Product Design Specification:
Real Time Modulation Classification using FPGAs

Cory Nezin, Brenda So

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Purpose

Wireless signal classification has applications in jammer identification, automatic cognitive radio control, and interference mitigation. The purpose of this project is to create a low-power, low-weight, low-latency device capable of state of the art modulation classification. The product includes a register-transfer level design and implementation of a convolutional neural network.

Features

- Cost: $5-$10 (ASIC), $100 (FPGA)
- Quantity: 1000
- Maintenance: None
- Packaging: Ceramic
- Materials: Light-weight chip
- Weight: Less than 0.5 *pounds*
- Aesthetics: Small, darkly colored. Difficult to detect
- Product life: 2 years

Competition

- Qualcomm's "Snapdragon"
- Apple's "Nueral Engine"
- Cadence's "Tensilica Vision C5"

Intended Market

- Military
- Academia

Performance Requirements

- Less than $50ms$ classification latency
- 75% accuracy or higher for positive SNR

Life-cycle

- Predicted 2-3 years before obsolescence

Human Factors

- Special training or documentation may be required for new users.

Social, Political, Legal, and Ethical Issues

- Device may be used to kill people