

Ritik Roongta

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EDUCATION

IIT Bombay

B.Tech in Computer Science, GPA: 7.99/10.0

Mumbai, India

2017–Current

Bhagat Public Sr. Sec. School

Intermediate, Percentage: 94.0/100.0

Kota, India

2015–2017

RESEARCH EXPERIENCE AND INTERNSHIPS

University of California, Santa Barbara

Research Intern, Seclab | *Guide: Giovanni Vigna & Christopher Kruegel*

California, US

Apr '20–Current

- Developed a kernel-assisted network fuzzer (**KANF**) using linux kernel driver modules and networking tools
- Interleaved the fuzzer with American Fuzzy Lop (**AFL**) to achieve **coverage-guided** fuzzing
- Created a pool of **10,000+** debian network packages for testing, finding vulnerabilities and reporting **CVEs**
- Evolved fool-proof testing environment for kernel modules using **QEMU** and ubuntu kernel images

A.P.T Portfolio

Software Intern | *Guide: Pratyush Rathore*

Delhi, India

Apr –Jun '20

- Reported and **patched** crucial **bugs** in the source code implemented for placing orders at the exchange
- Processed the BSE and NSE exchange **order-book** with a daily **traffic** in excess of **4 crores** orders and analysed the order delays to develop **dynamic latency** based exchange simulation model
- Fabricated exchange and algorithmic trading servers **interplay** flowcharts for teaching and training purposes

Lucideus

Cyber Security Research Intern | *Guide: Rahul Tyagi*

Delhi, India

May –Jul '19

- **Hardened** CentOS linux using 239 remediations as provided by **CIS** (Center for Internet Security)
- Prepared a detailed documentation covering attacks and mitigation techniques on **OWASP Top 10 Attacks 2017** (Open Web Application Security Project) along with their video **POCs** (proof of concept)
- Developed a robust and thorough session flow on **Blockchain Technologies** for emerging Bitcoin enthusiasts

PV Diagnostics

Data Analyst | *Guide: Pranav Maheshwari*

Mumbai, India

Dec '18–Jan '19

- Developed a **SQL Database** to incorporate the current-voltaic data received from solar power plants
- Devised a system comprising of polynomial and exponential terms to satisfy the desired IV plots and outliers using python libraries and achieved an accuracy of more than **85 percent**

PUBLICATIONS

1. Aravind Machiry, **Ritik Roongta**, Christopher Kruegel and Giovanni Vigna, “Kernel Assisted Network Fuzzing”, *Usenix Security, Feb 2021**

**to be submitted*

KEY PROJECTS

Blockchain P2P Network

CS765

Blockchain and Cryptocurrencies | *Guide: Vinay Rebeiro*

Aug –Nov '20

Github: <https://github.com/Racro/blockchain>

- Designed a P2P network with seed and peer nodes to communicate over a local network
- Incorporated Blockchain protocol over the P2P network with Proof-of-Work to imitate the Bitcoin cryptocurrency mining
- Implemented various security checkpoints to tackle private chain attacks and longest chain hijacking

Malware and Botnet Detection Tool

IIT Kanpur, India

HCL HACKIITK Hackathon | *Guide: Sandeep Shukla*

Jul –Aug '20

Github: <https://github.com/deut-erium/Mal-det-cal>

- Developed a python based **Malware Detection** tool to categorise a binary file using its assembly as malware or benign using an **ML trained** model and achieved an accuracy of **97%**
- Created a Botnet Detection tool for classifying botnet network traffic based on botnets like **Vinchuca**, **Storm**
- Secured **19th** All India Rank for this project with **12000+** participants from over **10+** countries

Text Summarisation

CS337

Artificial Intelligence & Machine Learning | *Guide: Prof. Ganesh Ramakrishnan*

Sep –Nov '19

Github: <https://github.com/mohitiitb/Textsummarization>

- Developed an NLP based model for text summarisation using **Extractive** and **Abstractive** techniques
- Achieved an accuracy of **79%** over **LSA** (Latent Semantic Analysis) model and a **rogue-R** score of **48%**
- Adopted **LSTM** model with Seq2Seq algorithm and word embeddings for classification over **kaggle** datasets

