Deepa Jagyasi

Research Engineer
Département Informatique et Réseaux
Telecom-Paris (ENST), Paris, France.
Member of LINCS laboratory, Paris, France
Email: deepa.jagyasi@telecom-paris.fr
        deepajagyasi@gmail.com
Webpage: deepajagyasi.github.io
Telephone: (+33) 668065934

WORK EXPERIENCE

Research Engineer   *Nov'18-Present*

Département Informatique et Réseaux, Telecom-Paris(ENST), Paris, France.
(Also affiliated with LINCS laboratory. Paris, France.)

- Range extension in Business or Mission Critical Communication System
- Achieve reliable communication by incorporating concepts of physical layer security in overall design
- Developing robust wireless communication systems
- Beam selection using machine learning and deep neural networks in millimeter wave communication system design.

Assistant Professor of Electrical Engineering   *May'14-Jul'14*

TSEC Engineering College, Mumbai, India

- Delivered lectures on "Digital logic design" and "Analog Communication" courses for under-graduate students.

EDUCATION

PhD, Wireless Communication   *Jul'2014-Present (Waiting for defence)*

International Institute of Information Technology (IIIT), Hyderabad, India.
   Thesis title: "Low-Complexity Millimeter Wave Communication System Designs"
   Thesis advisor: Prof. Ubaidulla P.

ME, Electronics and Communication Engineering   *2011-2013*

Vivekanad Institute of Technology, (VESIT), Mumbai University, India.
   Thesis Title:"Design And Development of RF Components of TR Module for ST RADAR."
   Research advisors: Prof. Shoba Krishnan (VESIT) and Prof. K.P.Ray (IIT-Bombay)

BE, Electronics and Communication Engineering   *2006-2010*

Cummins College of Engineering (CCOEW), University of Pune, India.

PUBLICATIONS

Journals

- D. Jagyasi and Marceau Coupechoux, " Secure and Robust MIMO Transceiver for Multicast Mission Critical Communications", *submitted at IEEE Transactions on Wireless Communication (TWC)*, arxiv url: https://arxiv.org/abs/2012.05829

- D. Jagyasi and Ubaidulla P., "In-Band Full-Duplex Relay-Assisted Millimeter-Wave System Design", *in IEEE Access,* vol. 7, pp. 2291-2304, Jan. 2019

- D. Jagyasi, K. P. Ray, S. Choudhari and S. Krishnan, "Six Bit Digital Phase Shifter using Lumped Network for ST Radar", *International Journal of Computer Applications, Foundation of Computer Science, USA*, (0975 − 8887), pp. 5-11, 2013

- D. Jagyasi, K. P. Ray, S. Choudhari and S. Krishnan, "A Novel Tee Network based Six Bit Digital Phase Shifter for ST Radar", *International Journal of Electrical, Electronics and Data Communication*, (2320-2084), vol. 1, no. 7, pp. 75-80, 2013

Conference Papers

- D. Jagyasi, Marceau Coupechoux, " DNN Based Beam Selection in mmW Heterogeneous Networks", *in Proc. International Conference on NETwork Games, Control and Optimisation (Netgcoop'2020), Corsica, France*, Sep. 2021 *(invited paper)*

- D. Jagyasi, Marceau Coupechoux and Alaa Daher, " Multi-cell MIMO Transceiver design for Mission-Critical Communication", *in Proc. IEEE Globecom (GLOBECOM'19), Hawaii, USA*, Dec. 2019

- D. Jagyasi and Ubaidulla P., "Leakage-Based Hybrid Transceiver Design for Millimeter Wave Multi-User Interference Channel", *in Proc. IEEE Globecom Workshop(GLOBECOM'17), Singapore*, Dec. 2017

- D. Jagyasi and Ubaidulla P., "Joint Hybrid RF/Baseband Transceiver design for Multi-User MIMO Downlink in Millimeter Wave Communication System", *in Proc. IEEE International Symposium on Personal, Indoor and Mobile Radio Communication (PIMRC-2017), Montreal, Canada*, Oct. 2017

- D. Jagyasi and Ubaidulla P., "Energy-Efficient Hybrid Transceiver Designs for Millimeter Wave Communication Systems", *in Proc. IEEE 86th Vehicular Technology Conference (VTC2017-Fall), Toronto, Canada*, Sept. 2017

- D. Jagyasi and Ubaidulla P., "Low-Complexity Two-Way AF Relay Design for Millimeter Wave Communication Systems", *in Proc. IEEE 85th Vehicular Technology Conference (VTC2017-Spring), Sydney, Australia*, pp. 1 - 5, June. 2017

- D. Jagyasi and Ubaidulla P., "Low-Complexity Transceiver Design for Multi-User Millimeter Wave Communication Systems under Imperfect CSI", *in Proc. IEEE 84th Vehicular Technology Conference (VTC2016-Fall), Montreal, Canada*, pp. 1 - 5, Sept. 2016

- D. Jagyasi, K. P. Ray, S. Choudhari and S. Krishnan, "A Novel Tee Network based Six Bit Digital Phase Shifter for ST Radar", *in Proc. 5th International Academic Conference on Electrical, Electronics and Computer Engineering (IACEECE-2013), Hyderabad, India*, pp. 102 - 107, Sept. 2013

MAJOR PROJECTS AND RESEARCH WORK

Secure and Robust Multi-Cell Transceiver Designs for Mission Critical Communication *Nov'18 - Present*
Telecom-Paris(ENST), Paris, France.
Advisor: Prof. Marceau Coupechoux

- To design systems that can satisfy the stringent requirements like high reliability, coverage and group communications in business or mission critical communication.

