

The background of the slide is a dark blue color with a subtle, glowing pattern of circuit board traces and nodes, resembling a printed circuit board (PCB) layout. The traces are thin and light blue, creating a complex, interconnected network across the entire slide.

IoT Neural Networks: Linear Integrate & Fire

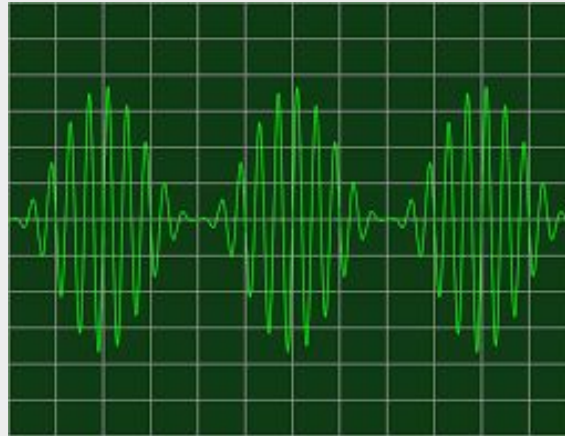
Simon Kaufmann, Owen Jow

IDEAL

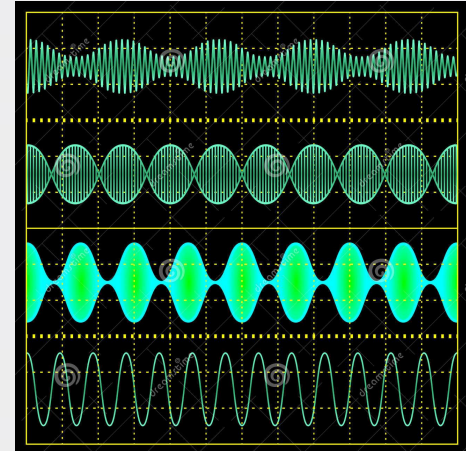
Software Defined Radio



Modulation

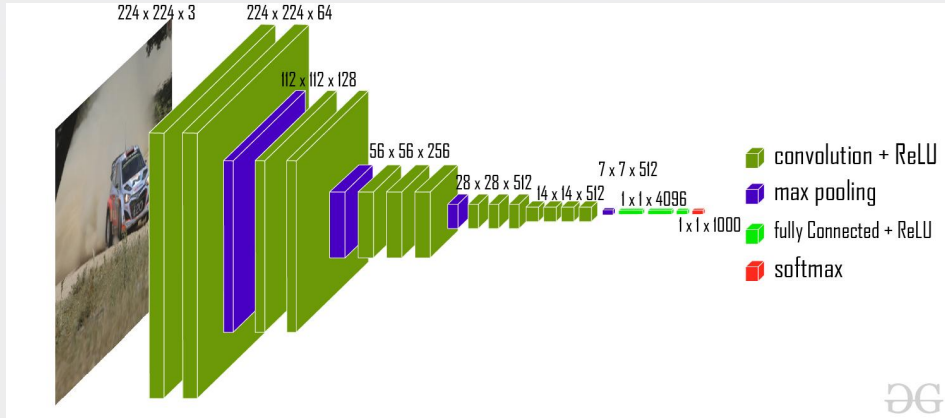


Classification

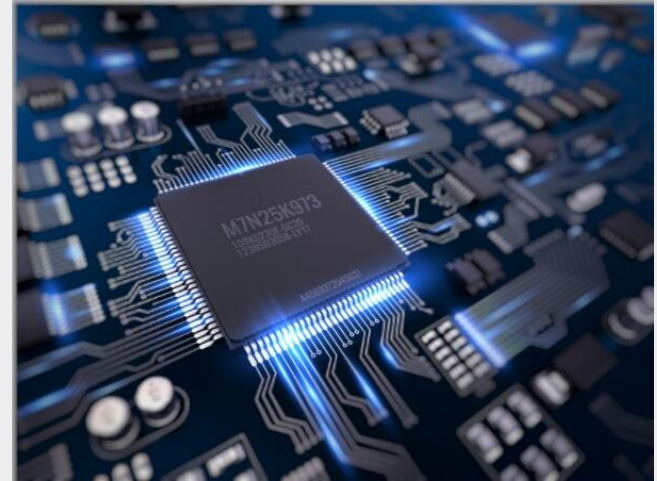


REALITY

Traditional Neural Net (VGG)

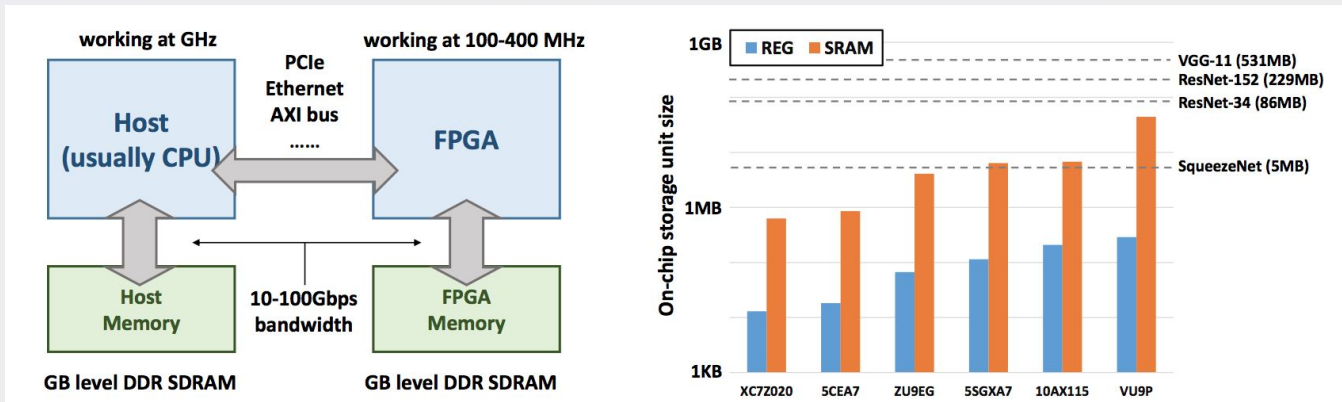


Implemented on FPGA



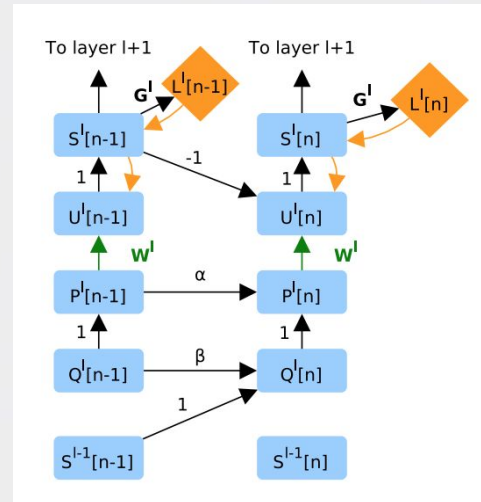
CHALLENGES

- FPGAs have **storage and bandwidth limitations**
 - Difficult to port large models with heavy I/O requirements
 - Want more **computationally-efficient** models



APPROACH

- **Spiking neural networks (SNNs)**
 - Inspired by biological neurons, brain...
 - Event-driven, so less computationally expensive
- Linear Integrate and Fire Neurons
- Train using “Deep Continuous Local Learning”
 - Weight changes computed locally



NEXT STEPS

- Implement DECOLLE SNN method and evaluate it on RadioML dataset
- Implement quantization for FPGA using Brevitas and evaluate effect on results

