

SHAILESH MISHRA

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AREAS OF INTEREST

Blockchain, Decentralised Systems, Networks, Security, Smart Contracts, Privacy, Internet of Things, Cryptography

EDUCATION

Indian Institute of Technology, Kharagpur
Bachelor's + Master's in Electrical Engineering
Minor in Computer Science and Engineering

2017 - 2022
CGPA: 8.89/10

PUBLICATIONS

Journal Papers

Vericom: A Verification and Communication Architecture for IoT-based Blockchain

Ali Dorri, Shailesh Mishra, Raja Jurdak — Under review at *Elsevier's Ad Hoc Networks Journal*

Near-Immediate Consistency with Tree-chain's Fast Consensus

Ali Dorri, Shailesh Mishra, Raja Jurdak — Under review at *IEEE IoT Journal*

Conference Papers

Smart Voltage Monitoring: Centralised and Blockchain-based Decentralised Approach

Shailesh Mishra, Shivam Kumar — 2020 *IEEE International Conference on Internet of Things & Intelligence System*

BlockTorrent: A privacy-preserving data availability protocol for multiple stakeholder scenarios

Ambrose Hill, Shailesh Mishra, Ali Dorri, Volkan Dedeoglu, Raja Jurdak, Salil S. Kanhere — *IEEE International Conference on Blockchain and Cryptocurrency 2021 (ICBC 2021)*

A Blockchain Enabled Privacy-Preserving Data Availability Protocol for Multi-stakeholder Scenarios

Ambrose Hill, Shailesh Mishra, Ali Dorri, Volkan Dedeoglu, Raja Jurdak, Salil S. Kanhere — **To appear** at *The 4th IEEE International Conference on Blockchain*

Towards Conversational Concrete Syntax for Model Specification and Code Generation : The Case of Smart Contracts Development

Ilham Qasse*, Shailesh Mishra*, Mohammad Hamdaqa — Under review

Workshop Papers

iContractBot: A chatbot for Smart Contracts' Specification and Code Generation

Ilham Qasse, Shailesh Mishra, Mohammad Hamdaqa — *3rd International Workshop on Bots in Software Engineering*

RESEARCH EXPERIENCE

Integration of Blockchain and IoT

Jan 2020 - Present

Supervised by **Prof. Raja Jurdak** and **Dr. Ali Dorri** — *Research Assistant, Queensland University of Technology*

- **BlockTorrent: A privacy-preserving data availability protocol for multiple stakeholder scenarios**
 - Developed an overlay network for off-chain communications in a system incorporating Blockchain & BitTorrent
 - Analysed the effect of file size & number of chunks on file splitting, distribution & regeneration based on BitTorrent algorithms to obtain important design choices for optimal network design
- **Vericom: A Verification & Communication Architecture for IoT-based Blockchain**
 - Implemented a packet-optimised blockchain framework for improving performance of IoT-based blockchain
 - Studied the packet overhead, network & processing delay to compare with the existing blockchain architecture
- **Near-Immediate Consistency with Treechain's Fast Consensus**
 - Worked on the implementation of an efficient consensus algorithm on a network to reduce the delay & overhead during transactions in IoT scenario
 - Developed the smart contract which is responsible for consensus code range allocation & ledger formation
- **A blockchain-based consensus-less data sharing platform for IoT networks**
 - Designed a blockchain-based consensus-less data sharing platform for IoT networks that works on the basis of trust between the devices
 - Working on implementation of the system on NS3 & improving the trust-based algorithm

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

- Built a beta version chatbot using Xtext & Xatkit to generate smart contract code for multiple platforms
- Conducted a user survey to understand user experience & expectation for the evaluation & analysis of the chatbot; working on improving the usability & robustness of the chatbot based on the reviews obtained from this survey

Amazon Review Analysis *Jan 2021 - Present*
Supervised by **Prof. Mainack Mondal** *Research Assistant, IIT Kharagpur*

- Processed >100GB data of Amazon reviews from amazon.com & detected critical PII revelations in 14k cases
- Qualitatively studied the circumstances & usability concerns of PII revelations; examined a random set of 200 reviews with PII revelations, assigned qualitative codes to reviews & calculated Krippendorff's alpha

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

- Developed a framework for distributed intrusion detection for improving accuracy & data provenance
- Working on implementation of the system by integrating Hyperledger Fabric, NS3 & IDS

Deca-ARCADE, A Decentralised 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 decentralised marketplace using Ethereum, IPFS, ReactJS & web3js
- Established an efficient distributed data sharing framework that could help both sellers & buyers

