Kartik Patel

Ph.D. Candidate – Electrical and Computer Engineering – University of Texas at Austin

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Education

Electrical and Computer Engineering	**University of Texas at Austin, Texas, USA**
Ph.D., Wireless Networking and Communication Group	*2017-Present*
Electronics and Communication Engineering	**Indian Institute of Technology, Roorkee, India**
B. Tech., GPA: 9.31/10, Class Rank: 2nd	*2013-2017*

Experience

Undergraduate Thesis Project...

Analytical Modelling of Bluetooth Low Energy Protocol based Networks

Supervisors: Dr. Neelesh Mehta, Associate Professor, Indian Institute of Science, Bangalore

*   Dr. Debashis Ghosh, Professor & Head of Department, IIT Roorkee*   *July 2016-Present*

○ Developed a analytical model to analyse Bluetooth Low Energy protocol based network using renewal theory.

Research Projects and Internships...

Energy Harvesting Wireless Sensor Network design with Bluetooth Low Energy protocol

Supervisors: Dr. Neelesh Mehta, Associate Professor, Indian Institute of Science   *May-July 2016*

○ Aim: Design a sensor network for a specific scenario using a Bluetooth Low Energy (BLE) protocol.
○ Because of lack of professional BLE simulators, the first task was to develop a BLE protocol module on NS3 [Documentation].
○ A BLE protocol based energy harvesting sensor network would be designed based on it.

Non-parametric Spectrum Sensing Technique for Full Duplex Cognitive Radio

Supervisors: Dr. Dhaval Patel, Assistant Professor, Ahmedabad University   *2015-2016*

○ A novel spectrum sensing technique for Full Duplex Radios was proposed.
○ The technique provided better performance against existing spectrum sensing techniques in literature.

Implementation of Spectrum Sensing method on WARP Board

Supervisors: Dr. Pyari Mohan Pradhan, Assistant Professor, IIT Roorkee   *May-July 2015*

○ Set up Wireless Open-Access Research Platform(WARP) test bed to analyse the spectrum sensing techniques.
○ Receiver Operating Characteristics(ROC) curves were plotted for different SNR and sample size.
○ Experimental results were compared with analytical and simulation results to verify the set up.

Literature Survey: Full Duplex Radio   *September-2015*

○ Understood the concept and challenges in the field of Full Duplex Radio.
○ Carried out extensive survey to understand the fundamentals of Full Duplex Radio.

Implementation based projects...

Open-Source development of Communication System Toolbox in Scilab

FOSSEE, IIT Bombay, Ministry of Human Resource Development, Govt. of India   *February-April 2016*

○ The project was focused on development of open source simulation packages equivalent to proprietary software.
○ Developed various functions of equalizers for Communication System Toolbox in Scilab.

MIPS Single Cycle Microprocessor using VHDL [Link]   *October 2014*

○ Implemented a processor capable to run 7 basic instructions.
○ Simulated the implementation using ModelSim. Added python script to convert assembly code to ModelSim Simulation Script to provide a programming like interface to simulate the project.

Academic Achievements

○ Ranked in top 1% students of the country in JEE-Advance 2013
○ Secured 99.99%tile in JEE-Mains 2013

Computer skills

Programming Languages: C, C++, Python, Java, Shell Scripting, VHDL
Softwares: MATLAB, NI LabView, GNU Radio, NS3

Relevant Courses

Graduate courses...

EE 381J: Probability and Stochastic Processes I | **EE 381K**: Convex Optimization

Undergraduate courses..

ECN-515: Coding Theory and Applications | **ECN-612**: Wireless Networks
ECN-512: Information and Communication Theory | **ECN-516**: Advance Digital Communication
ECN-311: Communication Systems | **ECN-312**: Digital Signal Processing
ECN-212: Principles of Digital Communication | **ECN-203**: Signals and Systems
IMA-301: Advance Engineering Mathematics | **MAN-006**: Probability and Statistics
CSN-341: Computer Networks | **CSN-102**: Data Structures & Algorithms

Additional Courses..

IITK, NPTEL: Principles of Modern CDMA/MIMO/OFDM Wireless Communications [Certificate]

Positions of Responsibility

Student Chair, IEEE Student Chapter, IIT Roorkee   *2014-Present*
With an aim of increasing technical culture in campus, IEEE Student Chapter conducts activities like Special Interest
Groups, Workshops, Guest Lectures and Internship Program for Electrical and Electronics Engineering students.
○ Initiated a Sixth Sense Lecture Series to explain fundamental concepts like Information Theory, Transforms and
  Linear Algebra in intuitive manner.

Chief Technical Lead, Information Management Group, IIT Roorkee   *2014-Present*
We develop and maintain the IIT Roorkee Intranet & Internet systems. We manage the Institute website, Content
Management System, Placement Portal, Academic Portal and many other applications for the institute.
○ Maintaining the technical stack and servers of institute's intranet and internet systems.
○ Responsible of initiating fundamental changes in development of applications to optimize the resource usage of
  servers and reduce no. of communications between servers and databases.

Community Service

SOPAN - A Voluntary Initiative   *2015-Present*
○ **Weekly Discussions**
  Conduct and actively participate in weekly discussions on topics ranging from modern education system to
  appropriate technology and economics to sociology, aimed at developing an insight into various sustainable
  development paradigms.
○ **Rural visits and End-semester camps**
  Regularly visit rural segments of society to witness the grass root level problems and closely study the systems
  evolved to tackle these challenges alongside ideating technological solutions to address the aforementioned
  problems without disrupting indigenous way of life.

Mentor, Academic Reinforcement Programme   *2015-2016*
○ Conducted weekly lectures for freshers facing academic problems.
○ Also, mentored a group of specific students to enhance their performance by initiating one to one discussions to
  tackle problems like language barrier, alienation and social awareness.