Manideep Mamindlapally

IEEE student member
Student, Indian Institute of Technology Kharagpur

Research Interests

Quantum Information Theory | Quantum Computation | Information Theory | Cryptography

Education

Current	Dual-Degree (BTech+MTech)	Indian Institute of Technology, Kharagpur MAJOR: Electronics & Electrical Communication Engineering MASTERS SPECIALISATION: Telecommunication System Engg. MINOR: Computer Science Engineering	9.16/10 (CGPA) 9.09/10 (ACGPA)
April 2017	TSBIE	FIITJEE Junior College, Hyderabad	97.0%
April 2015	ICSE	Johnson Grammar School(ICSE), Hyderabad	95.7%

Publications

Conferences:

- M. Mamindlapally, A. K. Yadav, M. Mishra and A. J. Budkuley, "Commitment Capacity under Cost Constraints," *2021 IEEE International Symposium on Information Theory (ISIT)*, 2021, pp. 3208-3213, doi: 10.1109/ISIT45174.2021.9518204. [IEEE Xplore]
- A. K. Yadav, M. Mamindlapally, A. J. Budkuley and M. Mishra, "Commitment over Compound Binary Symmetric Channels," *2021 IEEE National Conference on Communications (NCC)*, 2021, pp. 1-6, doi: 10.1109/NCC52529.2021.9530060. [IEEE Xplore]
- A. J. Budkuley, P. Joshi, M. Mamindlapally, A. K. Yadav, "On the Commitment Capacity of Reverse Elastic Channels" *2021 IEEE Information Theory Workshop (ITW)*, 2021. [*Accepted and Presented*]
- A. K. Yadav, M. Mamindlapally, P. Joshi, A. K. Yadav, "On Commitment over General Compound Channels" *IEEE Conference on Communication Systems and Networks (COMSNETS)*, 2022. [*Under Review*]
- M. Mamindlapally, A. Winter, "Singleton bounds for entanglement-assisted classical and quantum error correcting codes." [*Under Preperation*]

Journals:

- (*) A. J. Budkuley, P. Joshi, M. Mamindlapally, A. K. Yadav, "On Reverse Elastic Channels and the Asymmetry of Commitment Capacity under Channel Elasticity " *IEEE Journal on Selected Areas in Communication (JSAC)*, 2021. [*Minor Revision underway*]
- M. Mamindlapally, A. K. Yadav, M. Mishra and A. J. Budkuley, "Commitment Capacity under Cost Constraints," IEEE Transactions in Information Theory, 2021 [*Under preperation*]
- A. K. Yadav, M. Mamindlapally, A. J. Budkuley and M. Mishra, "Commitment over Compound Binary Symmetric Channels," IEEE Transcactions in Communications, 2021 [*Under preperation*]

Other:

- M. Mamindlapally "Unconditionally secure Commitment Problem," *Bachelor Thesis under guidance of Prof. A. J. Budkuley* [Pre-print]

Feel free to contact me if you are interested in looking at the work still to be published or the extended versions of the already published ones.

Research Experience

May 2021 - Oct 2021 — Singleton Bounds for EACQ Error Correcting Codes

Guide: Prof. Andreas Winter | Universitat Autònoma de Barcelona, Spain

Designed and presented a communication model for Entanglement-Assisted Classical and Quantum Information in the form of hybrid codes.

Using information theoretic deductions, found a bounded rate region for the number of (entangled)ebits, (classical)cbits, (quantum)qbits for general quantum channels.

Worked out the rate region for erasure channels to get Singleton bounds for **Entanglement-Assisted Classical & Quantum Error Correcting Codes**(EAQECC).

Dec 2020 - Now

Covert Communication over Quantum channels

Guide: Prof. Ligong Wang | CNRS, France

Looked at a communication problem (transmission without detection)covert communication. Studied its implementation and performance over Classical and Classical quantum channels. Currently exploring an extension of this problem to a fully quantum channel.

May 2020 - Now

Security and Privacy - Commitment Problem

Guide: Prof. Amitalok J Budkeley | IIT Kharagpur, India

Studied information theoretic security primitives **Bit-Commitment** and **Oblivious Transfer**.

Information theoretically derived the communication capacity limits for commitment over general discrete memoryless channels with certain cost constraints. Further developed a dual formulation of the same capacity limit.

Studied different noisy channel models *Compound Binary Symmetric Channels*, *Unfair Noisy Channels*, *Elastic Channels* and *Reverse Elastic Channels*.

Studied commitment problem over such channels. Derived Converse rate bounds using information theoretic methods. Presented maximum rate-achieving computationally efficient protocols for different channels.

Jan 2020 - Jun 2020

Optimizing codes for Peak Age of Information

Guide: Prof. Amitalok J Budkeley | IIT Kharagpur, India

Employed the Random arrival process theory to get a probabilistic expression for the metrics 'Peak age of Information' and 'Age of Information'. For **Markov sources**, obtained a closed form expression using linear algebra.

Designing a source code to optimise that metric. Comparing this with other standard source coding schemes.

Talks and Posters

- Talked and prsented about our published work "Commitment Capacity under Cost Constraints" at *IEEE International Symposium on Information Theory (ISIT)* 2021 Conference. [*short*, *long videos*]
- Presented a poster on "Commitment over Unreliable channels" with Pranav Joshi and Anuj K Yadav at 2021 IEEE International Symposium on Information Theory.
- Presented a poster on "Role of Costs in Commitment over Noisy Channels" at *IEEE North American School of Information Theory (NASIT) 2021*. [*poster*]

Teaching

- Teaching Assistant for the theory course, EC60083 *Information Theory and Coding Techniques*, Autumn 2021, IIT Kharagpur.

Technical Skills

Programming Languages:	C, C++, C#,Javascript, Python, Verilog
Libraries/Frameworks:	PyTorch, Flask, Qiskit
Software:	MATLAB, Xilinx, Unity Game Egnine, EasyEDA, EdSim51

Relevant Coursework

complete list here

Mathematics:	Matrix Algebra, Probability & Stochastic Processes, Operations Research
Computer Science:	Algorithms, Algorithmic Game Theory, Computational Number Theory, Foundations of Computer Science, Computational Complexity, Machine Learning, Neural Networks & Applications
Electronics & Communication	Information Theory & Coding Techniques, Linear Algebra & Error Control Techniques, Modern Digital Communication Techniques, Mobile Communication and Fading, Digital Voice & Picture communication, Telecommunication Switching Networks, Machine Intelligence & Expert Systems, Digital Signal Processing
Physics:	Quantum Mechanics & Quantum Computing

Academic Achievements

- Secured All India Ranks 1479 and 884 in the JEE Mains and Advanced exams where over one million students applied.
- Received a state top hundred certificate for the INPhO(Indian National Physics Olympiad) 2016 and INChO(Indian National Chemistry Olympiad) 2016.
- Secured second at the city level of the Zonal Informatics Olympiad 2017 and qualified for the National Informatics Olympiad 2017.

Extra curricular activities

- Executive Editor at The Scholars' Avenue, a campus media body at IIT Kharagpur.
- Secured BRONZE in the Cartooning event of the Inter Hall General Championship 2020, IIT Kharagpur
- Assistant Head Boy at Johnson Grammar School(ICSE), Hyderabad for the academic session 2014-15.