Diptyaroop Maji
Date of Birth: 03/03/1994
Nationality: Indian
Gender: Male

M.Tech
Computer Science & Engineering
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Examination	University/Board	Institute	Year	CPI/%
Post Graduation	IIT Bombay	IIT Bombay	2020	9.70/10
Graduation	Jadavpur University	Jadavpur University	2016	8.47/10
Intermediate/+2	ISC	Salt Lake School	2012	96.75%
Matriculation	ICSE	Salt Lake School	2010	94.00%

FIELDS OF INTEREST

- Networking, Distributed Systems, Network Security

WORK EXPERIENCE (2.5+ YRS)

- **Project Engineer, Indian Institute of Technology - Bombay** *(Guide: **Prof. Mythili Vutukuru**)* *(Jul'20-Present)*
  - Developed a high performance UPF data plane in 5G (saturated 40 Gbps while enforcing necessary QoS rules).
  - Working on comparing strengths and weaknesses of different hardware and/or software-based UPF designs. Also trying to determine what are the best UPF data plane designs for different types of workloads.
- **Senior Software Engineer, Samsung Research Institute - Bangalore** *(Jun'16-Jun'18)*
  - Worked on feature development and maintenance (product lifecycle management) in Android Mobile Hotspot project.
  - Wrote code primarily in Android framework & UX layers, which went into commercialization.
  - Worked on both flagship (Galaxy & Note series) as well as India specific models.
- **Student Trainee, Samsung Research Institute - Bangalore** *(May'15-Jul'15)*
  - Worked on "Concurrent Effective Utilization of Wi-Fi Frequency Bands for Data Sharing in RSDB enabled devices".
  - Built a file-sharing app (team of 2) which uses both hotspot & Wi-Fi of a device simultaneously to create 2 channels (2.4 & 5GHz) for fast transfer of files one device to another.

MAJOR PROJECTS AND SEMINAR

- **Building end to end UPF data plane in 5G testbed** *(M.Tech Project, Guide: **Prof. Mythili Vutukuru**)* *(May'19-Jun'20)*
  - **Objective:** Exploring various design options & building a high-performance UPF data plane.
  - Part of team that designed and developed the UPF data plane over linux TCP/IP stack as per 3GPP specifications.
  - Developed a high performance DPDK-based UPF data plane (saturated 10 Gbps while enforcing necessary QoS rules).
  - Developed 2 models for the UPF data plane (RTC & Pipeline) as part of thesis.
- **Understanding 4G/5G Architectures and Optimizations**
  *(M.Tech Seminar, Guide: **Prof. Mythili Vutukuru**)* *(Jan'19-May'19)*
  - **Objective:** Literature survey of 4G & 5G architecture and their optimizations.
  - Studied 4G & 5G architecture and their limitations (both from protocol design and implementation aspects).
  - Did a comparative study of the solutions proposed (virtualizing NFs, rearchitecting EPC etc) to overcome those limitations and improve data plane throughput/decrease control plane latency.

RESEARCH PROJECTS

- **Benchmarking of Fast I/O Techniques** *(R & D Project, Guide: **Prof. Mythili Vutukuru**)* *(Jan'19-May'19)*
  - **Objective:** Benchmarking of different fast I/O techniques.
  - Compared performance of different fast I/O methods with respect to that of linux kernel stack for both long and short TCP connections.
  - Compared performance of different packet delivery techniques used by fast I/O methods in virtualized (single VM) as well as non-virtualized setup.
  - Evaluated performance of software switch forwarding packets to multiple VMs with multi-queue vNIC.

