KAUSHIK SENTHOOR

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About me

I am a postdoctoral researcher in Prof. Stephanie Wehner's lab at QuTech in the Delft University of Technology. My current research work is on the topic of quantum network applications. I received my Ph.D. from the Indian Institute of Technology Madras. My doctoral research focused on how to reduce the communication cost during secret recovery in quantum secret sharing schemes. In the past, I also worked on problems in codes for distributed storage, image processing and compressed sensing.

Research interests

Classical and quantum error correction codes, information theory, quantum cryptography and signal processing

Education

Ph.D. in Electrical Engineering Jan 2016 - Jul 2023
Indian Institute of Technology Madras
Advisor : Prof. Pradeep Sarvepalli
Thesis : Communication Efficient Quantum Secret Sharing Using Quantum Codes

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

Postdoctoral researcher Nov 2023 - Present
QuTech, Delft University of Technology
Quantum network applications

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, "Communication Efficient Quantum Secret Sharing via Extended CSS Codes," *IEEE Journal on Selected Areas in Communications*, vol. 42, no. 7, pp. 1818–1829, 2024.

[2] K. Senthoor and P. K. Sarvepalli, "Theory of Communication Efficient Quantum Secret Sharing," *IEEE Transactions on Information Theory*, vol. 68, no. 5, pp. 3164–3186, 2022.

[3] K. Senthoor and P. K. Sarvepalli, "Communication efficient quantum secret sharing," *Physical Review A*, vol. 100, no. 5, p. 052 313, 2019.

[4] 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," *International Journal of Information and Coding Theory*, vol. 3, no. 4, pp. 255–298, 2016.

Conference proceedings

[5] K. Senthoor and P. K. Sarvepalli, "Concatenating Extended CSS Codes for Communication Efficient Quantum Secret Sharing," in *Proc. 2023 International Symposium on Topics in Coding (ISTC), Brest, France.*

[6] 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.*

[7] 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.*

[8] 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 (ISIT), Honolulu, Hawaii, USA.*

Presentations

- Talk at AQIS 2018, Nagoya, Japan.
- Poster at Indo-German Symposium on Quantum Science and Technologies 2020, IIT Madras, India.
- Poster at Quantum Information Processing 2025, Raleigh, USA.

Programming

I have good expertise in C and MATLAB. I also have exposure to programming in C++ and assembly language.

Teaching experience

Applied Linear Algebra I, Jul - Nov 2018

- One of four teaching assistants for a class of about 50 students. Conducted weekly tutorial sessions and discussed solutions for problem sets. Evaluated video presentations by students on recent research articles.

Information Theory (online mode), Jul - Nov 2022

- One of seven teaching assistants for a class of about 60 students. Conducted weekly tutorial sessions for a group of 10 students. Partly evaluated the mini-quiz and final exam papers.

I worked as a 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

Paper reviews

- Reviewed a paper for IEEE Transactions on Information Theory in 2021.
- Reviewed a paper for IEEE Journal on Selected Areas in Information Theory in 2025.
- Regularly review papers for national and international research conferences such as NCC (India), IEEE ISIT, IEEE ISITA, TQC and QCrypt.

Event management

- Partly organized the transportation of the speakers in JTG Summer School 2019 at IIT Madras.
- Helped with event photography in Electrical Engineering Symposium 2018 at IIT Madras.