Anindya Bal

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Research Interest

- Non-orthogonal Multiple Access (NOMA) and Massive Machine-type Communications
- Wireless Network Virtualization
- Beyond 5G (B5G) Cellular Networks (spectrum/resource management, distributed wireless access, power control, network selection, massive MIMO, cell-free large MIMO, mobility/handoff management)
- Resource Management in Multi-tier and UAV-assisted Cellular Wireless Networks
- Performance Analysis of Machine Learning Algorithms

Education

BRAC University *Dhaka, Bangladesh*

B.SC. IN ELECTRONICS AND COMMUNICATION ENGINEERING ***Jan. 2016-Dec. 2020***

- **CGPA:** 3.61 out of 4
- **Major:** Communication and Networking.

Research Experience

Execution of Hybrid NOMA Schemes Concerning Outage Performance and Sum Rate Interplay *Toronto, ON, Canada*

IEEE Conference ***21-24 April 2021***

- This paper plays out an investigation of the exhibition between hybrid NOMA systems such as CR-NOMA, U2X-NOMA, RIS-NOMA, HS-UAV NOMA, SCMA-NOMA and GFDM-NOMA. An examination of every one of these methods is led to recognize the best hybrid NOMA procedure for 5G and beyond wireless communication. The articulations for sum rate and outage probability have been determined for all the procedures.

Analyzing Hybrid NOMA Schemes Underlining Energy-Spectral Efficiency and SIC Tradeoff *Chongqing, China*

IEEE Conference ***4-7 June 2021***

- This paper focuses on comparative performance analysis among hybrid NOMA schemes such as MIMO-NOMA, NOMA-GSSK and STBC-CNOMA in terms of bit error probability, energy and spectral efficiency and number of SIC occurrence. The closed form expression to compute channel capacity for STBC-CNOMA scheme has been derived and less complex expression to calculate bit error probability for NOMA-GSSK scheme has been suggested.

Performance Comparison Among Hybrid NOMA Schemes Focusing on Outage Performance and Sum Rate Arrangement *Belagavi, India*

IEEE Conference ***21-23 May 2021***

- This paper performs an analysis of the performance between hybrid NOMA techniques which are hybrid NOMA-OMA, NOMA Space shift keying (NOMA-SSK) and Successive user relaying cooperative NOMA (SR-NOMA). A comparison of all these techniques is conducted to identify the best hybrid NOMA technique for 5G and beyond wireless communication. The expressions for sum rate and outage probability have been derived for all the techniques.

Machine Learning Algorithms for Spotting 6G Network Penetration of Different Attacks *Gwalior, India*

Accepted in IEEE Conference ***18-20 December 2021***

- In our research, the efficiency of a ML algorithm called J48-Decision Tree is analyzed and differentiated throughout this research to three other ML algorithms: Neural based Networks (NN), Supportive Vector Machines (SVM), and a flexible narrative web - based learning algorithm called fast machine learning (FML). The algorithms were put through their paces in terms of precision rate (PR), selection rate (SR), faulty alarm rate (FAR) and precision of four various attacks on network.

IoT Based Cost Effective Car Parking Management for Urban Area *Malaysia (Online)*

Accepted in IEEE Conference ***6-8 September 2021***

- This paper proposes a concept of the smart parking system in urban areas like Dhaka city where finding a parking zone is hard enough and time-consuming. This parking system uses low-cost technologies so that it can be developed in any urban area with the lowest possible cost in a short period of time. This system will help to make communication between the car owners and parking areas in real-time for finding parking zone easily.

Execution of Downlink STBC-GSSK and STBC-UAV Assisted NOMA for Next Generation Wireless Communication ***IEEE***

Submitted to IEEE Communication Letters ***Under Review***

- We are suggesting a totally new scheme called space time block coding with generalized space shift keying (STBC-GSSK) and STBC unnamed aerial vehicle (STBC-UAV) with NOMA compatibility. The proposed scheme's spectral efficiency and outage performance were compared to STBC-NOMA and GSSK-NOMA.

Professional Experience

Global University Bangladesh(GUB) *Dhaka, Bangladesh*

Lecturer, Department of CSE ***Feb. 2021-Present***

- **Course Taught:** Electrical Circuit II, Wireless and Mobile Communication, Mobile Network and Services, Computer Networks, Computer Networks Lab, Data Communication, Data Communication Lab, VLSI.

Skills

Programming: Java, C, VHDL, MATLAB, Assembly Language.

Software: Proteus, Cisco Packet Tracer, Matlab18, Quartus, Microwind.

Leadership Experience

First Year Advising Team (FYAT) *Dhaka, Bangladesh*

Student Coordinator, BRAC University ***Jan. 2018-Jan. 2021***

- Provide a welcoming and supportive environment for fresher.
- Facilitate the transition to academic and student life at BRAC University.
- Monitor academic performance in first-year courses and inform to advisors.

Amar Bangladesh Foundation *Barisal, Bangladesh*

Executive Member ***Jan. 2020-Present***

- Worked to eliminate discrimination against rural communities of Bangladesh to ensure equal opportunities of education for all.

Academic Projects

- Zigbee based Automatic Meter Reading System- Course: ECE481.
- GPS tracker and alcohol detector with engine locking system using GSM- Course: ECE441.
- Health Monitoring System of Patient using IoT Arduino- Course: ECE413.

Certified MOOC Courses

- Intel® Network Academy - Network Transformation 101 by INTEL on Coursera Platform.
- Intel® Network Academy - Network Transformation 102 by INTEL on Coursera Platform.
- Spatial Data Science and Applications by Yonsei University on Coursera Platform.
- Internet of Things: Multimedia Technologies by University of California San Diego on Coursera Platform.
- Statistical Inference by John Hopkins University on Coursera Platform.
- Intelligent Machining by The State University of New York on Coursera Platform.
- Data Analytics for Lean Six Sigma by University of Amsterdam on Coursera Platform.

Awards

- Distinction from School of Engineering for High CGPA.
- Best Student Coordinator- FYAT2019.
- Best Paper Presenter- IEEE IEMTRONICS Conference 2021.
- Champion- Inter University Hacklab 2.0 Competition 2018.
- Recipient of Government Scholarship in Higher Secondary School Certificate Examination.
- Recipient of Government Scholarship in Secondary School Certificate Examination.

Extra Curricular

- Host- Fresher Orientation Fall 19
- Founder Chair- IEEE Communication Society Student Branch, BRAC University.
- Founder Adviser- Global University Wireless Communication Club.
- Secretary- BRAC University Cultural Club.
- Best Athlete- BRAC University Carnival 2019.