SHAILESH MISHRA

First year PhD Student, School of Computer & Communication Sciences, EPFL

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EDUCATION

École Polytechnique Fédérale de Lausanne   *2022 - Present*
PhD in School of Computer and Communication Sciences (IC)

Indian Institute of Technology, Kharagpur   *2017 - 2022*
Bachelor's + Master's in Electrical Engineering   CGPA: 9.03/10

RESEARCH EXPERIENCE

Digital Identity Systems   *Jan 2023 - Present*
Supervised by **Prof. Bryan Ford**   *Doctoral Assistant*, DEDIS, EPFL
- Working with a team where I am leading the projects related to digital identities for a humanitarian setting
- **Sybil Resistance**: Developed a Sybil Resistance scheme based on *Proof of Personhood* for an equitable aid distribution
- **Social Key Recovery**: Designing a mechanism for recovering private key by using secret sharing in social graphs
- **Endorsement-based Credentials**: Building a endorsement scheme for credential issuance in a humanitarian setting

Integration of Blockchain and IoT   *Jan 2020 - Oct 2021*
Supervised by **Prof. Raja Jurdak** and **Dr. Ali Dorri**   *Research Assistant*, Queensland University of Technology
- Worked with a team where I was primarily involved in implementing systems for making blockchain scalable
- **BlockTorrent**: Built an overlay network for off-chain communications in a system incorporating Blockchain & BitTorrent
- **Vericom**: Implemented an IoT-based blockchain to improve its performance by optimizing the number of packets shared
- **Treechain**: Implemented & tested an efficient consensus algorithm to reduce the delay & overhead in IoT-based blockchain

Smart Contract Generation from Natural Language   [Repository]   *Feb 2020 - Oct 2021*
Supervised by **Prof. Mohammad Hamdaqa**   *Research Assistant*, Reykjavik University
- Worked with a team where I was involved in designing and implementing the chatbot and formulating its evaluation
- Built an interactive chatbot using Xatkit and designed a domain specific language to generate smart contract code
- Integrated software engineering modules with language processing components for a seamless code generation process
- Performed a comprehensive user study spanning diverse domains to assess the efficacy of the chatbot's performance

Caching in disaggregated memory in datacenters   *Sep 2022 - Dec 2022*
Supervised by **Prof. Rachid Guerraoui**   *Doctoral Assistant*, DCL, EPFL
- Worked with a team where I engineered a caching framework for disaggregated memory using *RDMA* programming
- Evaluated the impact of prefetching and cache replacement policy in both temporal & non-temporal memory accesses

Distributed Secure Image Regeneration   [Repository]   [Report]   *Aug 2021 - Apr 2022*
Supervised by **Prof. Sanand Dilip Amita Athalye**   *Master's Thesis*, IIT Kharagpur
- Worked with my thesis supervisor for designing and implementing two distributed frameworks for image regeneration
- Designed & implemented data splitting schemes for improving data privacy & enhancing the performance of the network
- Utilized RPCA & matrix completion techniques to facilitate image regeneration from limited image data

Privacy preservation in decentralised identities using selective disclosure   *May 2022 - July 2022*
Supervised by **Prof. Salil Kanhere**   *Research Assistant*, UNSW
- Worked with a team where I was primarily involved in implementation of the identity system
- Implemented a DID-based identity system for enhancing privacy preservation using selective disclosure
- Built the system on Hyperledger Fabric & integrated it with Google Drive for evaluating its overall performance

Blockchain Research & Development   *Jun 2022 - Aug 2022*
Supervised by **Michal Zajac, Joel Kahil and Marcos Maceo**   *Engineering internship*, Nethermind
- Worked with two teams where I was involved in designing identity system and analyzing cryptocurrencies respectively
- **Research**: Designed an identity management system using blockchain and IPFS for operators in liquid staking
- **Trantor**: Analyzed the various components of AAVE GHO and the performance of various stablecoins on AAVE

Smart Voltage Monitoring   *Oct 2019 - Jun 2020*
Supervised by **Prof. Ashok K. Pradhan**   *Term Project*, IIT Kharagpur
- Worked with a team where I led the design of a centralized model, using client-server paradigm, and a decentralized model, using blockchain and IPFS, to store and analyze voltage data for detecting faults and thefts
- Analyzed the performance of the models in terms of time taken to distribute and analyze voltage data for anomaly detection

