JONATHAN NGUYEN

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https://www.github.com/puresoda

EDUCATION

University of California, Los Angeles: Electrical Engineering BS — Graduation: March 2021
- GPA: 3.841

University of California, Los Angeles: Electrical Engineering MS — March 2021 – June 2022

WORK EXPERIENCE

Communications / DSP Intern, Astranis – San Francisco, CA — March 2021 – Present
- Analyzed link budget and power constraints to optimize radio satellite system bandwidth
- Designed custom software for software defined radio to implement and consider:
  - Forward error correction, channelization, carrier synchronization, PA linearization
- Collaborated with FPGA engineers to implement and finalize signal processing algorithms on radio hardware

Digital Communications Intern, Aerospace Corporation – El Segundo, CA — June 2020 – Sept. 2020
- Researched and simulated digital radio signals for use in deep neural network classifier
  - Utilized GNU Radio, USRPs, and Python to generate P25, DMR, NXDN, DSTAR, and YSF signals
  - Generated random signal bursts to serve as negative examples for the classifier
- Built framework for integrating a USRP into a Modular Open Radio Frequency Architecture (MORA) system
  - Researched MORA standard and facilitated device communication with Flask Webservice
  - Learned about VITA-49 standard to handle / parse VRT packets on sockets

Lab Intern, Physical Optics Corportation – Torrance, CA — June 2019 – Sept. 2019
- Researched and integrated IEEE 802.11n error correction protocol in simulations
  - Collaborated to implement Information Bottleneck LDPC decoder on Xilinx FPGA
  - Performed preprocessing of data using Python and created parallelized simulations using C++
  - Achieved frame and bit error rate (FER / BER) rivaling current standard only using 4-bit quantization

Intern, City of Fremont ITS Department – Fremont, CA — July – Sept. 2017
- Managed city-wide replacement of old computers and integration of new hardware
- Created and maintained standardized OS images for rollbacks and new deployments

PROJECTS AND ACTIVITIES

UCLA Communications Systems Laboratory Research Assistant — April 2019- Present
- Simulation of Low-Density Parity Check (LDPC) code for use in MLC Flash Memory
- LDPC decoding using Information Bottleneck quantization for use in 5G technology
- Worked alongside SA Photonics to simulate free space optical fading channel and hybrid RF-FSO modem
- Collaborated to build neural network on C++ to aid in LDPC iterative min sum decoding
- Design of trellis and message passing decoders to supplement disparity management system

UCLA Senior Capstone: Underwater Image Enhancement — Jan. - March 2021
- Implemented image processing algorithms to recover edges, contrast, and color of underwater images
- Utilized git to collaborate to implement the algorithm on an embedded system using C and MATLAB
- Researched and implemented image fusion techniques to recover image quality (code on Github)

UCLA IDEA Hacks — Jan. 2018
- Collaborated in a team for 36 hours to create a wearable, gesture-based wireless controller
- Utilized flex resistors and accelerometer to track hand movement and control a LED

Boy Scouts of America — Aug. 2013 - Nov. 2017
- Eagle Scout earned Sept. 20, 2017 by leading scouts to build bulletin boards for local temple

J O N A T H A N N G U Y E N

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RESEARCH PUBLICATIONS

[1] J. Nguyen, E. Liang, L. Wang, T. Drullinger, T. Chauvin and R. D. Wesel, "Comparison of Integrated and Independent RF/FSO Transceivers on a Fading Optical Channel," in *Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, 2020.

[2] L. Wang, S. Chen, J. Nguyen, D. Divsalar, and R. D. Wesel, "LDPC Minsum Decoder with Neural-Network-Optimized Degree-Specifc Weights," in *IEEE International Symposium on Information Theory*, Melbourne, Australia, 2021.

RELEVANT COURSE WORK AND SKILLS

Relevant Course Work	Skills
Data Structures and Algorithms	C and Object-Oriented C++ and Java
Machine / Deep Learning (2 classes)	Version Control using Git
Image and Speech Processing Design	Bash and Linux
Digital Signal Processing	MATLAB
Communication Systems	Python
Analog Circuit Analysis	GNU Radio
Electromagnetics and Waves	Software Defined Radios (SDRs)
Feedback Systems	LateX
Information Theory (Graduate)	PCB design through Eagle's software
	Oscilloscopes, and function generators