Chicago, IL, USA
+1-(773)-457-4156
siddhant.r98@gmail.com
www.linkedin.com/in/siddhant-ray
https://github.com/Siddhant-Ray (GitHub)

Siddhant Ray

Education

2023 – 2028 **University of Chicago**, *PhD in Computer Science*
Advisor - Junchen Jiang and Nick Feamster

2020 – 2022 **ETH Zürich**, *MSc in Electrical Engineering and Information Technology*
Advisor - Laurent Vanbever

2016 – 2020 **VIT Vellore**, *B.Tech in Electronics and Communication Engineering*

Professional Experience

Sep 2022 – Mar 2023 **Cloud Networks Researcher**, *Advanced Network Architecures Lab, UPC Barcelona*
- Analysed reinforcement learning based resource sharing, offloading and allocation for cloud-edge systems.
- Developed an approximation for a Mixed-Integer Optimal Matching Algorithm for resource allocation to significantly reduce execution time while achieving similar performance levels.

Oct 2021 – Sep 2022 **Graduate Research Assistant**, *Law, Economics, and Data Science Group, ETH Zurich*
- Research Assistant to Professor Dr. Elliott Ash and worked on improving semantic labelling for text corpora using newer NLP models, sentence simplification and clustering for topic modelling.
- Worked on paraphrase mining to determine clusters of similar narratives in legal corpora and use NLP models to capture underlying narratives in meat policy documents to analyse political discourse.

May 2019 – July 2019 **Software Development Intern**, *Capgemini Engineering*
- Developed a K-Shortest Path Searching algorithm for ONOS based Software Defined Layer 2 VPNs.
- Algorithm was subject to dynamic constraints of network resources (e.g.required edges, vertices etc.) to be used for path calculation.

May 2018 – July 2018 **Software Development Intern**, *BlueStacks*
- Worked on a machine learning algorithm to predict the App Engine's appropriate display screen based on the customer's past experiences.
- Developed an automation script for generating SVG cards for the App Engine's game front end and an address verification tool using the EasyPost API.

Research Experience

Feb 2022 – Aug 2022 **Advancing Packet-Level Traffic Predictions with Transformers**, *Master Thesis at the Networked Systems Group*, ETH Zurich
- Transformer based neural network learn network dynamics and make smarter packet-level decisions.
- Used both packet and network state features to capture the underlying patterns in network traffic with a task-agnostic pre-training phase.
- Task-specific fine-tuning phases to leverage learnt behaviour, make quicker, better forwarding decisions.

Mar 2021 – Jun 2021 **Towards a New Framework for Integration of Network Planes**, *Research Project at the Networked Systems Group*, ETH Zurich
- Prototype for a new programmble forwarding node (a Super-Node) for dynamic control over forwarding in Layer-3 networks.
- Super-Node combines a traditional L3 router's control plane (CP) with a P4 programmable data plane (DP).
- Accelerated forwarding and network convergence by leveraging the newly combined CP and DP.

Feb 2021 – May 2021 **Attentive Neural Networks for News Classification**, *Research Project at the Chair for Mathematical Information Science*, ETH Zurich

- Transformer based neural network to classify a multi-class hierarchical, context-overlapping news dataset.
- Created a new statistical algorithm to reduce class label redundancy the dataset classes.
- Demonstrated improvements of the classification model based on the algorithm's reduction.

Dec 2019 – May 2020 **Machine Learning based Cell Association for 5G Communication Networks**, *Bachelor Thesis at the Networking Lab*, VIT Vellore

- New cell association scheme to meet the ultra low latency, higher load and traffic needs of the 5G networks.
- Hidden Markov Model based learning algorithm followed by a Viterbi based decoding scheme, on the network's telemetry data, to learn network parameters and select the optimal eNodeB for cell association.

Publications

2022 Alexander Dietmüller, **Siddhant Ray**, Romain Jacob, and Laurent Vanbever. A new hope for network model generalization. In *Proceedings of the 21st ACM Workshop on Hot Topics in Networks*, 2022.

2020 **Siddhant Ray** and Budhaditya Bhattacharyya. Machine learning based cell association for mmtc 5g communication networks. *International Journal of Mobile Network Design and Innovation*, 10(1):10–16, 2020.

Skills

Programming Python, C++, Java, Bash, Rust, SQL, C, TEX

Software Linux, Git, Docker, P4 switches, ONOS, Google Cloud, AWS, Maven, MATLAB, NetSim, Cadence

Frameworks Mininet, FRRouting, PyTorch, TensorFlow, Sklearn, NLTK, Flask, SciPy, Scapy, Spacy, BS4, NS3

Languages English (C2), Hindi, Bengali, Deutsch (B1)

Course Projects

2021 Investigating Possible Inductive Biases in Local Sparse Attention ViT Architectures Against Traditional CNNs - [code, paper]

2021 Automatic Certificate Management Environment - [code]

2020 Maximizing Cross Traffic Flows in a L2/L3 Network with Programmable Switches - [code, poster]

Relevant Courses

Graduate Advanced Computer Networks, System Security, Network Security, Distributed Computing, Discrete Event Systems, Networks Seminar, Introductory Machine Learning, Deep Learning, Learning and Classification Theory, Mathematics of Data Science, Neural Network Theory

Undergraduate Computer Networks, Operating Systems, Wireless Communication, Linear Algebra

Honors and Awards

2023 – 2028 **Liew Family Graduate Fellowship**, University of Chicago

2022 **Winner at Datathon**, *Microsoft Challenge*, ETH Zurich

2020 **Best Outgoing Student**, *SENSE department*, VIT Vellore

2019 **Runner-Up at VIT Hack**, *Education Track*, VIT Vellore

2016 – 2019 **Merit Scholarship for Academic Excellence**, VIT Vellore

Leadership and Volunteering

2019 – 2020 **Technical Advisor**, IETE VIT

2018 – 2019 **Organizer**, TEDx VIT Vellore

2017 – 2020 **President** (2018 – 2019) & **Outreach Worker**, Anokha NGO