OTHER RELEVANT PROJECTS

- **Study and Implementation of Single Trace Attack against RSA key generation in Intel SGX SSL**
  *(Advanced Network Security and Cryptography, Guide: **Prof. Bernard Menezes**)* *(Jan'19-May'19)*
  - Studied a research paper on single trace attack against RSA key generation based on implementation flaws of Intel SGX SSL.
  - Implemented and demonstrated (team of 3) the aforementioned side-channel attack to obtain the private key during RSA key generation.
  - Implementation took less than 15 secs to recover the private key for 8192-bit modulus.
- **Algorand Simulator**
  *(New Trends in Information Technology, Guide: **Prof. Vinay Ribeiro / Prof. Umesh Bellur**)* *(Jan'19-May'19)*
  - Studied Algorand paper which specifies a set of protocols for users to reach consensus on a set of transactions, even in the presence of dishonest users.
  - Implemented a discrete event simulator (team of 3), simulating a connected network of upto 256 nodes (including both honest and fail-stop adversary) where the nodes reach consensus on a set of transactions by following the said protocols.
- **T-Mem based cache implementation and partitioning policies for different mount points**
  *(Topics in Virtualization and Cloud Computing, Guide: **Prof. Purushottam Kulkarni**)* *(Jan'19-May'19)*
  - Studied concepts & kernel implementations (v3.4, as removed in latest kernel versions) of transcendent memory (tmem) frontend and backend.
  - Tried implementing tmem backend APIs (team of 2) in kernel v4.20 - mainly getting and putting pages into the tmem respectively from & to page cache in RAM.
- **Instant messaging application similar to Slack**
  *(Software Lab, Guide: **Prof. Umesh Bellur**)* *(Jul'18-Nov'18)*
  - Implemented a web-browser based instant messaging app (team of 4) similar to Slack.
  - Implemented functionalities like creating new workspaces/channels for secure communication between authorised users, registering via mail, reply to & deletion of previous messages, editing profile etc.

POSITION OF RESPONSIBILITIES

- **Senior Software Engineer, Samsung Research Institute-Bangalore** *(Apr'18-Jun'18)*
- **Interview Coordinator, Institute Placement Team, IIT Bombay** *(Dec'18)*
  - Coordinated with a team of 250+ members for interviews of 1400+ students.
  - Assisted in conducting pre-placement talks and tests for 10+ firms.
- **Student Companion, ISCP Team, IIT Bombay** *(Jul'19-Jul'20)*
  - Coordinated orientation ceremony of 1867 PG freshmen with team of 174 student companions and coordinators.
  - Facilitated 7 PG freshmen on one-to-one bases; guiding them in their academic and co-curricular endeavors.
- **Teaching Assistantship**
  - **CS695**: Topics in Virtualization & Cloud Computing (**Prof. Mythili Vutukuru**). *(Jan'20-May'20)*
    Evaluated assignments & exams, assisted professor with creating assignments, resolved course-related doubts.
  - **CS744**: Design and Engineering of Computing Systems (**Prof. Umesh Bellur**). *(Jul'19-Nov'19)*
    Evaluated assignments & exams, assisted professor with creating assignments, resolved course-related doubts.
  - **CS224+CS252**: Computer Networks (Theory & Lab) (**Prof. Kameswari Chebrolu**). *(Jan'19-May'19)*
    Helped professor with weekly labs, invigilated & evaluated lab & theory exams, resolved associated cribs & general doubts regarding lab assignments or theory.
  - **CS305**: Computer Architecture (**Prof. Bernard Menezes**). *(Jul'18-Nov'18)*
    Invigilated & evaluated theory exams, resolved associated cribs.

TECHNICAL SKILLS

- **Programming Languages**: C, C++, Python, Java, HTML, Shell script
- **Tools & Libraries**: Android Studio, Git, LaTeX, Perforce, DPDK

ACHIEVEMENTS & EXTRA CURRICULAR ACTIVITES

- **Hobbies:** Football, Swimming, Travelling, Reading
- **TA of the month** for CS 744 course in CSE department, IIT Bombay. *(Sept 2019)*
- **Won** Intra-departmental Football Tournament organized by CSE department, IIT Bombay. *(2019)*
- Secured **AIR 42** in GATE 2018 amongst 107893 candidates.
- Achieved **Professional** Level Software Competency in Samsung Research Institute Bangalore. *(2018)*
- Passed B.E from Jadavpur University in **First Class with Honours**. *(2016)*