Aditya T

Contact

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Programming

Java
C, JavaScript, Matlab,
Octave.

YouTube

For some of my research/simulation tools my YouTube user name is, link: Audi TT

Education

(ICSE and ISC boards were established by the Local Examinations Syndicate of the University of Cambridge)

2013–2017	B.E in Electronics and Communication Engineering PES Institute of Technology GPA 9.53
2012-2013	Indian School Certificate (ISC) Class 12 95 % , The Frank Anthony Public School, Bangalore
2010-2011	Indian Certificate of Secondary Education (ICSE) Class 10 91 % , The Frank Anthony Public School, Bangalore
2017	TOEFL : 114, Reading : 29, Listening : 29, Speaking : 27, Writing : 29

Internships / Research Assistant

2015	Google Advisor : Keith Hughes Research : Interactive Spaces, Rayleigh-Sommerfeld Diffraction modelling.	Internship
2016	Nokia Networks Research : LTE Control Plane Optimization, GTP Stack development	Internship
2017	Indian Institute of Science (IISc) Numerics of Integrated Circuits and Electromagnetics Lab (NICE Lab) Advisor : Dr Dipanjan Gope Research : Through Wall Imaging Radar, Frustum-Fed Antenna, JHarmonic(Java Based Circuit Design and Sim suite), JEM(Java Based FEM solver for EM), JVScope(Deep-Learning based Hybrid 2D/3D solver)	Research Assistant
2018	SIMYOG (http://simyog.com) Advisor : Dr Dipanjan Gope	Internship

Research

2015 — Google Summer of Code : Interactive Spaces — Google

Advisor : Keith Hughes, Google, Caltech

The objective was to design the software and hardware for a haptic feedback system. If sufficient ultrasonic transducers can be synchronized to create points of constructive interference then these points can be perceived as pressure points by the human skin despite no object being physically present. The goal was to understand Rayleigh-Sommerfeld scattering which describes the pattern of interference from a transducer array and to model it in software which is then used to compute the phase delay between each transducer to create particular interference patterns. I was approached by a Los Angeles based startup called EmergeNow who wanted me to drop my degree and come and join them but I declined since my objective was to pursue a PhD.

2016 Remote Code Execution using ICMP Modified Structured Storage Covert Channels PESIT

Advisor : Dr Vamsi Krishna, PhD NTU

We had a Computer Communication Network course in our 5th semester, as a part of this course we had to submit simple projects related to networks. During the better part of this course I recognized a vulnerability in WinPcap which is a requisite for Wireshark and GNS. Using this vulnerability along with a formulation of an ICMP modified structured storage covert channel, I proved that code can be executed remotely on the victim's system without elevation of privileges. The tool was written in Java and a throughput bound was derived for Timing and Storage covert channels to justify the reason for using Storage Covert channels.

Paper Status : Submitted to IEEE Security and Privacy 2018, Oakland.

Paper Title : "Remote Code Execution using ICMP Modified Structured Storage Covert Channels Without Elevation of Privileges : Daemons from the Past?", Aditya T

2016 LTE Control Plane Optimization Nokia Networks

Advisers : Dr Srinivas,PESIT and Sudheesh Kanichu Veedu,Nokia

The objective was to make use of Nokia's proprietary LA Plane to reroute traffic from the EnodeB's before it hit the PDN Gateway. The intuition was that if the cellphone users were being served by EnodeB's in close proximity to eachother then rather than route their traffic through the internet(PDN Gateway) the LA Plane could be used which considerably cuts the latency. As a byproduct of this project I had to code my own GTP(GPRS Tunneling Protocol) stack to test the logic at home since access to Nokia network accessories was granted only on-campus. This stack which supported all the GTP versions as defined by ETSI(European Telecommunications Standards Institute) was later committed to the open-source project Pcap4J.

Patent Filed for LTE Control Plane Optimization.

2016 JCannon

I discovered a vulnerability in certain IP based devices which can be exploited to compromise the victims Email-Id and Password. Based on this observation I built a tool called JCannon to automate the process. The tool was written in Java. Videos demonstrating its effectiveness(Email accounts, Social Media accounts, Social Security accounts, E-commerce accounts and E-wallet accounts) is present in my YouTube account given above but the videos are private as I cannot disclose because of the legal issues concerning hacking. Please Email me for more information/access.

Paper Status : To be submitted to IEEE/IFIP DSN 2018.

Paper Title : "Gone in Sixty Seconds : How to compromise Email, Social Media, Social Security, E-Wallet Accounts in Minutes", Aditya T

2017 Through Wall Imaging Radar based on Micro-Doppler Features IISc,PESIT

Advisers : Dr Dipanjan Gope,IISc and Prof V.Mahadevan,PESIT

The objective of this research was to first and foremost design the hardware and software required for through wall radar imaging. This was subsequently followed by an investigation of making such a device more economically viable. During this investigation we designed a new Hybrid Antenna which is sufficiently directive for through wall imaging purposes and is inexpensive.

