

Nikesh Bajaj

PhD candidate

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RESEARCH INTERESTS

Signal processing & Machine learning | EEG signal processing | Mathematical modeling | Optimization techniques | Deep learning | Audio and speech processing | Image processing & Computer vision

EDUCATION

- since 2015 **PhD Course in Electronics Engineering and Computer Science**, *Queen Mary University of London, UK & University of Genoa, Italy*, Joint program.
- o I work on EEG signals for investigation and identification of auditory attention. I designed the experiment for auditory attention, collected physiological signals (EEG, GSR, PPG) and doing analysis and modeling.
 - o I am supervised by Jesús Requena Carrión (QMUL) and Francesco Bellotti (Unige).
- 2008–2010 **M.Tech. in Communications & Information Systems**, *Aligarh Muslim University, India*.
Major courses: *Digital signal processing, Speech and audio processing, Image processing, Information theory & coding, Secure communications*.
Thesis Title: *Cryptanalysis of some block and stream ciphers with signal processing techniques*. Supervised by Prof. Omar Farooq.
- 2003–2007 **B.E. in Electronics & Telecommunications**, *Institute of Electronics and Telecommunication Engineers- IETE, India*.

MACHINE LEARNING & SIGNAL PROCESSING (Activities & achievements)

- Challenges & Competitions **Second Place Winner Team** – Urban Analytics Data Dive: Second place winner for Urban Analytics Data Dive held at The Alan Turing Institute and hosted in collaboration with the Office of National Statistics –ONS Data Science campus. 25-26 July 2017
- Second Place Winner Team** – Person Identification from Audiovisual- challenge in summer school 2017 held at Centre of Intelligent Sensing, Queen Mary University of London, 7-9 Sep 2017
- Kaggle** – I worked on Kaggle's competitions of Machine Learning and Data Science, Profile is here <https://www.kaggle.com/nikeshbajaj/competitions>, 2012-2014
- Study Group **Data Study Group**: A week-long event, worked with team for Urban Analytics posed by Defense Science and Technology Laboratory (DSTL) at The Alan Turing Institute, London. 22-26 May 2017
- Study group** Weekly meeting for statistical machine learning, following the book- *Introduction to Statistical Machine Learning* by Gareth James

- Training Attended Faculty Development Program on Data Analytics by Cognizant Technological Solutions, India
- Attended workshop on Virtual Lab on Biomedical Signal and Image Processing organized by Indian Institute of Technology Roorkee –IITR -India
- Seminar Presented seminar on *Ensemble approaches for classification and regression* in Summer school - Machine Learning: A computational Intelligent Approach, University of Genoa (Unige), Italy
- Coursera Currently mentor for coursera course –Audio Signal Processing for Music Applications
Mentor

COURSES

- Machine Learning
- o Machine Learning (*Coursera*)
 - o Probabilistic Graphical Models 1 (*Coursera*)
 - o Machine Learning for Musicians and Artists (*Kadenze*)
 - o Regularization Methods for Machine Learning (*Summer course at Unige & MIT*)
 - o Machine Learning : A Computational Intelligent Approach (*at Unige*)
 - o Data Fusion and Bayesian Network (*Unige*)
 - o Statistical Learning (*Stanford Online*)
 - o Neural Network for Machine Learning (*Coursera*)
- Specialization in Deep Learning from Coursera
- o Neural Network and Deep Learning
 - o Improving Deep Neural Networks: Tuning Hyperparameters
 - o Structuring Machine Learning Projects
 - o Convolutional Neural Networks
 - o Sequence Models
- Signal Processing
- o Digital Signal Processing (*Coursera*)
 - o Audio Signal Processing for Music Applications (*Coursera*)
 - o Image and video processing (*Coursera*)
 - o Introduction to Digital Sound Design (*Coursera*)
 - o Computational photography (*Coursera*)

WORK EXPERIENCE

Teaching

- 2010–2015 **Assistant Professor**, *Lovely Professional University*, India.
In Electronics and Communication Engineering department, heading Digital signal processing domain, responsible for designing and conduction of courses and labs related to signal processing.
- o Courses I taught : Signals & Systems, Digital Signal Processing, Advanced Transform Techniques, Advanced Digital Signal Processing, Adaptive Signal Processing, Speech and Audio processing, Information theory and coding, Cryptography.
 - o Workshops : Introduction to Machine Learning, Statistics for Data Analytics, Python for school teachers & university students, MATLAB for student & faculties.

since 2017 **Teaching Assistant**, *Queen Mary University of London*, UK.

