# 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**                                      *2017 - 2022*
B.Tech + M.Tech in Electrical Engineering                                          CGPA: 8.89/10
*Minor in Computer Science and Engineering*

**Shiv Jyoti Secondary School, Kota**                                              *2015 - 2017*
All India Senior School Certificate Examination (AISSCE), 2017          Overall Percentage: 96.8

**Belpahar English Medium School, Belpahar**                                       *2005 - 2015*
Indian Certificate of Secondary Education (ICSE), 2015                   Overall Percentage: 97.2

## Publications

**Smart Voltage Monitoring: Centralised and Blockchain-based Decentralised Approach**
*Shailesh Mishra, Shivam Kumar*
**Accepted** at *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*
**Accepted** at *IEEE International Conference on Blockchain and Cryptocurrency 2021 (ICBC 2021)*

**iContractBot: A chatbot for Smart Contracts' Specification and Code Generation**
*Ilham Qasse, Shailesh Mishra, Mohammad Hamdaqa*
**Accepted** at *3rd International Workshop on Bots in Software Engineering*

**Near-Immediate Consistency with Tree-chain's Fast Consensus**
*Ali Dorri, Shailesh Mishra, Raja Jurdak*
Submitted to *Elsevier's Computer Networks Journal*

**Towards Conversational Concrete Syntax for Model Specification and Code Generation : The Case of Smart Contracts Development**
*Ilham Qasse*, Shailesh Mishra*, Mohammad Hamdaqa*
Submitted to *37th International Conference on Software Maintenance and Evolution*

## Research Experience

**Integration of Blockchain and IoT**                                              *Jan 2020 - Present*
*Remote Research Intern*                                         Queensland University of Technology
Supervised by **Prof. Raja Jurdak**

- 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 and number of chunks on file splitting, distribution and regeneration based on BitTorrent algorithms to obtain important design choices for optimal network design
- Vericom: A Verification and Communication Architecture for IoT-based Blockchain
  - Submitted to **International Conference on Internet of Things Design and Implementation (IoTDI)**
  - Implemented a packet-optimised blockchain framework for improving performance of IoT-based blockchain
  - Studied the packet overhead, network and processing delay to compare with the existing blockchain arhitecture
- Near-Immediate Consistency with Treechain's Fast Consensus
  - Worked on the implementation of an efficient consensus algorithm on a network to reduce the delay and overhead during transactions in IoT scenario
  - Developed the smart contract which is responsible for consensus code range allocation and ledger formation

**Smart Contract Generation from Natural Language** *Feb 2020 - May 2021*
*Remote Research Intern* [Repository] Reykjavik University
Supervised by **Prof. Mohammad Hamdaqa**
- Built a beta version chatbot using Xtext and Xatkit to generate smart contract code for multiple platforms
- Integrated DialogFlow intent detection and Levenstein within the chatbot to improve the robustness of the chatbot
- Conducted a user survey to understand user experience and expectation for the evaluation and analysis of the chatbot

**Deca-ARCADE, A Decentralised Marketplace** *May 2019 - Jul 2019*
*Summer Research Fellow* IIT Hyderabad
Supervised by **Prof. Uday B. Desai** and **Prof. Sathya Peri** [Report]
- Developed an end-to-end multi-featured decentralised marketplace using Ethereum, IPFS and ReactJS
- Established an efficient distributed data sharing framework that could help both sellers and buyers

**Smart Voltage Monitoring** *Oct 2019 - Jun 2020*
*Summer Research Project* IIT Kharagpur
- Built a centralised model for storing and analysing voltage data using client-server architecture
- Proposed and implemented a decentralised model for storing and analysing voltage data using Ethereum and IPFS
- Studied both the models to evaluate the time taken to distribute and analyse voltage data; examined the effect of improving security in the decentralised model

# Research Projects

**Protected Phase Measurement Unit(PMU) System** *Jul 2020 - Nov 2020*
*Term Project* IIT Kharagpur
Supervised by **Prof. Ashok K. Pradhan**
- Implemented different encryption schemes on voltage data obtained from 9-bus load flow simulation
- Developed on different network topology to obtain the optimal design for data transfer on a phasor network

**Study of privacy hazards of public reviews on E-Commerce platforms** *Aug 2020 - Dec 2020*
*Term Project* IIT Kharagpur
Supervised by **Prof. Mainack Mondal**
- 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
- Worked on qualitative analysis of reviews to understand the context of reviews of revealing sensitive information

**Voltage Monitoring System** *Dec 2018 - Mar 2019*
*Semester Project* [Repository] IIT Kharagpur
Supervised by **Prof. Ashok K. Pradhan**
- Constructed a handy and accurate hardware device using Arduino to obtain voltage values
- Developed an efficient client-server application to transfer voltage data from clients to server
- Designed an efficient method to package & extract data & applied DFT to improve the voltage measurement procedure

**Programmable and Embedded Systems** *September 2020 - November 2020*
*Semester Project* IIT Kharagpur
Supervised by **Prof. A. Routray**
- Noise filtering of EEG data on STM [Repository]
  - Implemented Notch Filter and 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 Jenson Shannon divergence for classifying estimated data to walking, standing and climbing stairs

**DyslexHelp: An application to help kids with dyslexia** *Jan 2020 - Jun 2020*
*Term Project* [Repository] IIT Kharagpur
- Built a web-application using flask to enhance the learning of kids with dyslexia
- Incorporated tests for improving both listening and 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

## Competitions

**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
- Secured **1st Position** among 17 teams in Open-IIT Product Design Competition

**DisHA: An aid for people stuck in disasters**   Report   *Oct 2018 - Mar 2019*
*Product Design*                                                          IIT Kharagpur
- Designed a cost-effective product to locate distressed people during disasters using RF waves

**Litigator: A law based search engine**   Report   *Mar 2019 - Apr 2019*
*Software Development*                                              IIT Kharagpur
- Built a efficient law-based search engine in the Indian domain for both law-experts and common people
- Secured **1st Position** among 12 teams in Inter-Hall Open Soft Competition

**ALCOLOC: A product for making driving safe**   Report   *Aug 2018 - Sep 2018*
*Product Design*                                                            IIT Kharagpur
- 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*
*Product Design*                                                                      IIT Kharagpur
- Designed a compact product to decompose biomedical waste using plasma pyrolysis technology

## Technical Skills

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|---|---|
| **Software** | Truffle, Ganache, IPFS, web3js, NS3, MS Office, AndroidStudio, MATLAB, LaTeX, SNAP, Rasa, DialogFlow, Xatkit, Xtext, Xtend |
| **Libraries** | Flask, Pandas, Socket, Scrapy, Matplotlib |
| **Languages** | C, C++, Java, Python, HTML, CSS, JavaScript, Solidity, ReactJS, Arduino, Assembly Language |

## Relevant Coursework

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|---|---|
| **Completed Courses** | Programming & Data Structures, Signals & Networks, Transform Calculus, Analog Electronics, Measurements & Electronic Instruments, Social Computing, Power System, Smartphone Computing & Analysis, Probability & Stochastic Processes, Embedded Systems, Computer Architecture & Operating System, Audio Systems & Engineering, Usable Security & Privacy, Digital Signal Processing, Analog Signal Processing, Programmable & Embedded System, Security Aware CPS & IoT Design, Statistical Signal Processing, Advanced Sensing Techniques |

## Awards and Achievements

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|---|---|
| **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 and 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