# Custom DNN Deployment on AI Hardware Accelerator

INTRODUCTION

A U.S. based semiconductor company that designs ASIC and platform SoCs approached Ignitarium for benchmarking an AI accelerator; customization & porting of deep neural networks; and associated activities to host the application on an emulator toolbox and subsequently on an FPGA prototype. The AI SoC is targeted at a consumer electronics application for object detection of more than 80 classes.

Service in Focus

CUSTOM DEPLOYMENT OF DEEP NEURAL NETWORK
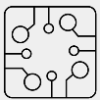
Industry
Semiconductors

Challenge
Unique Development Environment- porting custom neural network on emulator setup and then on FPGA

Scope
Customizing a neural network, training it, debugging of related source codes and implementation on AI accelerator

THE CHALLENGES

While designing the solution, Ignitarium was required to address the following challenges:

- Constraints with respect to deployment on low-memory devices
- Handling non-supported layers in the custom neural network by the Toolbox
- Balancing the expectations from business and engineering teams at customer end

IGNITARIUM'S APPROACH

- The target network had to detect a large number of object classes with reasonable accuracy. As existing widely used networks like YoloV3 have limitations on number of classes, a custom neural network was utilized. Ignitarium's engineering team implemented pre-processing and post-processing source code in C for the custom neural network. The network was required to be tested on a hardware accelerator on FPGA.

- Devised smart and effective alternative workarounds for handling unsupported layers

- Successfully ran a few real-world applications on the emulator and validated the capabilities of the customer's product

- Accuracy benchmarking of the custom neural network was done in the next stage. Accuracy numbers were close to that of the standard accuracy benchmark numbers of state-of-the-art neural networks. Suggestions were given on further activities like power and speed benchmarking.

BUSINESS IMPACT
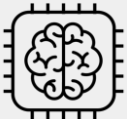
With Ignitarium's help, the customer demonstrated the working of a complex object classification neural network on emulator and FPGA setup, which increased the confidence of end customer on the performance of the AI SoC under design

Customer saved > 75% of their efforts by leveraging the deep experience of Ignitarium's core AI team

With the resulting positive saving on time (~25% reduction), the customer was able to showcase the solution demo with additional features, thereby exceeding the expectations of key stakeholders

Icons: Arne Mahn & shanthagawri, Noun Project

Looking to transform your product engineering?

Drop us a line to get in touch with our experts.

Contact Ignitarium at info@ignitarium.com