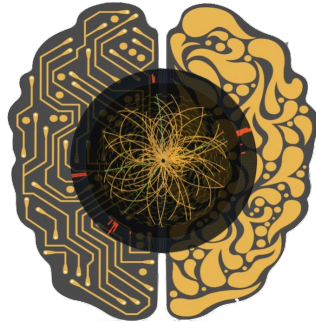# Outreach at non-typical conferences - DEFCON Debrief

Ben Hawks - August 25, 2022

DEFCON 30

- DEFCON is one of the worlds largest annual technology & information/cybersecurity conferences, is open to the public.
  - **25,000 attendees this year!**

- Not exclusively information/cybersecurity based, though has a strong emphasis on it and related topics (Privacy, cryptography, hardware, etc.)

- Contains multiple "Villages" (tracks w/ dedicated demo & booth space) for things such as AI, Quantum Computing, Aerospace, etc.

- Very open, inclusive atmosphere of a large number of technical professionals and hobbyists from all fields/backgrounds, attending for professional and personal interests

- Lots of "bleeding edge" technology, discussion, and experts present

- **Large US Govt presence** to interact, recruit, and engage with the community
  - US MIL/DDS, DoD, DHS, NSA, and a number of US National Labs (INL, PNNL, etc.)
  - Some there "officially" with a booth etc., some attending (personally and professionally)

DEFCON 30 Demo Labs - hls4ml Live Demonstration

- We submitted & were selected to present a live demo of hls4ml in the "Demo Labs" portion of DEFCON 30
- Showed a live real time image classification demo, along with background and how to use the tool to generate FPGA firmware

Using the Pynq Software stack (Python API to interact with & program FPGA, hosts Jupyter directly on Pynq-Z2 Board)

Have a live webcam running inferences via HLS4ML accelerator, outputting to an HDMI display
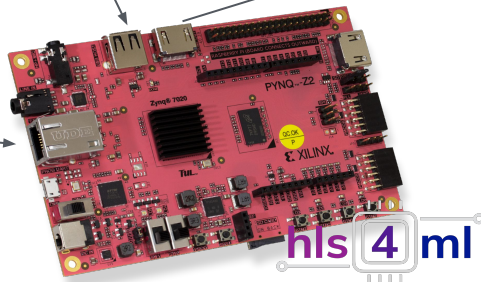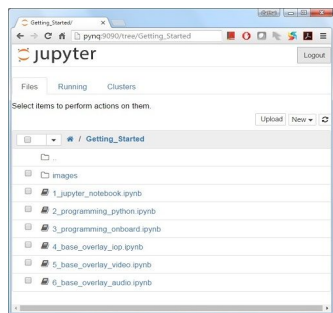
DEFCON 30 Demo Labs - hls4ml Live Demonstration

- Reception was good! Lots of interest from the attendees (~25-30, full room) with follow up questions, good feedback on future directions to take the tool, what users applications and interests are, what perceived "strengths" hls4ml has
  - Industrial, IoT applications
  - Edge/Low Power
  - Interest in developing a fully open source toolchain (vs use of vendor tools)
  - Custom/flexible/open solutions are a main strength vs other tools
    - "Bring your own model" is appealing vs other "black box" (application specific) solutions

- Lots of meaningful "chance" encounters waiting in line, at villages, etc. with people from industry & government, leading to demo attendees and follow up contact post-conference!

Future Outreach @ DEFCON and beyond

- Presenting and engaging with a non-physics/HPC community, including different industries & highly technical hobbyists, proved insightful and valuable. Further outreach might also be worthwhile/valuable, such as:
- Booth/Recruiting
  - *A lot* of very talented individuals were present, subject matter experts in lots of technical areas beyond (and including) cybersecurity. Many companies & govt agencies had open interview/job postings at booths.
- "Capture the Flag" (CTF) Challenges/Demos
  - CTF events to challenge and engage with the community's technical skills, test (analogs of) actual systems,
  - MIL/DDS had multiple interactive demos to introduce people to aerospace security, hardware systems, etc. INL had a "mini [power] grid" and an "Escape Room" to explore and test.
- "Badges" - Wearable electronics containing/showing off cool hardware and art
  - Large culture @ DEFCON around "badges", having cool ones led to a *lot* of chance encounters 🙂
  - Potential for an updated "Quarknet" like cosmic ray detector project, designing a wearable badge with scintillator/SIPM + Raspberry Pi (and beyond!) like hardware, for demo/use at conferences and educational/citizen science opportunities (High school classrooms, Lederman Science Center, etc.) Hardware can based off existing, low cost, open source projects like MuonPi, CosmicWatch