Match Table Lookup Logic for SDN Router

CS226

Digital Logic Design | *Guide: Prof. Ashwin Gumaste*

Jan –Apr '19

Github: <https://github.com/Racro/Matchlookupable>

- Implemented a match table lookup for a router which returns the data stored in the table as well as updates the address in the table with the incoming data using a **simple dual Port BRAM**, arbiter and FIFOs
- Ensured fast lookup by **parallelising** the search algorithm with linear lookup in first stage followed by index based lookup in the second stage across different tables with the help of FIFOs

Secure Personal Cloud (SPC)

CS251

Software Systems Lab | *Guide: Prof. Soumen Chakrabarti*

Aug –Nov '18

Github: <https://github.com/mohitiitb/SecurePersonalCloud>

- Simulated a **client-server cloud** based file management system supporting multiple clients simultaneously
- Ensured **security of data** on server using **Block level file encryption** cryptographic algorithms
- Developed a mobile friendly **Web Client** using **Django** for well-organised display all files in server

Twitter Simulation

CS152

Programming Paradigm and Abstraction | *Guide: Prof. Amitabha Sanyal*

Feb –May '18

Github: <https://github.com/jinga-lala/Twitter-Simulation>

- Developed an attractive **microblogging** platform supporting all basic functionalities of Twitter Inc.©
- Devised an **Object-Oriented abstraction** to handle password authenticated database of every account
- Programmed in scheme-racket language using 2htdp/image, racket/gui/base and racket/draw libraries

Wireless Game Console

Institute Technical Summer Project | *Electronic and Robotics Club*
Github: <https://github.com/jinga-lala/Wireless-Game-Console>

IIT Bombay
May –Jul '18

- Designed an **Air Mouse** (small remote) which recognises its orientation & give signals for yaw, pitch and raw
- Integrated Raspberry Pi 3, gyroscope (MPU6050), Picamera and I2C Protocol to establish remote side interface
- Used **OpenCV3**, **Numpy**, **Matplotlib** libraries to implement image processing algorithms for the Air Mouse

TEDx Event

Project Management | *Guide: Prof. T.T. Niranjan*
Github: <https://github.com/Racro/TedXevent>

MG405
Mar –Apr '19

- Tailored a **foolproof** project management plan for a **TEDx event** targeting the marginalized strata of society
- Outlined a well-thought-out **cost** and **time estimations** using various project management techniques like **Gantt Chart**, work breakdown structure (WBS), network diagram and tools like Project Libre
- Predicted and resolved different risks and issues using strategically pre-planned **Risk Matrix** and **RPN Table**

SAT Solver

Abstractions and Paradigms in Programming | *Guide: Prof. Amitabha Sanyal*
Github: <https://github.com/Racro/SatSolver>

CS152
Mar –Apr '18

- Developed a **SAT Solver** implementing **DPLL Algorithm** in Racket-Scheme Language to solve the given **Boolean Satisfiability Problem**
- Used efficient and fast **Data Structures and Algorithms** to solve the given **NP-complete** SAT Problem
- Solved some classic problems like the **8 Queens Problem** & **Soduko** using it

Regular Expression Parser

Abstractions and Paradigms in Programming | *Guide: Prof. Amitabha Sanyal*
Github: https://github.com/Racro/twitter_simulation

CS152
Jan –Mar '18

- **Devised** an efficient Regular Expression Parser to match a string with a Regular Expression (**Regex**)
- Achieved **node by node** traversal by converting the Regex into **DFA** (Deterministic Finite Automaton) graph

