Asif Hanif

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Education

2018-2020 **Information Technology University (ITU), Lahore**
MS Electrical Engineering (3.87 /4.00)

2011-2015 **University of Engineering & Technology (UET), Lahore**
B.Sc. Electrical Engineering (3.42 /4.00)

2009-2011 **M. Public Higher Secondary School, Multan**
F.Sc. Pre-Engineering (1018 / 1100)

2007-2009 **Govt. High School, Vehari**
Matriculation (986 / 1050)

Experience

Research

Keywords Machine/Deep Learning, Digital Signal Processing, Inverse Problems, Bayesian Networks, RF Sensing

2018 – Present @ ITU My recent research interest is in application of machine learning and deep learning in solving inverse problem (Fourier Ptychograpgy and Light Field Microscopy) and modelling of Bayesian network using neural networks as recent advances in deep learning have shown its huge potential. I am using Bayesian network for root cause analysis of faults using industrial plant sensors data. In my MS thesis, I worked on a method for density estimation of continuous Bayesian network using neural networks.
MS Thesis Title: Parameter Estimation and Inference in Bayesian Network using Neural Networks

Sep 2015- Dec 2018 @ LUMS I worked as research assistant at Lahore University of Management Sciences (LUMS). My research revolved around RF sensing applications. I studied wireless channel conditions under different circumstances and used them for environmental sensing such as non-invasive breathing rate monitoring, intrusion detection, through-wall movement detection, non-obtrusive detection of concealed metallic objects. I used commodity off-the-shelf hardware (Intel 5300 WiFi Card) to implement above mentioned tasks. Following are the research projects that I worked on;

* Preparation of sensing nodes using commodity off-the-shelf hardware (Intel 5300 WiFi Radio)
* Intrusion detection using channel state information (CSI) extracted from WiFi Radio
* Through wall human motion detection by exploiting channel state information
* Non-invasive monitoring and estimation of breathing rate with channel state information
* Non-obtrusive detection of concealed metallic object with WiFi radios
* Angle-of-arrival(AoA) and time-of-flight(ToF) estimation of WiFi signal for indoor localization
* Device-free indoor localization using joint AoA & ToF based fingerprinting
* Indoor localization using proximity sensing using Bluetooth low energy devices

Teaching

I was part-time teaching assistant in the following courses;

Fall 2015	Computer Organization & Assembly Language
Fall 2016	Topics in RF Sensing †
Fall 2017	Topics in RF Sensing †
Fall 2018	Electromagnetic Field Theory
SP 2019	Solid State Electronics
Fall 2019	Signals and Systems
SP 2020	Machine Learning

† This was grad-level course intended to introduce RF sensing applications. Research papers related to RF sensing were presented in class. I mentored multiple course projects too.

Publications

- Non-Obtrusive Detection of Concealed Metallic Objects Using Commodity WiFi Radios (IEEE GLOBECOM, 2018)
- WiSpy: Through-Wall Movement Sensing and Person Counting using Commodity WiFi Signals (IEEE SENSORS, 2018)
- Adaptive Ptych: Leveraging Image Adaptive Generative Priors for Subsampled Fourier Ptychography (ICCV, Learning for Computational Imaging, 2019)
- Subsampled Fourier Ptychography via Pretrained Invertible and Untrained Network Priors (NIPS, 2019)

Projects

Following notable projects were completed during BS degree:

Final Year Project	SLAM based Self-navigating and Mapping Robot A robot equipped with ultrasonic sensors explored obstacle-free path, calculated its current coordinates using differential-drive position estimation and finally transmited its location and distance from obstacles to a remote server using IEEE 802.15.4a based ZigBee device. GUI on remote server displayed real-time map of explored area, robot's current location, orientation and position of surrounding obstacles while robot explored unknown area.
MIPS Architecture	Simulated processor based on MIPS architecture in Proteus
Viterbi Decoder	Implementation of Viterbi decoder in MATLAB
IEEE 802.11a Tx	Implementation of IEEE 802.11a standard transmitter in MATLAB

Skills

Languages	MATLAB, Python, R, C++, C, Shell-Scripting
Operating Systems	Windows, GNU/Linux(Ubuntu)
Machine Learning	Fully-Connected and Masked Neural Networks, Convolutional Neural Networks, RNNs, SVM, K-NN, K-Means Clustering
Software & IDEs	MATLAB, JupyterNotebook, Proteus, LaTeX(TexStudio), MS(Word, Power, Excel, Visio), Visual Studio, Qt Creator, ANSYS HFSS
Embedded Systems	ARDUINO, STM Microcontroller(Keil), TI LaunchPad, ARM, MIPS

Major Subjects

Topics in RF Sensing	Digital Signal Processing	Communication Systems
Digital Communication	Computer Vision	Machine/Deep Learning
Microwave Engineering (Active & Passive Devices)		

Non-Academic Accomplishments

* Editor-in-Chief of IET UET Chapter monthly news journal "**SPOTLIET**"
* Former head of "Documentation Team" at IET UET Chapter
* Interviewed many worthy and renowned professors of **UET** for "**SPOTLIET**"
* 3rd Position in Matriculation on district level, BISE Multan
* 5th Position in F.Sc. Pre-Engineering(overall), BISE Multan
* Published an article on 'Religious Intolerance' in college annual magazine
* "Quad-e-Azam Scouts" badge holder
* Winner of "Science Quiz Competition" on division level, 2009
* Got 1st position in "Annual Judo Karate Championship" 2006

Events

* International Conference on Open Source Systems and Technologies, 2014
* IET UET Chapter ARDUINO Workshop (organizer)
* Organized "IET UET Chapter, LaTeX Workshop"
* IEEE UET Lahore, 3G & Higher Generation Systems Workshop
* IEEE UET Lahore, Junkyard Wars (served as organizer in this recreational event)
* IEEE INMIC 2014, UET Lahore
* Organized "Annual University Sports Event" 2014 UET Lahore (Chief Organizer)
* Organized "UET MEDIA Festival" 2015 (Finance Manager)