WENHUI(BERYL) SUI

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EDUCATION

University of California, Los Angeles   Los Angeles, CA
Ph.D., Electrical and Computer Engineering

University of California, Los Angeles   Los Angeles, CA
Combined B.S. & M.S., Departmental Scholar in Electrical Engineering   March 2023
UCLA ECE Fast Track Honors Program
UCLA Eta Kappa Nu Publicity & Secretary

RESEARCH EXPERIENCE

UCLA Communications Systems Laboratory, Professor Richard Wesel

Ph.D. Student   **March 2023 - Present**

- Emphasis in error correction codes and information theory. Focus on lowering decoding complexity for convolutional codes (CCs).
- Identified a close estimation for the performance of punctured CCs concatenated with cyclic redundancy checks (CRCs) through a distance spectrum union bound. Built MatLab scripts for both tail-biting (TB) and zero-terminating (ZT) cases.
- Mentored undergraduate students through their individual research projects at UCLA summer research programs for four years. Tutored students on probability and communications systems. Prepared lecture-style notes and assignments.

UCLA Communications Systems Laboratory, Professor Richard Wesel

Undergraduate Researcher   **June 2019 - March 2023**

- Designed a new algorithm (in MatLab and C++) for decoding rate-(n-1)/n CCs which lowered the decoding complexity by approximately 2^n while maintaining the same error detection and correction levels.
- Improved the brute-force implementation for searching suboptimal codewords with a min heap for better runtime performance at high noise levels.

SK Hynix Memory Solutions America Inc.

Algorithms Engineer Intern   **June 2022 - September 2022**

- Created MatLab simulations to evaluate the performance gap between belief-propagation (BP) and quantized min-sum (MS) algorithms for low-density parity-check (LDPC) codes.
- Researched on strategies to identify optimal scaling factors to improve the error rates of quantized MS, such as 2-D normalization, exponential approximation, and neural networks.
- Found optimal scaling factors through neural networks, which improved the performance of quantized MS by 0.3 dB.

PUBLICATIONS

W. Sui, B. Towell, Z. Qu, E. Min, and R. Wesel, "Linearity-Enhanced Serial List Decoding of Linearly Expurgated Tail-Biting Convolutional Codes," accepted for ISIT 2024, Athens, Greece, Jul 7–12, 2024.

Z. Qu, A. Antonini, W. Sui, E. Min, A. Yang, and R. Wesel, "Complementary Exclusion of Full Polynomials to Enable Dual List Decoding of Convolutional Codes," accepted for ISIT 2024, Athens, Greece, Jul 7–12, 2024.

W. Sui, B. Towell, A. Asmani, H. Yang, H. Grissett, and R. Wesel, "CRC-Aided High-Rate Convolutional Codes With Short Blocklengths for List Decoding," in *IEEE Transactions on Communications*, vol. 72, no. 1, pp. 63-74, Jan. 2024.

A. Antonini, W. Sui, B. Towell, D. Divsalar, J. Hamkins, and R. Wesel, "Suppressing Error Floors in SCPPM via an Efficient CRC-aided List Viterbi Decoding Algorithm," ISTC 2023, Brest, France, September 4-8, 2023.

R. Wesel, A. Antonini, L. Wang, W. Sui, B. Towell, and H. Grissett, "ELF Codes: Concatenated Codes with an Expurgating Linear Function as the Outer Code," ISTC 2023, Brest, France, September 4-8, 2023.

W. Sui, H. Yang, B. Towell, A. Asmani, and R. Wesel, "High-Rate Convolutional Codes with CRC-Aided List Decoding for Short Blocklengths," ICC 2022, Seoul, South Korea, May 16–20, 2022.

TEACHING EXPERIENCE

UCLA EC ENGR 131A - Probability and Statistics (Upper-level undergraduate course)
Tutor, Reader   June 2020 - December 2020

UCLA EC ENGR 231E - Channel Coding Theory (Graduate course)
Teaching Assistance   April 2024 - June 2024