Alec Xu

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EDUCATION

University of Michigan, Ann Arbor, MI **GPA:** 4.0/4.0
B.S.E Electrical Engineering, Minor in Computer Science *Dec 2021*

- **Concentration:** Digital Signal Processing
- **Relevant Coursework:** Data Structures and Algorithms (enrolled), Digital Communication Systems (enrolled), Linear Spaces and Matrix Theory (enrolled), Digital Signal Processing, Software Defined Radio
- **Awards & Honors:** EECS Scholar, James B. Angell Scholar, William J. Branstrom Freshman Prize, College of Engineering Dean's List, University Honors

EMPLOYMENT EXPERIENCE

Wireless Integrated MicroSensing and Systems Group Ann Arbor, MI
Undergraduate Research Assistant *Sept 2019 – Present*

- Developing anchor synchronization algorithm using TI's proprietary RF protocol to achieve sub-decimeter localization accuracy.
- Utilizing TI Code Composer Studio to develop C programs to execute I2C and I2S data transfer between CC1352P LaunchPads and TLV320 Evaluation Modules to transmit and receive ultrasonic OFDM signals.
- Designed ultrasound-based localization system based on existing literature using TI CC1352P LaunchPad and TLV320AIC3268 Evaluation Modules to locate position of mobile target relative to transmitting anchors.

Johns Hopkins University Applied Physics Laboratory Laurel, MD
Summer Intern *May 2020 – Aug 2020*

- Implemented preamble detection, carrier synchronization, and QAM modulation algorithms in C++ using FFTW and Boost libraries. Implementations were integrated into transmitter and receiver to determine API capabilities for Eridan MIRACLE software-defined radio (SDR).
- Tested and evaluated RF performance of Eridan MIRACLE SDR using spectrum analyzers. Documented and analyzed results in verification report to determine if RF performance matched specifications.
- Developed MATLAB scripts to simulate path loss within fixed grid space using ITM and TIREM RF propagation models. Scripts were handed off for future data collection to evaluate accuracy of RF mapping algorithm.

H3D, Inc. Ann Arbor, MI
Summer Intern *May 2019 – Aug 2019*

- Optimized radiation detector calibration process by automating calibration machine, reducing time by over 50%. Implemented multithreaded C++ program to collect sensor data and control sensor movements via TCP/IP.
- Developed C and Energia programs to execute I2C and UART data transfer between TI MSP430 LaunchPad, CPU board, and sensor board, Programs were used to aid development of radiation detector systems.
- Organized PCB layout and routed electrical connections between components on company-made OEM board in DipTrace. Layout was approved to be used in production.

PROJECTS

Facial Reconstruction Program Ann Arbor, MI
Digital Signal Processing Final Project *Feb 2020 – Apr 2020*

- Collaborated with three peers to develop facial reconstruction program in MATLAB using Viola-Jones object detection and k-Nearest Neighbors classification techniques.
- Developed image completion algorithm based on rank regularized low rank matrix completion. Algorithm was able to reconstruct partial image input with 95% accuracy.

Code-Division Multiple Access (CDMA) Communication System Ann Arbor, MI
Software Defined Radio Final Project *Mar 2020 – Apr 2020*

- Built CDMA wireless communication system with a peer using GNU Radio Companion and USRP X310s.
- Implemented preamble detection, phase offset correction, and data bit demodulation algorithms in Python. Receiver decoded the desired user's data with 100% accuracy with three users transmitting simultaneously.

SKILLS

- Programming Languages: Experience with C++, C, MATLAB, Python, Verilog
- Applications: Experience with GNU Radio, TI Code Composer Studio, Quartus, Altium, DipTrace