- Coding for scientist (2017)
- Digital signal processing (2017)
- Signals & systems theory (2018)
- Data Analytics (2018)
- Security engineering (2018)

Other

2006-2008 **Customer care officer**, *Colwell & Salmon Communications*, Noida, India.
International BPO & KPO - Market research center

PROGRAMMING & FRAMEWORK

Python Numpy, Pandas, Matplotlib, Scipy, Scikit-Learn, Scikit-Image, Opencv
Framework Tensorflow, Keras
Other R, MATLAB, C# , Java, P5js(Javascript), Chuck(Music programming language)

OTHER AWARDS AND ACHIEVEMENTS

- Awards Received Best Faculty Award 2014-15 for outstanding performance from Cognizant Technology Solutions, India.
- Best Faculty Facilitator Award 2015– for being facilitator for *Uttara-Scientia Divina*-Student Organization at LPU, India
 - Graduate Aptitude Test in Engineering: GATE-2010, 2008, 2007, 2006 Qualified. GATE is conducted by Indian Institutes of Technology (IITD, IITB, IITK), that led to MHRD funding for Masters in Technology in India.
- Grant JD-ICE- Joint Doctoral Course in Interactive and Cognitive Environment program for PhD between Queen Mary University of London & University of Genoa
- Ministry of Human Resource Development (MHRD), Government of India -funding for Masters in Technology

MEMBERSHIP

- Associate Member of Institute of Electronics and Telecommunication Engineering – IETE (India)

SERVICES AS REVIEWER

- IEEE Transactions on Cognitive and Developmental Systems
- IEEE Transactions on Intelligent Transportation Systems
- Springer: Neural Computing and Applications (NCAA) Journal

PUBLICATIONS

1. Bajaj, Nikesh, Francesco Bellotti, Riccardo Berta, and Alessandro De Gloria. "**A Neuroscience Based Approach to Game Based Learning Design**". In International Conference on Games and Learning Alliance, pp. 444-454. Springer, Cham, 2016.

2. Dogra, Ashish Kumar, Nikesh Bajaj, and Harish Kumar Dogra. **"Facial Expression Recognition using Neural Network with Regularized Back-propagation Algorithm"**. International Journal of Computer Applications 77, no. 5 (2013).
3. Kharbanda, Mohina, and Nikesh Bajaj. **"An exploration of fractal art in fashion design"**. In Communications and Signal Processing (ICCSP), 2013 International Conference on, pp. 226-230. IEEE, 2013.
4. Kaul, Nitin, and Nikesh Bajaj. **"Audio in Image Steganography based on Wavelet Transform"**. International Journal of Computer Applications 79, no. 3 (2013).
5. Deora, Divya, and Nikesh Bajaj. **"Indian sign language recognition"**. In Emerging Technology Trends in Electronics, Communication and Networking (ET2ECN), 2012 1st International Conference on, pp. 1-5. IEEE, 2012.
6. Bajaj, Nikesh, and Rahul Kashyap. **"Extension of wavelet family in fractional fourier domain"**. In Emerging Technology Trends in Electronics, Communication and Networking (ET2ECN), 2012 1st International Conference on, pp. 1-4. IEEE, 2012.
7. Kaur, Rosepreet, and Nikesh Bajaj. **"Enhancement in Feedback Polynomials of LFSR used in A5/1 Stream Cipher"**. International Journal of Computer Applications 57, no. 19 (2012).
8. Bajaj, Nikesh. **"Enhancement of A5/1: Using variable feedback polynomials of LFSR"**. In Emerging Trends in Networks and Computer Communications (ETNCC), 2011 International Conference on, pp. 55-60. IEEE, 2011.
9. Bajaj, Nikesh. **"Effects of Parameters of Enhanced A5"**. International Journal of Computer Applications 2, no. 2 (2011): 7-13
10. Bajaj, Nikesh, and Amit Thakur. **"Enhancement of RC5 for image encryption"**. In Image Information Processing (ICIIP), 2011 International Conference on, pp. 1-5. IEEE, 2011.
11. Singh, Ajmer, and Nikesh Bajaj. **"Analysis of signals in Fractional Fourier Domain"**. In Emerging Trends in Networks and Computer Communications (ETNCC), 2011 International Conference on, pp. 259-262. IEEE, 2011.