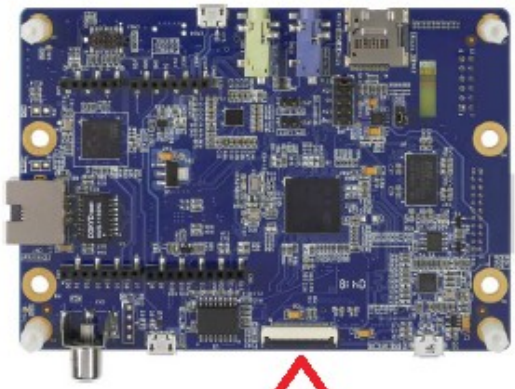
STM32 food recognition

The examples provided from STM (in the function pack, see below) are **food recognition** applications.
They recognize among **18 classes** of common food such as **pizza**, **hamburger**, and **Caesar** salad.

Block Diagram – HW & SW:

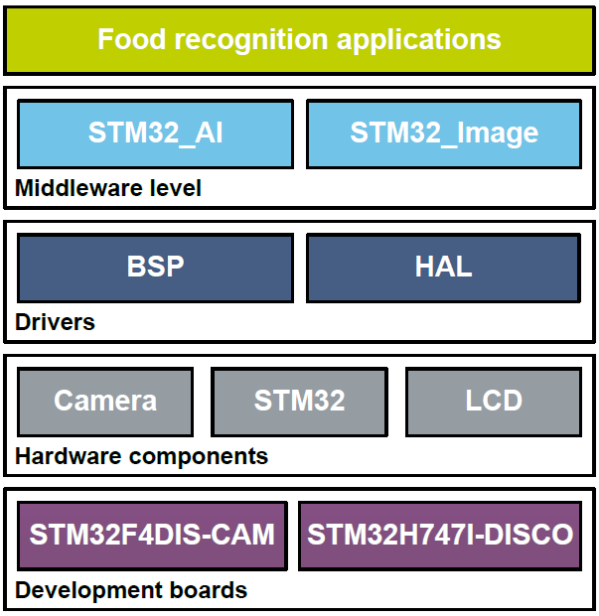
STM32H747I-DISCO (top view)

STM32H747I-DISCO (bottom view)



STM32F4DIS-CAM

SW block diagram (FP-AI-VISION1)



Software Package:

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.
Key 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 (AN5020 - Digital camera interface (DCMI) for STM32 MCUs)
- Free, user-friendly license terms

X-CUBE-AI is an STM32Cube expansion package part of the STM32Cube.AI ecosystem and extending STM32CubeMX capabilities with automatic conversion of pre-trained **Neural Network** and integration of generated optimized library into the user's project.
The easiest way to use it is to download it inside the STM32CubeMX tool (version 5.0.1 or newer) as described in user manual Getting started with X-CUBE-AI Expansion Package for Artificial Intelligence (AI) (UM2526).
Key Features

- Generation of an STM32-optimized library from pre-trained Neural Network models
- Supports various Deep Learning frameworks such as Keras, TensorFlow™ Lite, Caffe, ConvNetJs, and Lasagne
- Supports 8-bit quantization of Keras networks and TensorFlow™ Lite quantized networks
- Allows to run larger networks by storing weights in external Flash memory and activation buffers in external RAM
- Easy portability across different STM32 microcontroller series through STM32Cube integration
- Free, user-friendly license terms

STM32CubeIDE - is an advanced C/C++ development platform with peripheral configuration, code generation, code compilation, and debug features for STM32 microcontrollers and microprocessors.
It is based on the ECLIPSE™/CDT framework and GCC toolchain for the development, and GDB for the debugging.
It allows the integration of the hundreds of existing plugins that complete the features of the ECLIPSE™ IDE.
STM32CubeIDE integrates all STM32CubeMX functionalities to offer all-in-one tool experience and save installation and development time.
Video: How to use STM32CubeIDE

Interesting links

- AN5020 - Digital camera interface (DCMI) for STM32 MCUs
- UM2526 - Getting started with X-CUBE-AI Expansion Package for Artificial Intelligence (AI)
- UM2611 - Artificial Intelligence (AI) and computer vision function pack for STM32H7 microcontrollers
- FP-AI-VISION1 - Data brief Artificial Intelligence (AI) and computer vision function pack for STM32Cube
- Video: How to use STM32CubeIDE