Paper Status : Accepted at IEEE and IET 11th International Radar Symposium.

Paper Title : "Through Wall Imaging Radar based on Micro-Doppler Features", Aditya T, Nikhil S, Dipanjan Gope, V Mahadevan.

Paper Status : Submitted to IEEE RadarCon 2018.

Paper Title : "Frustum Fed Antenna : A Better Inexpensive Alternative to MIT's Cantenna in Through Wall Imaging Radar", Aditya T, Dipanjan Gope, V Mahadevan.

2017 JHarmonic IISc

Advisor : Dr Dipanjan Gope,IISc, Phd UWash

The objective of the research was to investigate a frequency domain circuit simulation method called Harmonic Balance. During the course of this research I built a circuit design and simulation suite in Java without any 3rd party libraries. It supports DC Linear/Non-Linear analysis, under time domain it supports small-signal AC, large-signal AC and transient Linear/Non-Linear analysis. Under frequency domain an experimental Jacobian formulation has shown high correlation with the time domain results and is currently being worked on.

2017 Virtual Scope IISc, Intel

Advisor : Dr Dipanjan Gope,IISc, Phd UWash

The objective of this research is to use Deep Learning to classify sections of MTL(Multi Line Transmission Line Conductors) which can be simulated using 2D and 3D simulation. As long as Quasi TEM assumptions hold, a 2D simulation is sufficiently accurate to warrant its preference over 3D since 2D simulation is faster. During this research, I built a Java based FEM solver for solving Laplace and Poisson Equation. A portion of this project has been requested by a Houston,Texas based Radiologist Dr Raja Shankar to be used in his TED Talk in Riyadh scheduled November 26, 2017. His speech is based on Radiomics which deals with characterization of diseases using deep learning.

Projects/Awards/Open Source Contributions

2015 All India Robotics Competition, Wipro

My project *Driverless car using Machine Learning* was awarded First place in the two regional rounds and Second place in the national round.

2015 Project Interhaptics to Google's Interactive Spaces

Project Interhaptics which was developed during the course of Google Summer of Code was committed to Google's Interactive Spaces.

2014 Microsoft Hackathon

My project *Sixth Sense* inspired by Pranav Mistry was awarded the Audience Best Project Choice Award and Top five best projects Award.

2014 Android App for Multinational Company DSC

I designed an Android App for the multinational Company Quan Zhou Dong Shan Machine CO.,LTD (DSC for short) which is based in China, Canada, India and Taiwan etc.

2016 GTP Stack for Pcap4J

I developed the GTP(GPRS Tunneling Protocol) stack for experimenting with Nokia Networks project at home. I committed this project to the Java open-source packet library Pcap4J.

2016 UDE vs Adaptive Neural Control of Knee Joint Orthosis
A literature survey done on traditional PID or sliding control revealed that the control effort in these cases is plagued by jitter which would be restricted due to inertia in realistic cases. As a result a better alternative is needed. My work was to implement UDE and adaptive neural control for knee joint orthosis and compare their result with each-other as well as with PID and sliding control.

2010-2012 GreenWood South Division Chess Championships
Awarded First place in 2012 and Second Place in 2010.

2013-2017 Distinction Awards
Awarded Distinction all 8 semesters

Relevant Courses Taken

- Antenna and Wave Propagation
- Microwave Devices and Radars
- Wireless Communication
- Estimation and Detection
- Information Theory and Coding
- Probability and Random Processes
- Digital Communication
- Digital Signal Processing
- Analog Communication
- Signals and Systems
- Artificial Neural Networks
- Control Systems Engineering
- Computer Communication Networks
- LTE and 5G Networks
- Linear Algebra and Engineering Math
- Mathematical Modelling
- Electromagnetic Field Theory
- Microwave Engineering
- Analog Design
- Network Analysis and Synthesis
- Microprocessors and Micro-controllers
- Robotics

Extra-Curriculars/Community Service

personal: Writing Poetry. I have written a collection of poems titled “From Nubra to Fjords” for the Cincinnati Review and the Mississippi Lakeview Review. I have repaired Computers intended to be donated to rural schools near Bidadi, a satellite town near Bangalore.

professional: Investigating Vulnerabilities in Networked Systems. Building things from scratch like a telephone from AT89C51, Solder Reflow Oven using AT90USB646, Van Eck based Keylogger, Land Based Android Tablet Controlled Imaging Robot, Wireless transmission of Images using Morse Code etc