- Transceiver designs for a multi-cell multicasting scenario with coordinating base-stations (BSs) scheme to ensure enhanced coverage. Greedy algorithm is employed to dynamically form the cluster of synchronized BSs for optimal utilization of resources.

- The overall system is optimised by minimizing the sum mean square error (SMSE) to achieve a reliable communication and QoS. Further, robust systems are studied and developed that achieves robustness towards imperfect channel state information (CSI).

- Transceiver designs to achieve physical layer security in presence of multiple passive eavesdroppers.

Beam Selection using Deep Neural Network (DNN) for mmWave Communication *Mar'19 - Present*
Telecom-Paris(ENST), Paris, France.
Advisor: Prof. Marceau Coupechoux

- Utilizing deep neural network to select the optimal mmWave base station and an optimal beam for a user in a heterogeneous sub-6GHz and mmWave network architecture scenario.

- Properties extracted from the legacy sub-6GHz CSI are used as input features to train the DNN and predict best mmWave BS and beam.
- Detailed understanding of prominent features was initially done by utilizing concepts of wireless communication and performing the correlation analysis among the features, before passing them through the designed deep neural network to achieve better results.

Low-Complexity Millimeter Wave Communication System Designs
International Institute of Information Technology (IIIT), Hyderabad.
Advisor: Prof. Ubaidulla P.

Jan'15 - Oct'18

- Designed optimal low-complexity transceiver models for massive MIMO equipped millimeter wave communication systems. Various network topologies that include multi-user downlink, multi-user interference channel, and co-operative relay assisted mmWave systems are considered.
- Utilization of different optimization techniques like sparse signal processing, signal-to-leakage-plus-noise (SLNR)-based maximization, MMSE minimization, power minimization etc., inorder to achieve optimality in different scenarios.
- Achieved hybrid beamforming by using Orthogonal Matching Pursuit (OMP)-based greedy sparse approximation technique to obtain reduced complexity hybrid analog-digital precoders, relay filters and receive filters.
- Another major work includes achieving robustness in the overall system design towards errors due to imperfect knowledge of channel state information (CSI).
- All designs are first derived mathematically and then performance is evaluated using MATLAB simulations.
- Language and Tools used: MATLAB

Design And Development of RF Components of TR Module for ST RADAR.
M.E. Trainee (R&D), at RF and Microwave Communication (RFMC) Lab, SAMEER, IIT Bombay.
Advisors: Prof. Shoba Krishnan (VESIT) and Prof. K.P.Ray(IIT-Bombay)

Jul'12 – Sep'13

- Phase Shifter module for high resolution Stratospheric Tropospheric (ST) Radar having circular array of 576 Yagi-Uda antennas,has been developed at SAMEER, IIT Bombay.
- Designed and implemented Six Bit Digital Phase Shifter using "Lumped element equivalent of Transmission line " at the RF frequency of 212MHz that can provide minimum resolution of $5.625°$. Phase shifter design was mathematically modeled, computationally verified in MATLAB, implemented in ADS and fabricated and tested the hardware for all possible 64 combinations of input control signal.
- The final fabricated design resulted in maximum error of $1.54°$, which was significantly less than the half bit error. It resulted in uniform insertion loss of around -6 dB and return loss better than -15dB throughout, hence outperforming the other available designs at that time.
- Language and Tools used: MatLab, ADS, Circad, Hardware Fabrication tools

SHORT TERM PROJECTS

Study of Cognitive Radar
VESIT, Mumbai.
Advisor: Shoba Krishnan

Jul'12 – Dec'12

- In depth study and seminar presentation on Cognitive Radar and its applications.

Information Theory and Network Coding
Indian Institute of Technology (IIT)- Bombay
Advisor: B. K. Dey

Jul'10 - Apr'11

- Study of Information Theory – Coding theorems and Applications.

Multipurpose Image Watermarking Based on Multistage Vector Quantization.
CCOEW, Pune.

Jul'09 – May'10

- Embedded two level invisible watermarking scheme (robust and semi-fragile) using two different stages of vector quantization.

