IoT Neural Networks:
Linear Integrate & Fire

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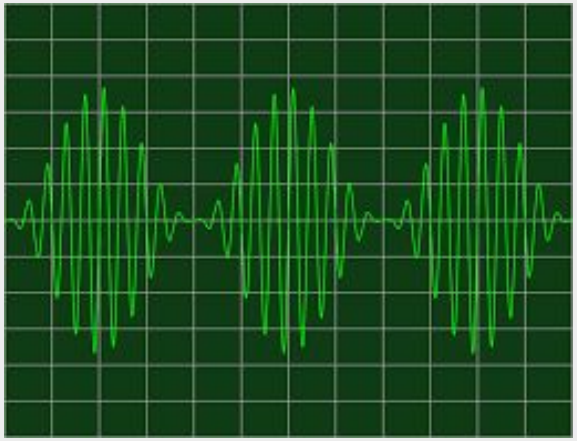
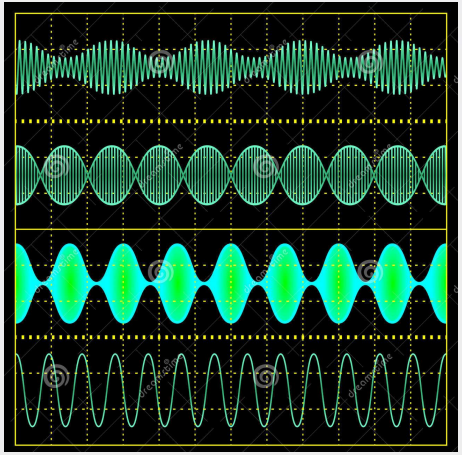
IDEAL

Software Defined Radio

Modulation

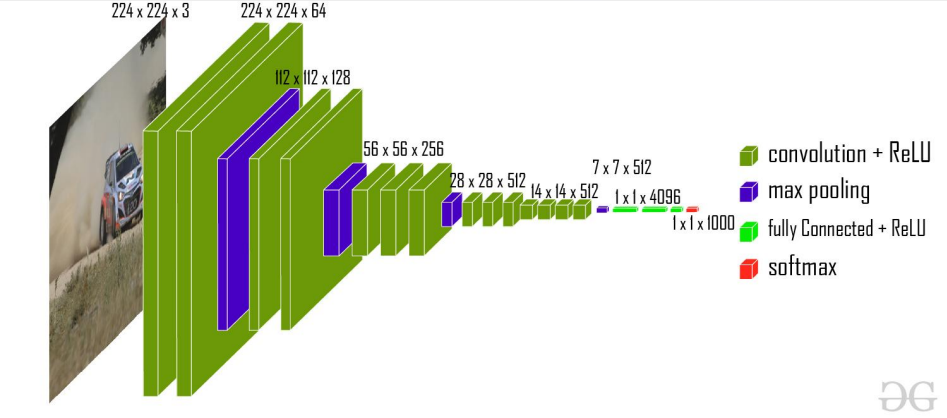


Classification

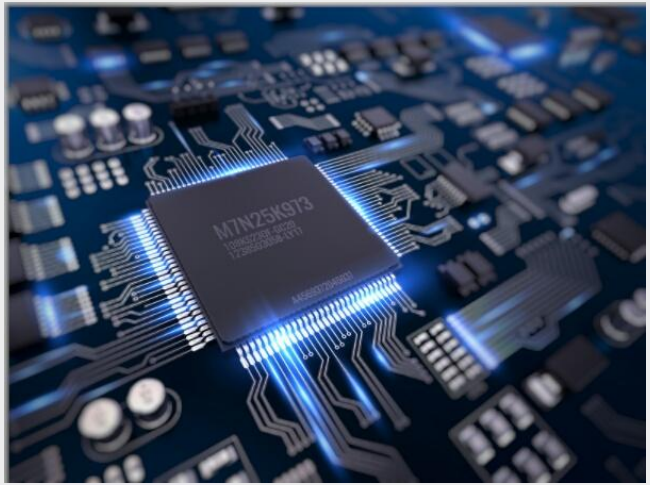


REALITY

Traditional Neural Net (VGG)

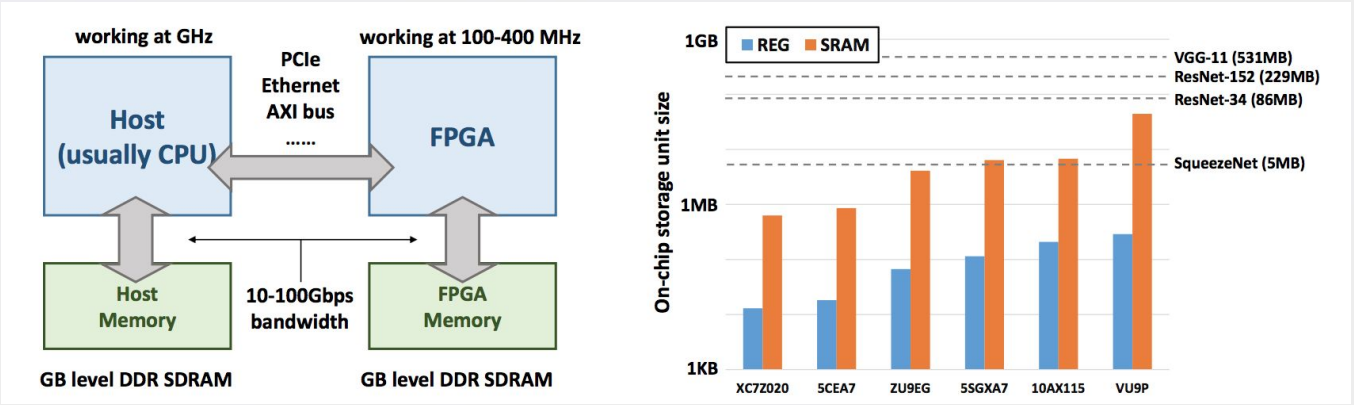


Implemented on FPGA



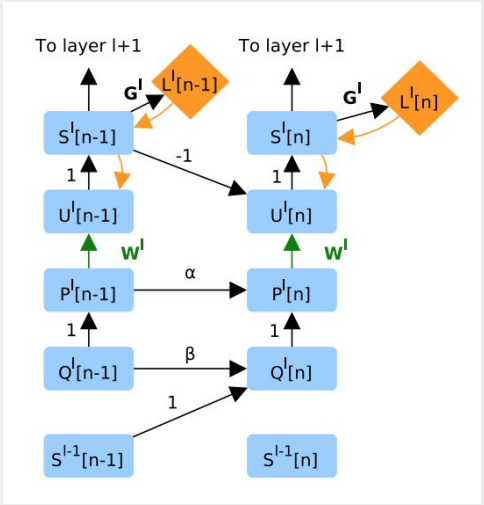
CHALLENGES

- 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