

## THE PROBLEM ADDRESSED

With Neural Network applications in AI taking a prevalent role in our society, it is strategic to develop specialized hardware. Approxinet proposes a Micro-NPU (Neuro-Processing-Unit) targeted at mobile visual and audio applications with a focus on ultra low power consumption.

The Secure and Safe Hardware team of Telecom Paris is historically specialized on new chips development. They have been working on low power AI since 2015 to answer needs identified with their industrial partners.

## TECHNOLOGY

- An Application-specific integrated circuit (ASIC) leveraging sparsity and quantization in neural networks through adaptive training
- DCMI interface for video, SPI for audio and IMU. Customized for Edge AI Video/Audio/IMU applications.
- Resnet50 running at 30fps, with ~10ms latency

## COMPETITIVE ADVANTAGES

- Easy Integration into Existing ARM based SoCs
- Ultra low power operation (Packing 2 Tops/S in 0.5 mm<sup>2</sup> (28nm) with ultra low power operation @10Tops/Watt)
- 8 bits features, and customizable 1-4 bits weights without loss of precision
- Look-Ahead fusion of network layers, resulting in low memory bandwidth, No DDR memory required.
- Seamless integration with Tensorflow-Lite

## APPLICATION

Visual intelligence requiring small form factor chips (mobile applications):

- Drones
- Motion detection, eye tracking, wake-up in ultra-low power computer vision

## DEVELOPMENT STATUS

TRL 3: POC on 28nm nodes FPGA, the team is now moving toward integration in specialized ARM chips

## INTELLECTUAL PROPERTY

- Convolutional Neural Network – CNN-accelerator using Look-Ahead convolution "(EP 24307281)
- A serializing device for convolutional filtering "(EP 24307282)
- A convolutional filtering system and method using sparsity encoding (EP 25307055)

## INVENTORS & CONTACTS

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## LOOKING FOR

- Looking for partnership for licensing and/or collaborative research