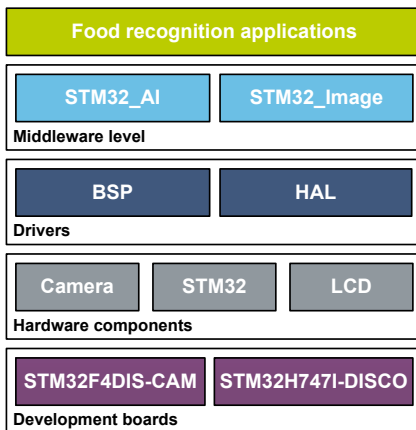


Artificial Intelligence (AI) and computer vision function pack for STM32Cube



Features

- Complete firmware to develop a computer vision application on STM32 microcontroller
- Image pre-processing library (STM32_Image)
- Neural Network library optimized for STM32 (STM32_AI) generated by means of the [X-CUBE-AI](#) Expansion Package for [STM32CubeMX](#)
- Food recognition applications based on Convolutional Neural Network model (MobileNet CNN model derivative)
- Integration examples based on float and quantized models
- Sample implementations available for the [STM32H747I-DISCO](#) Discovery board connected to the STM32F4DIS-CAM camera daughterboard
- Free, user-friendly license terms

Description

FP-AI-VISION1 is an [STM32Cube](#) function pack featuring examples of computer vision applications based on Convolutional Neural Network (CNN).

FP-AI-VISION1 is composed of software components generated by the [X-CUBE-AI](#) Expansion Package complemented with application software components dedicated to the AI-based computer vision example for food recognition.

FP-AI-VISION1 enables advanced computer vision application on the basis of outputs generated by Neural Networks (NNs). The NNs are implemented by libraries generated by the [X-CUBE-AI](#) Expansion Package for the [STM32CubeMX](#) tool.

The examples provided in the function pack are food recognition applications based on a CNN derived from MobileNet CNN. They recognize among 18 classes of common food such as pizza, hamburger, and Caesar salad.

The function pack demonstrates two different integrations of the food recognition application: one is based on a floating-point model, and the other one on a quantized model generated by the quantization tool featured by [X-CUBE-AI](#).

FP-AI-VISION1, together with the suggested combination of HW boards, is used to develop specific computer vision applications: it includes the drivers for the camera as well as the framework for capturing images into the frame buffer, pre-processing the content of the frame buffer, and running the Neural Network inference.

FP-AI-VISION1 runs on the [STM32H747I-DISCO](#) Discovery board connected to the STM32F4DIS-CAM camera daughterboard through STMicroelectronics DCMI parallel interface. Information related to STM32H747I-DISCO is available on STMicroelectronics website at www.st.com while information about STM32F4DIS-CAM is obtained directly from Farnell website at <https://www.farnell.com>.

Product status link

[FP-AI-VISION1](#)



1 General information

The FP-AI-VISION1 function pack runs on STM32 microcontrollers based on Arm® cores.

Note: Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



1.1 Ordering information

FP-AI-VISION1 is available for free download from the www.st.com website.

1.2 What is STM32Cube?

STM32Cube is an STMicroelectronics original initiative to significantly improve designer's productivity by reducing development effort, time and cost. STM32Cube covers the whole STM32 portfolio.

