SHAILESH MISHRA

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

Email: shailesh.mishra@epfl.ch **Phone**: +41-0764723406

EDUCATION

Ecole Polytechnique Federale de Lausanne *2022 - Present*
PhD in School of Computer and Communication Sciences

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

PUBLICATIONS

Journal Papers

Vericom: A Verification and Communication Architecture for IoT-based Blockchain **[Link]**
Ali Dorri, Shailesh Mishra, Raja Jurdak
Accepted at *Elsevier's Ad Hoc Networks Journal*

Conference Papers

Smart Voltage Monitoring: Centralised and Blockchain-based Decentralised Approach **[Link]**
Shailesh Mishra, Shivam Kumar
2020 IEEE International Conference on Internet of Things & Intelligence System

BlockTorrent: A Blockchain Enabled Privacy-Preserving Data Availability Protocol **[Link]**
Ambrose Hill, Shailesh Mishra, Atharv Singh Patlan, Ali Dorri, Volkan Dedeoglu, Raja Jurdak, Salil S. Kanhere
4th IEEE International Conference on Blockchain 2021

Chat2Code: Towards conversational concrete syntax for model specification and code generation, the case of smart contracts **[Link]**
Ilham Qasse, Shailesh Mishra*, Mohammad Hamdaqa* (* - Equal contribution)
Under review

Privacy preservation in decentralised identities using selective disclosure
Rahma Mukta, Shantanu Pal, Shailesh Mishra, Salil Kanhere
Under review

Workshop Papers

iContractBot: A chatbot for Smart Contracts' Specification and Code Generation **[Link]**
Ilham Qasse, Shailesh Mishra, Mohammad Hamdaqa
3rd International Workshop on Bots in Software Engineering (*BotSE 2021*)

Thesis

Distributed Secure Image Regeneration in CyberPhysical Systems **[Link]**
Shailesh Mishra, Sanand Dilip Amita Athalye
Master's Thesis

RESEARCH EXPERIENCE

Integration of Blockchain and IoT *Jan 2020 - Oct 2021*
Supervised by **Prof. Raja Jurdak and Dr. Ali Dorri** *Research Assistant*, Queensland University of Technology

- **BlockTorrent**: Developed an overlay network for off-chain communications in a system incorporating Blockchain & BitTorrent to analyse the impact of packet size on performance of the framework
- **Vericom**: Implemented an IoT-based blockchain to improve its performance by optimizing the number of packets shared and mathematically proved the security of the algorithm
- **Treechain**: Implemented and tested an efficient consensus algorithm to reduce the delay & overhead during transactions in IoT networks; built the ledger formation and consensus code range allocation in Solidity

Smart Contract Generation from Natural Language **[Repository]** *Feb 2020 - Oct 2021*
Supervised by **Prof. Mohammad Hamdaqa** *Research Assistant*, Reykjavik University

- Built an interactive chatbot using Xatkit to generate smart contract code in Solidity, MS Azure & Composer
- Integrated software engineering modules such as Xtext & Xtend with NLP modules such as DialogFlow & Levenshtein's edit distance to facilitate code generation

Distributed Secure Image Regeneration [Repository] *Aug 2021 - Present*
Supervised by **Prof. Sanand Dilip Amita Athalye** *Master's Thesis*, IIT Kharagpur

- Designed an efficient leader selection algorithm to achieve consensus for distributed image regeneration
- Integrated & tested data splitting schemes for improving data privacy & for enhancing the performance of the network by reducing packet size while taking into account the quality of final image regenerated
- Incorporated RPCA & matrix completion for enabling regeneration of image from less image data

Privacy preservation in decentralised identities using selective disclosure [Repository] *May 2022 - July 2022*
Supervised by **Prof. Salil Kanhere** *Research Assistant*, UNSW

- Implemented a DID system on Hyperledger Fabric for enhancing privacy preservation using selective disclosure
- Integrated the system with Google Drive and evaluated its overall performance

Blockchain-based Intrusion Detection System(IDS) for IoT networks *May 2021 - Present*
Supervised by **Prof. Sathya Peri and Prof. Salil Kanhere** *Research Assistant*, IIT Hyderabad

- Engineered a framework for distributed intrusion detection for improved accuracy & data provenance
- Integrated Hyperledger Fabric (blockchain), NS3 (IoT network), python & shell scripts (IDS) for implementation

Study of privacy hazards in user reviews on Amazon Marketplace *Jan 2021 - July 2022*
Supervised by **Prof. Mainack Mondal** *Research Assistant*, IIT Kharagpur

- Scraped 32.16k user reviews & public profiles from Amazon for quantitative & qualitative analysis; executed Named Entity Recognition and RegEx matching to obtain the first set of sensitive information in reviews
- Analyzed reviews to obtain qualitative code and then, examined a random set of 200 reviews with PII revelations, assigned qualitative codes to reviews & calculated Kripendorff's alpha (for 3 raters)

