

Abhijit Mahalunkar

CONTACT INFORMATION

Email: abhijit.mahalunkar@tudublin.ie

Web: <https://www.abhijitm.com>

RESEARCH INTERESTS

My research interests include Sequential Data Modeling, Natural Language Processing, Reinforcement Learning, Internet of Things, and their impact on other areas of science.

EDUCATIONAL QUALIFICATIONS

DUBLIN INSTITUTE OF TECHNOLOGY, Dublin, Ireland **August 2017 - Present**

Degree: ***Doctor of Philosophy (Ph.D.)***

- Explore long-range correlations in sequential datasets.
- Use formal language theory to explore the representational capacity of sequential models.
- Explore unpredictability in sequential datasets.

GOA COLLEGE OF ENGINEERING, Goa University, Farmagudi, Goa, India. **2006-2010**

Degree: ***Bachelor of Engineering in Electronics and Telecommunication***

- Project: "Design and Implementation of an Optimized Speech Recognition system"

RESEARCH & WORK EXPERIENCE

Assistant Lecturer at **Technological University Dublin, Ireland** **Sept 2017 - Present**

- Conduct labs in the School of Computer Science
- Subjects Handled: Machine Learning, Computer Networks, Mobile Robotics, Operating Systems, Databases, Forensics.

Instructor at **CTYI - Dublin City University, Ireland** **June 2019 - July 2019**

- Instructor of Robotics at Centre for Talented Youth Ireland (CTYI).
- Conducted lectures for school students

Co-founder & Product Architect at **SpitiQ, Goa, India** **April 2015 - Present**

- Model user behavior using sequential models in order to aid home automation.
- Developed a wireless sensor node using Atmel Atmega128RFA1 MCU which uses 6LoWPAN protocol to establish a mesh network.

Technical Advisor at **Qubiseed Technologies LLC, Goa, India** **Sept 2017 - Present**

- Design of doctor appointment system.

Project Assistant at **National Institute Of Oceanography, India** **Nov 2010 - Sept 2014**

- At Marine Instrumentation Division (team member), developed **Autonomous Underwater Vehicle (AUV-MAYA)** and **Autonomous Vertical Profiler (AVP)**.

PUBLICATIONS

- "**On the Inability of Markov Models to Capture Criticality in Human Mobility**", International Conference of Artificial Neural Networks 2019.
- "**Multi-Element Long Distance Dependencies: Using SPk Languages to Explore the Characteristics of Long-Distance Dependencies**", ACL Workshop on Deep Learning and Formal Languages 2019
- "**Synthetic, yet natural: Properties of WordNet random walk corpora and the impact of rare words on embedding performance**", GWC 2019
- "**Examining the Limits of Predictability of Human Mobility**", Entropy 2019, 21, 432.
- "**Understanding Recurrent Neural Architectures by Analyzing and Synthesizing Long Distance Dependencies in Benchmark Sequential Datasets**", Arxiv 2018
- "**Using Regular Languages to Explore the Representational Capacity of Recurrent Neural Architectures**", International Conference of Artificial Neural Networks 2018.
- "**Generating Diverse and Meaningful Captions**", International Conference of Artificial Neural Networks 2018.
- "**Addressing the Free-Rider Problem in Public Transport Systems**", Arxiv 2018

- **“An Autonomous Underwater Vehicle ‘MAYA’, For Monitoring Coastal Waters, Estuaries, Rivers And Dams”**, 11th Biennial Conference of Pan Ocean Remote Sensing Conference (PORSEC) - 2012.
- **“An Integrated Approach To Study Mud Banks Of Alleppey Kerala Using The Autonomous Vertical Profiler (AVP)”**, Underwater Technology (UT), 2015 IEEE

TECHNICAL SKILLS *Languages & Tools:* C, C++, C#, CUDA, Java, Python, Go, Perl, Lua, HTML, CSS, JavaScript, SQL, Processing, Unix Shell, Bash, LabView, MATLAB, Octave, Scilab, Android SDK, Eclipse, Django, Ruby on Rails, Node.JS
Deep Learning Libraries: PyTorch, Tensorflow, Theano.

RELEVANT COURSES Artificial Neural Networks, Probability Theory, and Random Processes, Robotics, Signals and Systems, Digital Signal Processing, Data Communication, Control System Engineering, Advanced Microprocessors

TEACHING

- Conducted talks, seminars and workshops in robotics, embedded systems, MATLAB and Octave for Bachelors and Masters Students.
- Member of team “Inventrom” in conducting a workshop on Raspberry Pi for professionals of Tata Consultancy Services, Persistent Systems, and faculty of various colleges in India. Also for students of BITS, Pilani and IIT Roorkee.

OTHER EXPERIENCE **Freelance Development, Goa, India** **2013 - July 2017**
Developer

- **Cloud Computing**
 - Built cloud infrastructure in Django, Go, PHP for various projects and companies.
- **Web Development**
 - Developed various Android apps and websites

PROJECTS **Design and Implementation of an Optimized Speech Recognition system**

- Linear Predictive Coding, Cepstral Coefficients, and Mel Frequency Cepstral Coefficients (MFCC) were selected as speech features, Dynamic Time Warping was used for match recorded speech and stored templates.

Sound Processing

- Implemented a speech recognition system using Convolutional Neural Network by converting from the time domain to the spectral domain and then using spectral maps.
- Worked with Stacked Denoising Autoencoder to learn the spectral variations in an unsupervised way for a specific person in order to recreate his voice.

Learning Systems

- Designed a disease diagnostic system using decision trees and minimax algorithm.
- Clustering chemical compounds based on various properties by using Support Vector Machines and Artificial Neural Networks.

Parallel Computing

- Optimized various codes by introducing parallel programming techniques using Multithreading and multi-process codes.

OTHERS

- **“DIT Fiosraigh Award”** to pursue MPhil at Technological University Dublin, Ireland
- **“TU Dublin Scholarship”** to pursue Ph.D. at Technological University Dublin, Ireland
- Funding by **“ADAPT Centre”** to pursue Ph.D. at Technological University Dublin, Ireland
- **“Travel Grant by Naver Labs”** to attend ACL 2019 workshop on Deep Learning and Formal Languages: Building Bridges
- **“ENNS Student Travel Grant”**, International Conference on Artificial Neural Networks (ICANN), Rhodes, Greece, 2018
- Attended **Machine Learning Summer School (MLSS) 2016**, Arequipa, Peru