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Suman Bhunia

Education

2013–present GPA:4.0/4.0 **Ph.D. Candidate in Computer Science**, *University of Nevada, Reno*, *Research Area:* Security and Vulnerability in Cognitive Radio Network.

2008–2010 GPA:8.39/10 **M.Tech in Distributed and Mobile Computing**, *Jadavpur University*, Kolkata, India, *Thesis:* Performance Evaluation of WiMAX Network in Aspect of Modulation and Coding Schemes and Hand-off using OPNET.

2004–2008 GPA:8.36/10 **B.Tech in Electronics and Communication Engineering**, *West Bengal University of Technology*, Kolkata, India.

Experience

Research Experience

2013–present **Research Assistant**, *Computer Networking Lab*, University of Nevada, Reno.
- Implemented frequency agile cognitive radio testbed using USRP, GNU Radio.
- Evaluated performance for Channel bonding, fragmentation, Jamming attacks etc.
- Built Stochastic simulation model of Cognitive Radio as a queue with fixed server vacation.
- Applying machine learning techniques on smartphone's sensor data for intelligent user interaction, which includes user's activity prediction, cooperative network formation in adverserial condition, etc..

2012–2013 **Research Assistant**, *Security in Wireless & Ad hoc Networks (SWAN) Lab*, John Jay College of Criminal Justice, City University of New York.
- Proposed Honeynet based defense mechanism for Cognitive radio network under jamming attack.
- Prediction based channel selection mechanism for Cognitive radio network.
- User's activity detection by applying machine learning on smartphone's sensor data.

2009–2011 **Research Fellow**, *Broadband Wireless Communication Lab*, Jadavpur University.
- Performance of mobile WiMAX under varying mobility, pathloss models, traffic type and scheduling.
- Reduced Hand-off delay for WiMAX network by integrating MAC and Mobile-IP.
- Built MAC layer for Cognitive Radio in OPNET using Proto-C.
- Built Cross Layer Optimization model of VoIP performance and End-to-End QoS over Cognitive Radio.
- Proposed effective Adaptive Jitter Playout buffer algorithm for Real-Time application.

Teaching Experience

2014-present **Teaching Assistant**, *Department of Computer Science and Engineering*, University of Nevada, Reno, *Courses Taught:* Digital Design (CPE 201).

2011-2012 **Adjunct Lecturer**, *Department of Computer Science*, City College of New York.
Courses Taught: Introduction to Computing (CS 102) and Operating System Laboratory (CS 332)

2011-2011 **Adjunct Lecturer**, *Institute of Engineers, India*, Kolkata.
Courses Taught: Computer and Informatics

Research Interest

Wireless	Cognitive Radio, Dynamic Spectrum Access, Cross Layer optimization
Networking	End-to-End performance, QoS and resource management, Testbed Implementation
Security	Wireless Honeypot, Jamming attack

Technical Skills

Subjects	Algorithms, Stochastic models, Machine learning, Game theory, Wireless Security
Programming	C, Java, Python / Numpy , Android SDK
Networking	TCP/IP, WLAN deployment and diagnostics, wireshark
Wireless	IEEE802.11x, GSM, WiMAX, LTE
Simulator	OPNET, NS-2
SDR	GNURadio, USRP, Frequency agile implementations

Fellowships and Awards

2016	Awarded Outstanding graduate student of Department of Computer Science, UNR
2016	Awarded Outstanding Graduate Student by Graduate Student Association of UNR
2015	Awarded Outstanding International Graduate Student award, UNR
2014	Awarded International Graduate Student fellowship, UNR
2011	Awarded two year CUNY Science Fellowship
2010	Paper entitled "Study of OPNET and performance evaluation of WiMAX network under various terrain conditions in OPNET" won the *best student paper award* at the National Conference on Microwave and Communication NCMicroCom-2010
2008	Awarded full scholarship for M.Tech programme for qualifying Graduate Aptitude Test in Engineering (All-India basis)

Extra Curricular Activities

2015-2016	Elected Chair of the Graduate Student Association Club Funding committee
2014-2016	Elected College of Engineering Representative, Graduate Student Association, UNR
2014-2015	Elected Vice President, Computer Science Graduate Student Club, UNR
2013-2015	Elected Vice President, Indian Student Organization, UNR

International Professional Activities

Session Chair at International Conferences

International Symposium on Cyberspace Safety and Security (IEEE CSS) 2015, track - Active Defense Techniques and Systems

Technical Program Committee

International Conference on Information Technology, 2015

Selected Journal/Conference Reviewer

Computer Communications (Elsevier), Physical Communication (Elsevier), Pervasive and Mobile Computing (Elsevier), Future Generation Computer Systems (Elsevier), International Journal of Communication Systems (Wiley), Wireless Communications and Mobile Computing (Wiley), International Journal of Distributed Sensor Networks (Hindawi)

IEEE Globecom, IEEE ICC, IEEE MILCOM, ISCIT, IEEE WoWMoM

Patent Invention Disclosure

[1] S. Bhunia, M. R. Khan, S. Sengupta, and M. Yuksel. *In-Band Line-of-Sight Discovery for Directional Full-Duplex Transceivers*, U.S. Provisional Patent Application 62/338,953

Peer Reviewed Publications

Journals

[1] S. Bhunia, V. Behzadan, P.A. Regis, and S. Sengupta. Adaptive beam nulling in multihop ad hoc networks against jammer in motion. *Elsevier Computer Networks*.

[2] S. Mneimneh, S. Bhunia, S. Sengupta, and F. Vazquez-Abad. A Stochastic Survivability Mechanism against Induced Attacks in CR Networks. *submitted to ElsevierPervasive and Mobile Computing*.

