Grovety

Launching Audio Processing Inference on Knowles IA8201



ORGANIZATION:

developer of an engineering environment for Edge AI / tiny ML product development using sensors.

The customer offers pre-built AI sensing modules, and tools to build custom solutions. Based on the data provided by a client our customer's cloud service generates optimized ML models that are ready to run on the customer's target platform.

• INDUSTRY: AI / Machine Learning

PROBLEM STATEMENT:

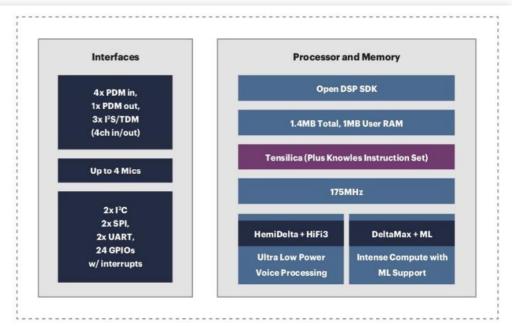
The customer set the task to demonstrate an inference run on a new audio processor <u>Knowles</u> <u>AISonic IA8201</u>, the first mobile-centric edge processor with two Tensilica DSP cores. The Grovety team had to complete the following tasks a) optimize and run the code on IA8201 processor b) and, as a result, achieve performance of over 3 fps. Moreover, we also made commitment to train customer's engineering team on how to work with the new processor.

SOLUTION:

In order to optimize the code, we used following approaches:

- vector instructions for batch data processing for basic ML and DSP operations like conv, pool, max, fft, etc.;
- specific DSP instructions that combine several operations per single instruction.

Due to Grovety's solid experience in code optimization for various platforms (ARM, x86, Tensilica) and custom accelerators, we successfully achieved the challenge. Within the project scope, our team gained experience in work with Knowles IA82XX processors and their ecosystem.





RESULTS:

We successfully ran inference on IA2801 and received data from real microphones instead of test data. Due to the code optimization on IA8201, the performance has been improved up to ~30 fps, i.e. ten times higher than on Arm Cortex-M (3 fps). We also have reduced power consumption in terms of mW/inference.

Grovety developers achieved impressive performance and lower power consumption not only by usage of a more advanced processor but also by deep code optimization that taking in account customer's solution features.

We had also trained the customer's team how to work with Knowles IA82XX.

TOOLS & TECHNOLOGIES:





