

Nitin Awathare

Mumbai (India)

✉ nitina@cse.iitb.ac.in

☎ +91 9503884632

📍 IIT Bombay, Mumbai

🌐 linkedin profile

🐙 github profile

🌐 <https://www.cse.iitb.ac.in/~nitina/>

Education

Ph.D.	IIT Bombay (Jul 2016 – Feb 2022) <i>Department of Computer Science and Engineering</i> Thesis title : On the Scalability of Blockchains Advisor: Prof. Umesh Bellur and Prof. Vinay Ribeiro
M.Tech	IIT Kharagpur (Jul 2013 – May 2015) <i>Department of Computer Science and Engineering</i> Advisor: Prof. Arobinda Gupta
B.Tech	WCE Sangli (Jul 2008 – May 2012) <i>Department of Computer Science and Engineering</i>

Professional Experience

Jun 2015 - Jul 2016	Capillary Technologies, Bangalore, India <ul style="list-style-type: none">Worked on API development using Django-Python.
Jun 2012 - Jul 2013	Persistent System Ltd., Pune, India <ul style="list-style-type: none">Worked on ERP application using AX-Dynamics.
Jun 2019 - Aug 2019	IBM Research Lab, Bangalore, India (Research Internship) <ul style="list-style-type: none">Worked on empirical evaluation of different permissioned blockchain protocols such as Quorum, Hyperledger Fabric, and Corda.

Research Interest

Distributed Systems, Blockchain, Payment Channel Network.

Publications

2022	1. Das, S., Awathare, N. , Ren, L., Ribeiro, V. J. & Bellur, U. Tuxedo: Maximizing Smart Contract computation in PoW Blockchains. accepted @ACM SIGMETRICS (2022).
2021	2. Awathare, N. , Das, S., Ribeiro, V. J. & Bellur, U. RENOIR: Accelerating Blockchain Validation using State Caching. <i>International Conference on Performance Engineering (ICPE)</i> (2021). 3. Awathare, N. , Suraj, Akash, Ribeiro, V. & Bellur, U. REBAL : Channel Balancing for Payment Channel Networks. <i>IEEE International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS)</i> (2021).

Patent Application

Jun 2020	Method for scaling computation in blockchain by delaying transaction execution https://patents.google.com/patent/US20200409941A1/en US Patent App. 16/912,389
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Professional Activities

- Reviewer for **Transactions on Management Information Systems(TMIS)** and **COMSNETS- Blockchain workshop**.
- Technical advisor for an e-learning company **TalentServe**.

Academic Activities

- TA for course Introduction to Blockchains, Cryptocurrencies and Smart Contracts (CS765, CS653, CS620) and Advance Blockchain technologies (CS762).
- Mentored 3 UG and 6 PG students.
- Delivered a talk at Dr. B. R. Ambedkar Technological University, Lonere, on my Ph.D. research.

Skills

- Languages: C/C++, Java, Python, Shell Script, Solidity, Golang.
- Technologies: Ethereum, Bitcoin, Quorum.
- Tools: Omnet++, LaTeX, gnuplot.

Projects of Interest

- **Enable computationally-intensive transactions on the Blockchain without compromising security:** We have reduced the block validation time by prior state caching with and without changing the block structure. We have implemented both approaches after a major edit in the Ethereum-1.9.3 code. Further, we developed the experimental test-bed from scratch and demonstrated that the First approach increases the computation to 74% the block inter-arrival time, while the second increases it to 25% from the current value of 1%.

Tools & Technologies - Ethereum, Golang, Python, and Shell script

- **Improved the transaction success ratio in the Payment Channel Network:** We have simulated the Lightning Network (LN) using Omnet++ (Discrete event simulator). Our simulator reflects the production LN topology, which we have collected by instrumenting Golang implementation of LN. We have demonstrated an increase in the transaction success from 30.18% to 79.54% and transaction success volume from 3.98% to 29.99%.

Tools & Technologies - Omnet++, C++, and Python

- **Scale the throughput and bandwidth utilization in Bitcoin:** We have modified the block to include only the transaction's hash, which is off the track from the current Bitcoin that includes complete transactions. It is implemented by non-trivial changes in the Bitcoin-C++ code and demonstrated the improvement of $\simeq 7x$ in throughput and bandwidth utilization.

Tools & Technologies - Bitcoin and C++

- **Measuring and improving the quality of barrier coverage in the wireless sensor network (M.Tech thesis):** We propose a distributed approach to improve the quality of k-barrier coverage with the objective of minimizing the number of sensors required.

Tools & Technologies - C++

- **Edge-based attack on the time-varying network:** The edge-based attack is the more constrained case of the node-based attack where the attacker targets the link between the nodes. We found that the node-based attack is more severe than the edge-based attack for different attacking behavior that prioritizes the attacking edge based on betweenness centrality, eigenvector centrality, degree centrality, etc.

Tools & Technologies - Python