

SHAILESH MISHRA

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EDUCATION

Indian Institute of Technology, Kharagpur
Bachelor's + Master's in Electrical Engineering

2017 - 2022
CGPA: 8.98/10

PUBLICATIONS

Journal Papers

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

[\[Link\]](#)

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*

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)

In preparation for submission to *Journal of Systems and Software*

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 privacy-preserving data availability protocol for multiple stakeholder scenarios

[\[Link\]](#)

Ambrose Hill, Shailesh Mishra, Ali Dorri, Volkan Dedeoglu, Raja Jurdak, Salil S. Kanhere

IEEE International Conference on Blockchain and Cryptocurrency 2021 (ICBC 2021)

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

Ambrose Hill, Shailesh Mishra, Atharv Singh Patlan, Ali Dorri, Volkan Dedeoglu, Raja Jurdak, Salil S. Kanhere

To appear at the *4th IEEE International Conference on Blockchain 2021*

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

DIRAS: Distributed Image Reconstruction in Adversarial Scenario

[\[Link\]](#)

Shailesh Mishra, Sanand Dilip Amita Athalye

Master's Thesis

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 IoT-based blockchain to improve its performance by optimizing the number of packets shared
- Compared the packet overheads, network and processing delays with the existing blockchain architecture

• Near-Immediate Consistency with Treechain's Fast Consensus

- Implemented an efficient consensus algorithm to reduce the delay & overhead during transactions in IoT networks

- Implemented ledger formation and consensus code range allocation in a Solidity smart contract
- **A light-weight blockchain-based data sharing platform for IoT networks**
 - Designed a blockchain-based data sharing platform for IoT networks that works on the basis of trust
 - Currently improving the trust-based algorithm for better load balancing & making it resistant to network attacks
- **Blockchain-based Dynamic Virtual Power Plants (D-VPP)**
 - Building a blockchain-based D-VPP for augmenting the data privacy & efficiency of VPPs
 - Formulating the transaction flow in blockchain & working on decentralized aggregation of nodes to form DVPP

Smart Contract Generation from Natural Language [\[Repository\]](#)

Feb 2020 - Oct 2021

Supervised by [Prof. Mohammad Hamdaqa](#)

Research Assistant, Reykjavik University

- Built the beta version of a 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 Image Reconstruction in Adversarial Scenario [\[Repository\]](#)

Aug 2021 - Present

Supervised by [Prof. Sanand Dilip Amita Athalye](#)

Master's Thesis, IIT Kharagpur

- Designed an efficient, randomized leader selection algorithm to achieve consensus for distributed image regeneration
- Incorporated RPCA, matrix completion & data splitting for improving data privacy & defense against various attacks

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 - Present

Supervised by [Prof. Mainack Mondal](#)

Research Assistant, IIT Kharagpur

- **PII Detection and qualitative analysis of Amazon Reviews**
 - Processed >100GB data of user reviews from amazon.com & detected critical PII revelations in 14k cases
 - Analyzed the reviews to obtain qualitative code and then, examined a random set of 200 reviews with PII revelations, assigned qualitative codes to reviews & calculated Krippendorff's alpha (for 3 raters)
- **Re-identification Attack and Privacy Sensitive Information (PSI) Detection**
 - Formulated a cross-platform re-identification attack using data obtained from Amazon reviews
 - Defined PSI for Amazon reviews & working on PSI detection from the reviews of products of various categories

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

Privacy Analysis of Amazon Reviews

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
- **Android 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
Term Project, IIT Kharagpur

Supervised by **Prof. Manjira Sinha**

- 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 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
Term Project, IIT Kharagpur

Supervised by **Prof. Ashok K. Pradhan**

- 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

Learning By Doing NeurIPS 2021 Competition – ROBO [\[Repository\]](#)

Aug 2021 - Sep 2021
NeurIPS 2021

Robotics Competition

- 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
IIT Kharagpur

Product Design

- Fashioned a compact helmet which enhanced overall safety of a person riding on a two-wheeler vehicle; incorporated a tilt-sensor and 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
IIT Kharagpur

Software Development

- 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

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; analyzed the different modes of working of the device to reduce the power consumption
- Sketched out the working of RFID reader & various algorithms for the rescue teams to locate the affected people

ALCOLOC: A product for making driving safe [\[Report\]](#)

Aug 2018 - Sep 2018
IIT Kharagpur

Product Design

- Designed a product to road prevent accidents due to drink-and-drive cases by using blood alcohol content
- Integrated a feature of sending an SOS signal to an acquaintance of the intoxicated person for immediate help

MEDI-BIN: A product for safe disposal of biomedical waste [\[Report\]](#)

Oct 2017 - Mar 2018
IIT Kharagpur

Product Design

- Developed a compact product to decompose biomedical waste using plasma pyrolysis technology
- Planned out the geometry as well as working of plasma chamber & plasma torch for proper decomposition of waste

TECHNICAL SKILLS

Software	Truffle, Ganache, IPFS, web3, Hyperledger Fabric, NS3, MS Office, AndroidStudio, L ^A T _E X,
Libraries	MATLAB, SNAP, Rasa, DialogFlow, Xatkit, Xtext, Xtend
Languages	Flask, Pandas, Socket, Scrapy, NumPy, Matplotlib, scikit-learn, Gym
	C, C++, Java, Python, Go, HTML, CSS, JavaScript, Solidity, ReactJS, Arduino, Assembly
	Language

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

MENTORING AND TEACHING ACTIVITIES

- **Teaching Assistant, Fall Semester 2021, Electrical Technology, IIT Kharagpur**
 - Providing academic support & guidance to more than 50 first-year students in this undergraduate electrical course
 - Grading submissions of 4 different tutorials to be solved by each student & providing regular feedback
- **Student Tutor, 2019, Student Welfare Group, IIT Kharagpur**
 - Tutored over **100 first-year undergraduate students** in Programming & Data Structures Doubt Sessions
- **Student Mentor, 2019-2021, Student Welfare Group, IIT Kharagpur**
 - Mentored **4 first-year UG students** of Electrical Engineering Dept. under the Student Mentorship Program

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