KAUSHIK SENTHOOR

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About me

I am a research scholar completing my PhD programme at Indian Institute of Technology Madras. My research is in the area of quantum error correction codes. More specifically, my work focuses on reducing the communication cost for secret recovery in quantum secret sharing schemes. In the past, I also worked on problems in compressed sensing, image processing and distributed storage codes. I am currently looking for a research position in academia or industry to work on quantum error correction and related topics.

Research interests

Classical and quantum error correction codes, information theory, distributed storage and signal processing

Education

Ph.D. in Quantum Error Correction Codes Jan 2016 - Mar 2023
Indian Institute of Technology Madras (Expected)
Advisor : Prof. Pradeep Sarvepalli
Thesis : Communication Efficient Quantum Secret Sharing

M.E. in Telecommunication Engineering Aug 2012 - Jul 2014
Indian Institute of Science Bangalore
Advisor : Prof. P Vijay Kumar
Thesis : Storage Overhead vs. Repair Bandwidth Tradeoff in Exact Repair Regenerating Codes

B.Tech. in Electronics & Communication Engineering Aug 2008 - Jul 2012
Amrita School of Engineering Coimbatore
Group project : Compressed sensing in ECG signals

Work Experience

Engineer Aug 2014 - May 2015
Mobile-Video team, Ittiam systems, Bangalore
Development of video codecs in H264 and HEVC standards

Project Associate Jun 2015 - Dec 2015
Codes and Signal Design lab, Indian Institute of Science Bangalore
Project for intrusion detection using Wireless Sensor Networks

Publications

Journal papers

[1] K. Senthoor and P. K. Sarvepalli. "Theory of Communication Efficient Quantum Secret Sharing". In: *IEEE Trans. Inform. Theory* 68.5 (2022), pp. 3164–3186. URL: https://ieeexplore.ieee.org/document/9674910.

[2] K. Senthoor and P. K. Sarvepalli. "Communication efficient quantum secret sharing". In: *Phys. Rev. A* 100.5 (2019), p. 052313. URL: https://journals.aps.org/pra/abstract/10.1103/PhysRevA.100.052313.

[3] B. Sasidharan, N. Prakash, M. N. Krishnan, M. Vajha, K. Senthoor, and P. V. Kumar. "Outer bounds on the storage-repair bandwidth trade-off of exact-repair regenerating codes". In: *International Journal of*

Information and Coding Theory 3.4 (2016), pp. 255–298. URL: https://www.inderscienceonline.com/doi/abs/10.1504/IJICOT.2016.079498.

Conference proceedings

[4] K. Senthoor and P. K. Sarvepalli. "Universal Communication Efficient Quantum Threshold Secret Sharing Schemes". In: *Proc. 2020 IEEE Information Theory Workshop (ITW), Riva del Garda, Italy*. URL: https://ieeexplore.ieee.org/abstract/document/9457576.

[5] K. Senthoor, B. Sasidharan, and P. V. Kumar. "Improved layered regenerating codes characterizing the exact-repair storage-repair bandwidth tradeoff for certain parameter sets". In: *Proc. 2015 IEEE Information Theory Workshop (ITW), Jerusalem, Israel*. URL: https://ieeexplore.ieee.org/abstract/document/7133121.

[6] B. Sasidharan, K. Senthoor, and P. V. Kumar. "An improved outer bound on the storage-repair-bandwidth tradeoff of exact-repair regenerating codes". In: *Proc. 2014 IEEE International Symposium on Information Theory*, pp. 2430–2434. URL: https://ieeexplore.ieee.org/abstract/document/6875270.

Preprint

[7] K. Senthoor and P. K. Sarvepalli. "Concatenating Extended CSS Codes for Communication Efficient Quantum Secret Sharing". In: *e-print quant-ph/2002.09229* (2022). URL: https://arxiv.org/abs/2211.06910.

Presentations

- Presentation at AQIS 2018, Nagoya, Japan.
- Virtual presentation at IEEE ITW 2020, Riva del Garda, Italy.
- Poster at Indo-German Symposium on Quantum Science and Technologies 2020, IIT Madras, India.

Programming

Proficient in C, C++ and MATLAB.

Teaching experience

Applied Linear Algebra I, Jul - Nov 2018
I worked as one of four teaching assistants for a class of about 50 students. I took part in conducting weekly tutorial sessions and providing solutions for problem sets. The term project in the course required the students to make video presentations of research articles related to the course content. I evaluated some of these video presentations.

Information Theory (online mode), Jul - Nov 2022
I worked as one of seven teaching assistants for a class of about 60 students. I conducted weekly tutorial sessions for a group of 10 students. I also evaluated some problems in the mini-quiz and final exam papers of the students.

I worked as teaching assistant also in courses such as Error Control Codes, Modern Coding Theory and Advanced Topics in Quantum Information during my Ph.D. programme.

Academic services

I reviewed research articles in the area of error correction codes for the following conferences and journal.

- National Conference on Communications organized by Joint Telematics Group
- IEEE International Symposium on Information Theory
- IEEE Transactions on Information Theory

I participated as a volunteer in organizing the following events.

- National Conference on Communications 2017 at IIT Madras
- EE department symposium 2018 at IIT Madras