SKILLS

- **Certifications:** IBM Blockchain Essentials, IBM Bitcoin 101
- **Software Skills:** Git, MATLAB, MySQL, AutoCAD, CMake, \LaTeX
- **Hacking Tools:** Kali Linux, Metasploit Framework, Xerosploit, KIMI Framework, Fluxion

LANGUAGES

- **C++:** Proficient
- **Python:** Proficient
- **Bash:** Intermediate
- **Lisp:** Intermediate
- **Java:** Intermediate

SCHOLARSHIPS AND AWARDS

AIR 48	JEE Advanced (IIT-JEE)	(2017)
99.96 percentile	JEE Mains	(2017)
0.1% Certificate of Merit	Chemistry and Physics (AISSCE)	(2017)
National top 1%	NSEP and NSEC	(2016)
KVPY & NTSE Fellowship	Govt. of India	(2016)
Pratibha Scholarship	Aditya Birla Group	(2018)

POSITION OF RESPONSIBILITY

General Secretary

IIT Bombay, India

CSE Association | *CSE Department*

Jul '20 –Current

- Headed a team of **24+ students** for organising various remote and in-person sports and social events along with student **wellness** webinars with an annual budget in excess of **INR 3.5 lakhs**
- **Ideated 7+** engaging events to be conducted in an online manner during the remote semester due to CoVID-19
- Enhanced student outreach manifold by revamping the CSEA website and increasing its **online visibility**

Department Sports Secretary

IIT Bombay, India

CSE Association | *CSE Department*

Apr '18 –Apr '19

- Organized a plethora of **Sports and Recreational Activities** for the students in the department
- **Innovated** new games and **introduced** different Sports categories to enhance overall **girls participation**

Coordinator, Competitions and LYP

IIT Bombay, India

Mood Indigo, IIT Bombay | *Asia's Largest Festival*

Jul –Dec '19

- Ideated new competitions and **revamped** the governing **rules and regulations** of different competitions spanning over more than **210** Events
- Functioned as the first **Point of Contact** for the cultural heads of various colleges

XLR8 Mentor

IIT Bombay

Electronics and Robotics Club

Aug '17

- Guided a team of **four mentees** to make a successful remote controlled bot from scratch
- Led the team to the **1st spot** amongst **50+ teams** by clocking the **minimum time** in the competition

COMMUNITY SERVICE

REVA Mentor

Mumbai, India

REVA Fest | *India's Largest Fest for Underprivileged Kids*

Nov '17

- Mentored **under-privileged** students in various **Recreational** Activities and **interactive sessions** to bring them into mainstream world
- Successfully organized the **REVA fest** with annual attendance of over 200 under-privileged students

RISE Volunteer

IIT Bombay, India

CTARA | *Guide: Prof. Anand Rao*

Dec '19

- Visited a remote **tribal village** for a **14-day** camp along with a team of 6 volunteers and interacted with the locals about their problems
- Created a thorough **report** through **first-hand interviews** with the tribals about the water distribution, topology, demography and land distribution of the area to further assist a **community welfare project**

EXTRACURRICULAR ACTIVITIES

- Bagged Gold Medal at Badminton Team event, Raftaar, IIT Bombay 2018
Represented Hostel 15 in the singles' match against Hostel 16 in the final and led the team to victory
- Awarded Certificate of Recognition at Tinkerathon, Asus Computing 2018
Designed a hand gesture controlled wireless gaming console using ASUS tinker board and qualified into the finals along with 4 other teams
- Bagged Bronze Medal at Badminton General Championship, IIT Bombay 2017
Represented Hostel 2 in the inter-hostel general championship comprising of 16 hostels and bagged the 3rd position in the tournament
- Stood 3rd in CSE Department Badminton Open 2017
Participated in the Intra-CSE badminton tournament and earned the 3rd spot against 50+ competitors
- Stood 3rd in Short Movie Making Competition, Freshiezza 2017
Made a short movie in the freshmen year along with the wingmates for a institute-level movie making competition and was awarded with the 3rd position