TERM PROJECTS

Distributed Image Reconstruction in Adversarial Scenario *Aug 2021 - Present*
Supervised by **Prof. Sanand Dilip Athalye** *Master's Thesis, IIT Kharagpur*

- Designed an efficient, randomised leader selection algorithm for reaching consensus & regenerating the image
- Working on a completely distributed algorithm based on Least Square Solutions for improving scalability

Smart Voltage Monitoring *Oct 2019 - Jun 2020*
Summer Research Project *IIT Kharagpur*

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

Study of privacy hazards of public reviews on E-Commerce platforms *Aug 2020 - Nov 2020*
Supervised by **Prof. Mainack Mondal** *Term Project, 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

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

- **Noise filtering of EEG data on STM** [Repository](#)
 - Implemented Notch Filter & Particle Swarm Optimization on MATLAB to obtain the filter coefficients
 - Filtered the EEG data using Assembly Language on STM using the coefficients obtained from MATLAB
- **Mobile Application for Activity Detection** [Repository](#)
 - Implemented Kalman Filter on Android Studio(Java) for noise reduction of real-time acceleration sensor data
 - Integrated Jensen Shannon divergence for classifying estimated data to walking, standing & climbing stairs

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 flask to enhance the learning of kids with dyslexia
- Incorporated tests for improving both listening & reading ability of kids with dyslexia; Integrated a teacher module so that new words can be added by teachers for enhancing learning; included a tutorial module for learning new words

Voltage Monitoring System [Repository](#) *Dec 2018 - Mar 2019*
Supervised by **Prof. Ashok K. Pradhan** *Term Project, IIT Kharagpur*

- Constructed a handy & accurate hardware device using Arduino to obtain voltage values
- Developed an efficient client-server application to transfer voltage data from clients to server on Java; designed an efficient method to package & extract data & applied DFT to improve the voltage measurement procedure

COMPETITIONS

- HelpMate: A helmet meant for all-round protection of a driver** [Report](#) Aug 2019 - Apr 2020
IIT Kharagpur
Product Design
- Fashioned a compact helmet which enhanced overall safety of a person riding on a two-wheeler vehicle
 - Secured **1st Position** among 17 teams in Open-IIT Product Design Competition
- Litigator: A law based search engine** [Report](#) Mar 2019 - Apr 2019
IIT Kharagpur
Software Development
- Built a efficient law-based search engine in the Indian domain for both law-experts & common people
 - Secured **1st Position** among 12 teams in Inter-Hall Open Soft Competition
- DisHA: An aid for people stuck in disasters** [Report](#) Oct 2018 - Mar 2019
IIT Kharagpur
Product Design
- Designed a cost-effective product to locate distressed people during disasters using RF waves
- ALCOLOC: A product for making driving safe** [Report](#) Aug 2018 - Sep 2018
IIT Kharagpur
Product Design
- Designed a product to prevent accidents due to drink-and-drive cases by using blood alcohol content
- MEDI-BIN: A product for safe disposal of biomedical waste** [Report](#) Oct 2017 - Mar 2018
IIT Kharagpur
Product Design
- Designed a compact product to decompose biomedical waste using plasma pyrolysis technology

TECHNICAL SKILLS

Software	Truffle, Ganache, IPFS, web3, Hyperledger Fabric, NS3, MS Office, AndroidStudio, \LaTeX , MATLAB, SNAP, Rasa, DialogFlow, Xatkit, Xtext, Xtend
Libraries	flask, pandas, socket, scrapy, numpy, matplotlib
Languages	C, C++, Java, Python, Go, HTML, CSS, JavaScript, Solidity, ReactJS, Arduino, Assembly Language

RELEVANT COURSEWORK

Completed Courses	Programming & Data Structures, Signals & Networks, Transform Calculus, Social Computing, Smartphone Computing & Analysis, Probability & Stochastic Processes, Programmable & Embedded System, Computer Architecture & Operating System, Digital Signal Processing, Usable Security & Privacy, Statistical Signal Processing, Security Aware CPS & IoT Design
Ongoing Courses	Theory & Applications of Blockchain

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

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
- Tutored over **100 first-year undergraduate students** in Programming & Data Structures Doubt Sessions
- Guided over **70 undergraduate students** as **Vice-Captain** of RK Hall Product Design & OpenSoft Team
- Mentored **4 first-year UG students** of Electrical Engineering Dept. under the Student Mentorship Program