

Toradex AI Vision Starter Kit for NXP i.MX 8



Challenges

Rapid creation and deployment of ML models at the edge

Machine learning assisted computer vision offers the ability to transform industries by using cameras combined with compute at the edge for immediate analytics to drive appropriate action such as being able to detect a manufacturing defect on an assembly line. The biggest challenge to realizing the benefits of such a solution are the complexities involved in not only training and deploying the model, but also having the appropriate hardware available, tuned, and ready to run the models at the edge cost effectively without sending the entire video stream to the cloud for processing.



The Toradex – NXP based Solution AI Vision IoT Starter Kit

The AI Vision Starter Kit from Toradex offers customers value out-of-the-box. The kit consists of a Toradex Apalis System-on-Module based on NXP i.MX 8QuadMax applications processor together with an Allied Vision camera. The solution is powered on the edge by AWS IoT Greengrass and Amazon SageMaker Neo. The kit comes out-of-the-box with a pre-trained example machine learning model to recognize various kinds of pasta, providing value right out of the box together with a cloud dashboard to receive data and to monitor telemetry data coming from the edge solution. The publication includes detailed instructions on how to recreate the pasta model, source code for the cloud dashboard and edge, as well as the raw training data. Because most of the solution is available in source code, it can be easily customized by anyone or integrated as part of a larger business application.

Benefits

The kit simplifies the process of using computer vision to create machine learning models for object detection by pre-integrating with AWS IoT Greengrass and Amazon SageMaker Neo.



Off-the-shelf Solution

The hardware is made to work for several years on a 24/7 schedule. The sample software for the demonstration shortens the path to a final solution.



Easy-to-use

You don't need a hardware expert or a data scientist to create and deploy what would otherwise be a complex solution.



Fast time-to-market

A proof-of-concept can be created by simply replacing the inference model with a custom one trained using SageMaker.



Industrial-grade Hardware

Both NXP and Toradex focus on providing solutions that strive in the extreme, dependable environments.

NXP and Toradex on AWS

NXP, Toradex and AWS produced a joint-solution – a computer vision starter kit – which includes the Toradex System on Module (SOM) Apalis i.MX 8, equipped by NXP i.MX 8QuadMax processor and is integrated to several AWS services such as AWS IoT Greengrass and Amazon SageMaker. Together, these companies collaborated deliver customers an invaluable solution already integrated, making it possible to build AI at the edge proofs-of-concept in short time frames without giving up on important factors – security and reliability. The solution utilizes AWS IoT Greengrass to deploy trained and SageMaker Neo models optimized for NXP i.MX 8QuadMax to the Edge. Then telemetry data is collected and send to AWS IoT Core which can be used to monitor the system, refine the models, and maintain optimal performance of the entire system.

Features



Hardware-optimized Machine Learning Inference at the Edge

Machine Learning inference is a compute intensive task that often does not meet requirements even on cutting-edge computers. Making good use of specialized hardware units, latest technologies and the correct software is paramount for developing a successful solution that meets the performance demands of an embedded system. This is exactly what is delivered by Amazon SageMaker Neo on the Toradex Apalis i.MX 8.



Secure, Reliable and Resilient Cloud Connectivity

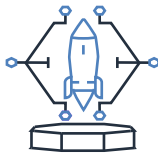
When a device is plugged to the internet, security is highly important – both AWS services as well as Toradex hardware address that necessity. In addition, AWS IoT Greengrass also manages connectivity outages transparently, making the Apalis iMX8 a truly reliable on-premises extension of the cloud – a premium-grade edge device.

Customer Profile



Challenges

Customer need to improve quality control and detect defects early so they can be rectified immediately. They would like to using machine learning and AI but is unsure of how to get started.



Solution

Customers can purchase the kit and use the sample raw data to then create their own data sets for their products. They then follow the simple instructions of how to use SageMaker Neo to train a model. Then then use the kit to test and refine their model.



Results

After training the model, a customer can deploy that model to the kit using AWS IoT Greengrass and using the camera can test on their own objects. They can attach the kit to their production line and pilot the implementation, tuning as required.

Get started with NXP - Toradex solutions on AWS

Visit [AWS Partner Device Catalog](#) and order the kit today.