Abhijit Mahalunkar

CONTACT INFORMATION

Email: **abhijit.mahalunkar@mydit.ie**
Web: **https://www.abhijitm.com**
Github: **https://github.com/silentknight**
Google Scholar: **https://scholar.google.com/citations?user=OuufHbUAAAAJ&hl=en**

RESEARCH INTERESTS

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

EDUCATIONAL QUALIFICATIONS

DUBLIN INSTITUTE OF TECHNOLOGY, Dublin, Ireland **2017-Present**
Degree: ***Doctor of Philosophy (PhD)***

- Explore long range correlations in sequential datasets.
- Use formal language theory to explore 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

Product Architect at **SpitiQ**, Goa, India **April 2015 - April 2017**

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

Technical Advisor at **Qubiseed Technologies LLC**, Goa, India **Sept 2016 - July 2017**

- Design of doctor appointment system.

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

- Part of team at Marine Instrumentation Division (MID) which developed **Autonomous Underwater Vehicle (AUV-MAYA)** and **Autonomous Vertical Profiler (AVP)**.

PUBLICATIONS

- "**On the Inability of Markov Models to Capture Criticality in Human Mobility**", Arxiv 2018.
- "**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

- **Assistant Lecturer** at Technological University Dublin, Dublin, Ireland
- **Instructor of Robotics** at Centre for Talented Youth Ireland (CTYI) at Dublin City University (DCU), Dublin, Ireland
- Conducted talks, seminars and workshops in robotics, embedded systems, MATLAB and Octave for Bachelors and Masters Students.
- Member of team "Inventrom" in conducting 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.

Computer Vision

- Designed plant disease identification using Gabor filter and Artificial Neural Network.
- Implemented object detection using Convolutional Neural Network

Sound Processing

- Implemented speech recognition system using Convolutional Neural Network by converting from time domain to 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

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

OTHERS

- **"ENNS Student Travel Grant"**, International Conference on Artificial Neural Networks (ICANN), Rhodes, Greece, 2018
- **"DIT Fiosraigh Award"** to pursue MPhil at Technology University Dublin, Ireland
- Attended **Machine Learning Summer School (MLSS) 2016**, Arequipa, Peru