm

The CogniSAT-HCS running on the On-Board Computer communicates with the processor to load CV and NN models to the processor, and to thereafter submit image frames to the processor and receive processing results. The host can dynamically update the processor application over the primary interface, enabling flexible runtime solutions. Multiple pipelines and NN models can be simultaneously resident on device, with CVAI API calls enabling the per-input selection of the pipelines and NN models to apply to that input.



Neural Network Supervisor

The CogniSAT-HCS Neural Network Supervisor (NNS) provides runtime monitoring of the decisions made by the NN under supervision. The NNS examines the internal NN activations to assess if the network is operating within its training scope, and flags low dependability inference results to the application.

CogniSAT - CV & ISP Filters

A library of over 200 filters is available within the environment, which enable the construction of optimised Myriad-accelerated pipelines for image processing and transformation, information extraction, and pre-processing for NN inference. The library is under continuous development and customer specific optimisations can be supported.

Full details available upon request.