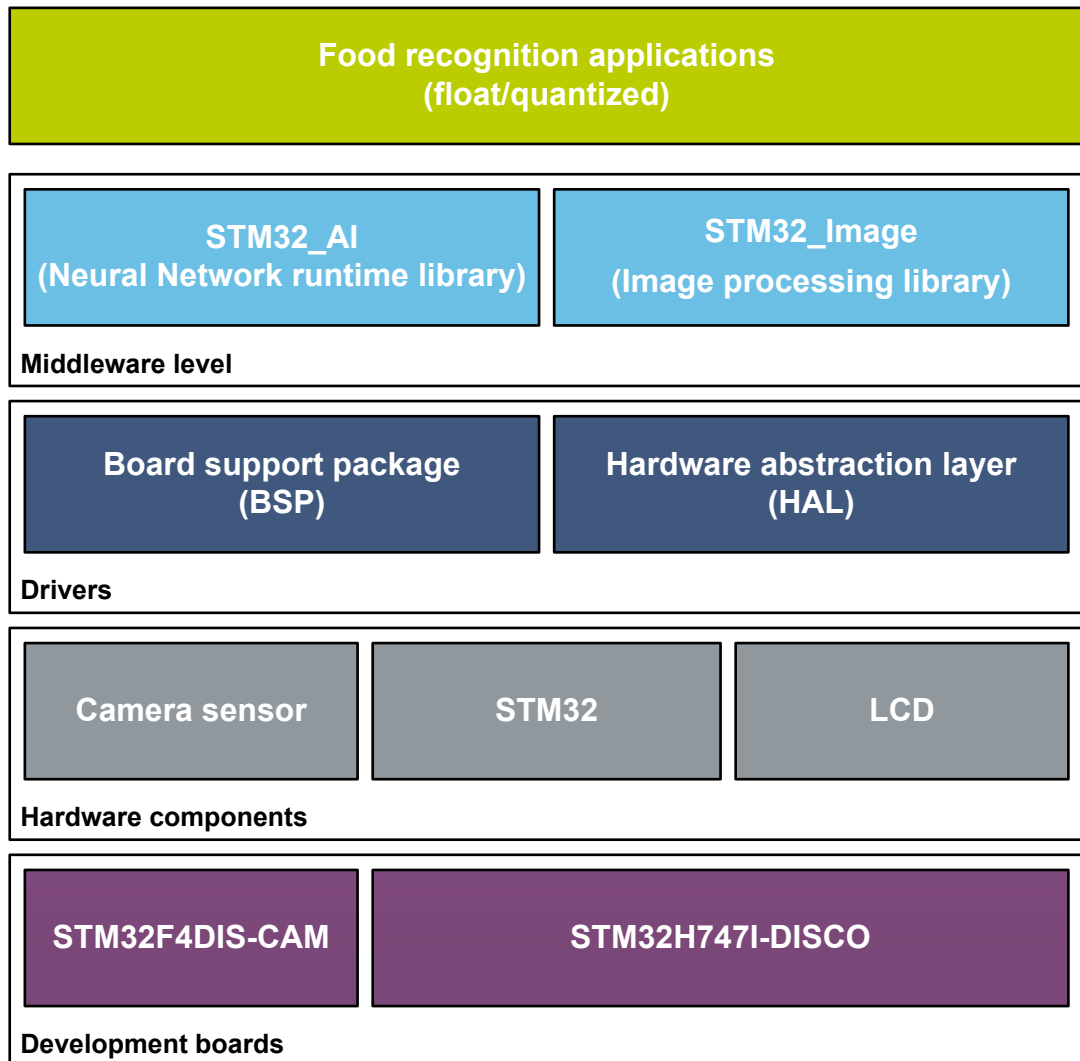
STM32Cube includes:

- A set of user-friendly software development tools to cover project development from the conception to the realization, among which:
 - [STM32CubeMX](#), a graphical software configuration tool that allows the automatic generation of C initialization code using graphical wizards
 - [STM32CubeIDE](#), an all-in-one development tool with peripheral configuration, code generation, code compilation, and debug features
 - STM32CubeProgrammer ([STM32CubeProg](#)), a programming tool available in graphical and command-line versions
 - STM32CubeMonitor-Power ([STM32CubeMonPwr](#)), a monitoring tool to measure and help in the optimization of the power consumption of the MCU
- [STM32Cube MCU & MPU Packages](#), comprehensive embedded-software platforms specific to each microcontroller and microprocessor series (such as STM32CubeH7 for the STM32H7 Series), which include:
 - STM32Cube hardware abstraction layer (HAL), ensuring maximized portability across the STM32 portfolio
 - STM32Cube low-layer APIs, ensuring the best performance and footprints with a high degree of user control over the HW
 - A consistent set of middleware components such as RTOS, USB, TCP/IP, FAT file system, audio, and graphics
 - All embedded software utilities with full sets of peripheral and applicative examples
- [STM32Cube Expansion Packages](#), which contain embedded software components that complement the functionalities of the STM32Cube MCU & MPU Packages with:
 - Middleware extensions and applicative layers
 - Examples running on some specific STMicroelectronics development boards

2 Global architecture

The top-level architecture of the FP-AI-VISION1 function pack usage is shown in Figure 1.

Figure 1. FP-AI-VISION1 architecture



3 License

FP-AI-VISION1 is delivered under the *Mix Ultimate Liberty+OSS+3rd-party V1* software license agreement (SLA0048).

The software components provided in this package come with different license schemes as shown in [Table 1](#).

Table 1. Software component license agreements

Software component	Owner	License
Board support package (BSP)	STMicroelectronics	BSD-3-Clause
Cortex [®] -M CMSIS	Arm [®]	Apache License 2.0
HAL STM32H7	STMicroelectronics	BSD-3-Clause
STM32H7471-DISCO BSP drivers	STMicroelectronics	BSD-3-Clause
STM32H7xx CMSIS	Arm [®] - STMicroelectronics	Apache License 2.0
STM32_AI	STMicroelectronics	Ultimate Liberty (source release)
STM32_Image	STMicroelectronics	Ultimate Liberty (source release)
Applications	STMicroelectronics	Ultimate Liberty (source release)

Revision history

Table 2. Document revision history

Date	Version	Changes
19-Jul-2019	1	Initial release.

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