Siqi (Rita) WANG

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EDUCATION

Shanghai Jiao Tong University (SJTU) Sept. 2020 – June 2024 (expected)

Bachelor of Engineering in Information Engineering

- **Upper Division GPA**: 88.8/100 (3.8/4.0) **Awards**: Scholarship of Academic Excellence in 2022-2023

SELECTED PROJECTS

Skin Lesion Classification Based on RGB Channel and Depth Information June 2023 – Present

Research Intern Supervisor: Prof. Yuye Ling

- Fine-tuned pre-trained models with data augmentation and focal loss to classify dermoscopy images across RGB channels, using ANOVA and first-order moments to analyze channel accuracy based on lesion depth
- Enhanced the baseline model by adding an auxiliary classifier with auxiliary classification loss and confusion loss, achieving a 2% accuracy improvement through 5-fold cross-validation
- Implemented multimodal fusion with non-polarized and polarized dermoscopy images, adding attention blocks to the non-polarized branch to better extract complementary information
- Submitted a manuscript to IEEE International Symposium on Biomedical Imaging (ISBI) 2024

Secure Wireless Communication System with Adversarial Learning Mar. 2023 – Sept. 2023

Leader Supervisor: Prof. Meng Jin

- Developed and jointly trained neural network-based modulation and demodulation modules for secure communication, while adversarially training against sensing modules to minimize sensing capacity
- Employed HackRF in GNU Radio to capture real-world signals, modulating white noise signals onto the 433 MHz band and executing down-conversion, demodulation, and bandpass filtering to reduce noise
- Converted signal spectra to cepstrum by Fourier transforms and logarithmic operations to gain Channel Frequency Response data for network training, finally reducing sensing capacity to random guess levels

Design of Anti-Interference Autoencoder Communication System Feb. 2023 – May 2023

- Utilized autoencoder for physical layer reconstruction and real-world simulations by introducing CFO and SFO into the AWGN channel, achieving a BER 10x lower than OFDM systems in low SINR scenarios
- Designed encoder-decoder networks resistant to interference by injecting signals either between them or at the input, enabling the encoder to adapt modulation schemes for various interferences dynamically
- Deployed the encoder and decoder to the transmitter and receiver respectively on the software radio platform (Pluto SDR), evaluating the impact of communication distance on BER

Image Feature Detection and Description Based on Deep Learning Sept. 2023 – Nov. 2023

- Applied histogram equalization for lighting variation issues and conducted template matching with SSD and ZNCC to compare their efficacy under different lighting conditions
- Employed SuperPoint, GLAMpoints, and RF-Net for image feature detection and description, including tracking across video frames, analyzing performance under varying angles, brightness, and resolutions

Synthetic Aperture Radar Imaging with Range-Doppler Algorithm Oct. 2023 – Dec. 2023

- Created a matched filter and performed range compression in the 2D frequency domain after computations
- Performed Range Cell Migration Correction by applying shifts to the range compressed data and created an azimuth matched filter, customizing its formula for azimuth compression
- Returned data to time domain, achieving enhanced focus and high-resolution detail in SAR satellite imagery

Predictive Modeling of Heart Failure Risk Using Machine Learning Dec. 2022 – Jan. 2023

- Conducted data preprocessing and feature engineering on the UK Biobank dataset, using heatmaps for correlation analysis and oversampling for class balance in 475,817 samples with 30 biomarkers
- Developed an XGBoost model for heart failure risk prediction, employing grid search for hyperparameter optimization and 10-fold cross-validation, achieving a mean F1 score of 0.6981 and 96.4% accuracy

MISCELLANEOUS

Programming Languages: Python, C++, R, Bash, MATLAB, HTML, VHDL, Verilog

Tools and Frameworks: PyTorch, TensorFlow, OpenCV, Spark, Nginx, Django, FFmpeg, LaTeX, GNU Radio, LabVIEW, Keil μVersion, Vivado, Multisim, Lattice Diamond, Solidworks, HFSS, ADS

Leadership: Secretary of the Contact Center in the Student Association; Volunteer in the Shanghai Marathon