WORK EXPERIENCE

Blockchain Research & Development *Jun 2022 - Aug 2022*
Supervised by **Michal Zajac, Joel Kahil and Marcos Maceo** *Engineering internship*, Nethermind

- **Research**: Designed a identity management system using blockchain and IPFS based on CanDID for operators in liquid staking; proposed a solution for tackling the issue of non-accountability in Ethereum2.0
- **Trantor**: Analyzed the various components of AAVE GHO & the performance of various stablecoins on AAVE
- **Juno**: Build the metric measurement framework using Prometheus for Juno, the Go client for Starknet

Deca-ARCADE, A Decentralized Marketplace [Report] *May 2019 - Jul 2019*
Supervised by **Prof. Uday B. Desai and Prof. Sathya Peri** *Research Assistant*, IIT Hyderabad

- Developed an end-to-end multi-featured decentralized marketplace using Ethereum, IPFS, ReactJS & web3js
- Designed an efficient distributed data sharing framework that could help both sellers & buyers

TERM PROJECTS

Smart Voltage Monitoring *Oct 2019 - Jun 2020*
Supervised by **Prof. Ashok K. Pradhan** *Term Project*, IIT Kharagpur

- Proposed centralized & decentralized models to store & analyze voltage data for detection of thefts & faults
- Studied both the models to evaluate the time taken to distribute & analyse voltage data for anomaly detection

Programmable and Embedded Systems *Sep 2020 - Nov 2020*
Supervised by **Prof. A. Routray** *Term Project*, IIT Kharagpur

- Noise filtering of EEG data on STM : Filtered the EEG data using Assembly Language on STM using Notch Filter; obtained the coefficients by implementing Notch Filter & Particle Swarm Optimization on MATLAB
- Android Application for Activity Detection : Implemented Kalman Filter on Android Studio(Java) for noise reduction of real-time acceleration sensor data & integrated Jenson Shannon divergence for classifying motion

DyslexHelp: An application to help kids with dyslexia [Repository] *Jan 2020 - Jun 2020*
Supervised by **Prof. Manjira Sinha** *Term Project*, IIT Kharagpur

- Built a web-application using text-to-speech, flask modules to enhance the learning of kids with dyslexia
- Incorporated tests for improving both listening & reading ability of kids with dyslexia; integrated a teacher module and a tutorial module for enhancing the learning process

COMPETITIONS

Learning By Doing NeurIPS 2021 Competition – ROBO [Repository] *Aug 2021 - Sep 2021*
Robotics Competition, NeurIPS 2021

- Built a gym environment for three different robots with unknown dynamics using a neural network-based model
- Employed various system identification techniques including Neural networks and SINDy to discover system dynamics and abstract controls of three different robots

HelpMate: A helmet meant for all-round protection of a driver [Report] *Aug 2019 - Apr 2020*
Product Design, IIT Kharagpur

- Fashioned a compact helmet which enhanced overall safety of a person riding on a two-wheeler vehicle; incorporated a tilt-sensor & a GSM module to provide immediate aid to an affected person during accidents
- Secured **1st Position** among 17 teams in Open-IIT Product Design Competition

Litigator: A law based search engine [Report] *Mar 2019 - Apr 2019*
Software Development, IIT Kharagpur

- Built an efficient law-based search engine in the Indian domain for both law-experts & common people; included Summarization Module, Spelling Correction Module & Query Detection Module for better results
- Secured **1st Position** among 12 teams in Inter-Hall Open Soft Competition

TECHNICAL SKILLS

Software	Truffle, Ganache, IPFS, web3, Hyperldeger Fabric, NS3, AndroidStudio, LaTeX, MATLAB
Libraries	Flask, Pandas, Socket, Scrapy, NumPy, Matplotlib, scikit-learn
Languages	C, C++, Java, Python, Go, HTML, CSS, JavaScript, Solidity, ReactJS, Arduino

RELEVANT COURSEWORK

Computer Science	Programming & Data Structures, Social Computing, Smartphone Computing & Analysis, Computer Architecture & Operating System, Usable Security & Privacy, Security Aware CPS & IoT Design, Theory & Applications of Blockchain, Big Data Processing, Machine Learning Foundations & Applications
Mathematics	Transform Calculus, Probability & Stochastic Processes, Linear Algebra
Electrical	Digital Signal Processing, Statistical Signal Processing, Signals & Networks, Programmable & Embedded System

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 IISc, 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, Fall 2021
- Measurements and Electronic Instruments Lab, Spring 2022

EXTRA-CURRICULAR ACTIVITIES

- A regular tennis player & participated in the **Inter-IIT Tennis Camp 2019** as well as an **Inter-IIT Probable**; lead a team of 5 players as the **Captain** of RK Hall Tennis Team
- Guided over **70 undergraduate students** as **Vice-Captain** of RK Hall Product Design & OpenSoft Team