DyslexHelp: An application to help kids with dyslexia   [Repository]   *Jan 2020 - Jun 2020*
Supervised by **Prof. Manjira Sinha**   *Term Project*, IIT Kharagpur
- Worked with a team where I led the design and implementation of the framework for helping kids with dyslexia
- Built a web-application using text-to-speech, flask modules to enhance the listening & reading ability of kids with dyslexia
- Incorporated *tutorials* & a *teacher* module for adding new tutorials to improve the overall learning process with time

COMPETITIONS

HelpMate: A helmet meant for all-round protection of a driver   [Report]   *Aug 2019 - Apr 2020*
Product Design, IIT Kharagpur
- Worked with a team where we built a compact helmet which enhanced overall safety of a person riding on a two-wheeler vehicle and secured **1st Position** among 17 teams in Open-IIT Product Design Competition
- Contributed to the design of a tilt-sensor and a GSM module to provide immediate aid to an affected person during accidents

Litigator: A law based search engine   [Report]   *Mar 2019 - Apr 2019*
Software Development, IIT Kharagpur
- Worked with a team where we built an efficient law-based search engine in the Indian domain for both law-experts & common people and secured **1st Position** among 12 teams in Inter-Hall Open Soft Competition
- Included Summarization Module, Spelling Correction Module & Query Detection Module for better results

AWARDS AND ACHIEVEMENTS

JEE 2017	Ranked among the top 0.1% of the students in India in Joint Entrance Examination - 2017.
KVPY Scholar	Selected for the prestigious KVPY fellowship offered by Department of Science and Technology of the Government of India, in the year 2016-17
SRFP Recipient	Selected for the prestigious Summer Research Fellowship Programme(SRFP) conducted by the Indian Academy of Sciences in the year 2018-19

TEACHING ACTIVITIES

- **Electrical Technology, IIT Kharagpur, Fall 2021**
  - Led exercise sessions for clarifying doubts during tutorials
- **Measurements & Electronic Instruments Lab, IIT Kharagpur, Spring 2022**
  - Helped students with MATLAB simulations of electrical circuits
- **Signals and Systems, EPFL, Spring 2023**
  - Led exercise sessions for clarifying doubts to students & taught student assistants during preparatory sessions

VOLUNTEERING AND EXTRA-CURRICULAR ACTIVITIES

- **RAMP: Graduate Application Mentorship Program**
  - Initiated & managed a mentorship program where PhDs from EPFL helped Computer Science PhD applicants worldwide
- **Member of EPIC**
  - Helped in planning & organizing recreational activities for Computer Science PhDs at EPFL
- **Tennis**
  - Inter-IIT probable in 2019 — one of the top 8 male tennis players in the institute
  - Runner-up with RK Hall Tennis team among 12 teams in Inter-Hall Tennis Tournament, 2022
- **Technology Head**
  - Guided over 80 undergraduate students as Captain of RK Hall Product Design & OpenSoft Team in 2021-22

SELECTED PUBLICATIONS (FULL PUBLICATIONS LIST)

iContractBot: A Chatbot for Smart Contracts' Specification and Code Generation. Qasse, I., Mishra, S., & Hamdaqa, M. *2021 IEEE/ACM Third International Workshop on Bots in Software Engineering (BotSE)*.   **[Link]**
BlockTorrent: A Blockchain Enabled Privacy-Preserving Data Availability Protocol. Hill, A., Mishra, S., Patlan, A. S., Dorri, A., Dedeoglu, V., Jurdak, R., & Kanhere, S. *2021 IEEE International Conference on Blockchain (Blockchain)*.   **[Link]**
Vericom: A Verification and Communication Architecture for IoT-based Blockchain. Dorri, A., Mishra, S., & Jurdak, R. *Ad Hoc Networks, Volume 133, 1 August 2022, 102882*.   **[Link]**
Chat2Code: A Chatbot for Model Specification and Code Generation, The Case of Smart Contracts[†]. Qasse, I.*, Mishra, S.*, Jónsson, B., Khomh, F., & Hamdaqa, M. *IEEE SSE 2023*. († - Invited paper, * - Equal contribution)
A Blockchain-Based Interoperable Architecture for IoT with Selective Disclosure of Information. Mukta, R., Pal, S., Mishra, S., Paik, H., Kanhere, S., & Hitchens, M. *Under submission at IEEE PRDC 2023*
Smart Voltage Monitoring: Centralised and Blockchain-based Decentralised Approach. Mishra, S., & Kumar, S. *2020 IEEE International Conference on Internet of Things & Intelligence System*.   **[Link]**