- Successfully extracted both the watermarks independently after introducing intentional attacks (noise, cropping, compressing, blurring, brightness enhancing and combination of these effects
- Algorithm used was scalable for multistage watermarking
- Language and Tools used: MATLAB

SPIROMETER- Lungs Efficiency Tester. *Jan'09 - May'09*
CCOEW, Pune.
- Developed electronic Spirometer using pressure sensor, voltage detector, peak detector, timer, ADC, micro-controller and LCD. Equipment was powered using 220V external AC
- Was able to detect patients with lung disorders on several parameters
- Language and Tools used: 8085 Microcontroller, Circad, Hardware Design and Testing

Automatic Voltage Controlled Mobile Battery Charger. *May'08 - Dec'08*
CCOEW, Pune.
- Designed a Mobile charger adaptive to voltage fluctuations with automatic voltage cut-off after a specified threshold level

ACADEMIC WORK EXPERIENCE

Teaching Assistant for Adaptive Signal Processing *Monsoon'16*
International Institute of Information Technology (IIIT), Hyderabad
- Delivered lectures for graduate students as a part of tutorial sessions.
- Evaluated the research project submitted as part of course requirement.

Teaching Assistant for Communication Networks *Spring'16*
International Institute of Information Technology (IIIT), Hyderabad
- Delivered lectures to under-graduate students on various modules of the course.
- Prepared question papers and quizzes for course grading.

Teaching Assistant for Communication Theory-I *Spring'15*
International Institute of Information Technology (IIIT), Hyderabad
- Conducted lectures as part of course and tutorial curriculum for under-graduate students.
- Other duties included grading assignments and test papers.

Research Assistant for EnhancedEdu *Mar'15-Dec'15*
International Institute of Information Technology (IIIT), Hyderabad, India.
- Worked as RA for developing "Solid State Devices" and "Embedded Systems" courses for Wiki and EnhanceEdu course portal.
- Developed and submitted the course material for "Solid State Devices" and "Embedded Systems" courses to be included in Pedagogy ($http://www.ide.iitkgp.ernet.in/Pedagogy1/pedagogy_main.jsp$).
- Delivered online lectures on "Solid State Devices" and "Digital Logic" and "Embedded Systems" courses.

SYNERGISTIC ACTIVITIES AND AWARDS

- Talk on "DNN Based Beam Selection in mmW Heterogeneous Networks" at LINCS laboratory, Paris, France (link).
- Talk on "Secure and Robust MIMO Transceiver for Multicast Mission Critical Communications" at LINCS laboratory, Paris, France (link).

- Talk on "Multi-cell MIMO Transceiver design for Mission-Critical Communication" at LINCS laboratory, Paris, France (link).

- Reviewer for various refereed journal and conferences (IEEE Access, IEEE TWC, IEEE GLOBECOM, IEEE ICC, IEEE PIMRC, IEEE WiMob, IEEE EuCNC and IEEE NCC).

- Technical program committee member of IEEE PIMRC 2017.

- IEEE student travel grants recipient to present a paper at IEEE VTC-spring, 2017, Sydney, Australia.

- Granted travel support by Govt. of India under Council for Scientific and Industrial Research (CSIR) student travel grant scheme to present a paper at IEEE VTC-Fall, 2017, Toronto, Canada.

- Student Volunteer for IEEE INFOCOM 2019.

- Actively maintain the SPCRC Lab website at IIIT-Hyderabad, India.

- Presented a Seminar on Voice Activity Detection (VAD) at VESIT, Dec. 2012.

RELEVANT COURSES

Adaptive Signal Processing	Convex Optimization
Advanced Communication Theory	Signal Detection and Estimation Theory
Information Theory and Coding	Digital Signal Processing
Error Correcting Codes	Wireless Communication
Antenna Design	Speech Signal Processing
Microwave Devices and Amplifier Design	Digital Communication II
Sparse Approximation Techniques	Machine Learning

TECHNICAL SKILLS

Languages:	C, C++, Matlab, ADS, Circad, Python.
Operating Systems:	Windows, Linux, MacOs.

ORGANIZATIONAL ACTIVITIES

- Coordinator, RnD showcase 2015 at IIIT-Hyderabad, India.

- Organizer, INNOVATION 2K9, National Level Technical Event at CCOEW, Pune, India.

- Coordinator, TVS Road safety Campaign.

OTHER ACHIEVEMENTS

- Swimming: Awarded 2nd in State level (Maharashtra) swimming competition.

- NCC: Cleared A certificate examination, CADET rank, Amravati, Maharashtra, India.

- Dancing:Awarded 1st for consecutive 3 years in classical dancing (Kathak), All India Gndharva University, Mumbai, India.

REFERENCES

- Prof. Marceau Coupechaux, Telecom ParisTech (ENST), Département Informatique et Réseaux, Paris, France. marceau.coupechoux@telecom-paris.fr

- Prof. Ubaidulla P., SPCRC, International Institute of Information Technology, Hyderabad, India ubaidulla.p@iiit.ac.in

- Prof. Lalitha V., SPCRC, International Institute of Information Technology, Hyderabad, India. lalitha.v@iiit.ac.in