[3] S. Bhunia, S. Sengupta, and F. Vázquez-Abad. Performance analysis of cr-honeynet to prevent jamming attack through stochastic modeling. *Pervasive and Mobile Computing*, 21:133–149, 2015.

[4] T. Chakraborty, A. Mukhopadhyay, S. Bhunia, I.S. Misra, and S.K. Sanyal. An optimization technique for improved voip performance over wireless lan. *Journal of Networks*, 7(3):480–493, 2012.

[5] S. Bhunia, I.S. Misra, S.K. Sanyal, and A. Kundu. Performance study of mobile wimax network with changing scenarios under different modulation and coding. *International Journal of Communication Systems*, 24(8):1087–1104, 2011.

[6] A. Kundu, I.S. Misra, S.K. Sanyal, and S. Bhunia. VoIP performance over broadband wireless networks under static and mobile environments. *International Journal of Wireless & Mobile Networks (IJWMN) Vol*, 2(4), 2010.

Conference Proceedings

[7] S Bhunia and S Sengupta. Distributed adaptive beam nulling to mitigate jamming in 3D UAV mesh networks. In *submitted to Milcom 2016 Track 4 - System Perspectives (Milcom 2016 Track 4)*, Baltimore, USA, November 2016.

[8] S Bhunia, M R Khan, S Sengupta, and M Yuksel. LOS discovery for highly directional full duplex RF/FSO transceivers. In *submitted to Milcom 2016 Track 2 - Networking Protocols and Performance (Milcom 2016 Track 2)*, Baltimore, USA, November 2016.

[9] M R Khan, S Bhunia, M Yuksel, and S Sengupta. LOS discovery in 3D for highly directional transceivers. In *submitted to Milcom 2016 Track 2 - Networking Protocols and Performance (Milcom 2016 Track 2)*, Baltimore, USA, November 2016.

[10] P A Regis, S Bhunia, and S Sengupta. Implementation of 3d obstacle compliant mobility models for uav networks in ns-3. In *Proceedings of the Workshop on Ns-3*, WNS3 '16, pages 124–131, 2016.

[11] S. Bhunia, V. Behzadan, and S. Sengupta. Enhancement of spectrum utilization in non-contiguous dsa with online defragmentation. In *Military Communications Conference, MILCOM*, pages 432–437. IEEE, 2015.

[12] S. Bhunia, V. Behzadan, P.A. Regis, and S. Sengupta. Performance of adaptive beam nulling in multihop ad-hoc networks under jamming. In *High Performance Computing and Communications (HPCC), 2015 IEEE 7th International Symposium on Cyberspace Safety*

and Security (CSS), 2015 IEEE 12th International Conferen on Embedded Software and Systems (ICESS), 2015 IEEE 17th International Conference on, pages 1236–1241. IEEE, 2015.

[13] S. Das, S. Barman, and S. Bhunia. Performance analysis of ieee 802.11 rate adaptation algorithms categorized under rate controlling parameters. In *Proceedings of the 2014 International Conference on Information and Communication Technology for Competitive Strategies*, page 8. ACM, 2014.

[14] S. Bhunia, S. Sengupta, and F. Vazquez-Abad. CR-Honeynet: A Learning & Decoy Based Sustenance Mechanism against Jamming Attack in CRN. In *Military Communications Conference (MILCOM), 2014 IEEE*, pages 1173–1180. IEEE, 2014.

[15] S. Bhunia, X. Su, S. Sengupta, and F. Vázquez-Abad. Stochastic model for cognitive radio networks under jamming attacks and honeypot-based prevention. In 15^{th} *International Conference on Distributed Computing and Networking (ICDCN)*. Springer, Jan 2014.

[16] S. Bhunia and S. Sengupta. Feasibility of channel hopping in jamming attack. *IEEE TCSIM Newsletter*, (19):2–5, 2013.

[17] S. Bhunia E. Troja, K. Ezirim. Route aware dynamic channel scheduling and selection for multi-hop cognitive radio networks. In *IEEE* 78^{th} *Vehicular Technology Conference, VTC 2013-Fall*. IEEE, 2-5 September 2013.

[18] A. Mukhopadhyay, T. Chakraborty, S. Bhunia, I.S. Misra, and S.K. Sanyal. Study of enhanced voip performance under congested wireless network scenarios. In *International Conference on Communication Systems and Networks (COMSNETS)*. IEEE, 2011.

[19] T. Chakraborty, A. Mukhopadhyay, S. Bhunia, I.S. Misra, and S.K. Sanyal. Analysis and enhancement of qos in cognitive radio network for efficient voip performance. In *World Congress on Information and Communication Technologies (WICT)*. IEEE, 2011.

[20] A. Mukhopadhyay, T. Chakraborty, S. Bhunia, I.S. Misra, and S.K. Sanyal. An adaptive jitter buffer playout algorithm for enhanced voip performance. In *International Conference on Advances in Computing and Information Technology (ACITY)*. Springer, 2011.

[21] T. Chakraborty, A. Mukhopadhyay, S. Bhunia, I.S. Misra, and S.K. Sanyal. Optimizing voip call in diverse network scenarios using state-space search technique. In *International Conference on Advances in Computing and Information Technology (ACITY)*, pages 231–242. Springer, 2011.

[22] A. Kundu, S. Bhunia, I.S. Misra, and S.K. Sanyal. Comparison of voip performance over wimax, wlan and wimax-wlan integrated network using opnet. In *International Conference on Wireless and Mobile Networks*. Springer, 2010.

[23] S. Bhunia, A. Kundu, I.S. Misra, and S.K. Sanyal. Reducing hand-off latency in wimax network using cross layer information. In *International Conference on Advances in Computer Engineering (ACE)*, pages 346–348. IEEE, 2010.