

# Dinesh Kumar Rana

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## TECHNICAL SKILLS

Java, JavaScript, React.js, Vue.js, Typescript, Node.js, Express.js, WebSockets, API Development, SQL, MongoDB, MySQL

## PROJECTS

### Real-Time Stock Exchange Simulation

- Engineered a real-time stock exchange simulation platform supporting 25,000+ concurrent users (load tested with k6).
- Developed a custom order matching algorithm inspired by NSE/BSE principles using priority queues and implemented trading APIs with Node.js and Express.
- Enabled trading across 200+ companies with price updates every 60 seconds; integrated real-time price and chart updates using Socket.IO.
- Constructed the full-stack system with React, Vanilla CSS, MongoDB, and MySQL; utilized Axios for efficient API communication.

### Offline Device-to-Device Communication Protocol

- Designed a custom audio-based communication protocol inspired by TCP/IP, enabling mobile devices to exchange data offline using ultrasonic signals up to 1.2 meters apart.
- Implemented real-time modulation/demodulation of binary payloads using Android's AudioTrack and AudioRecord APIs at 32 bytes/sec transmission speed.
- Achieved 95% message delivery accuracy under controlled noise conditions through checksum validation and retry mechanism.
- Explored potential applications including information retrieval, offline peer-to-peer payments, IoT communication, and emergency broadcast systems in network-denied environments.

### Offline Payment System (In Progress)

- Designing a real-time, offline digital payment system using a custom peer-to-peer protocol over audio for secure transaction exchange without internet or Bluetooth.
- Architected the backend leveraging React Native, AudioTrack, and JWT for user authentication and transaction validation.
- Developing the mobile client in React Native; system enables encrypted payments between devices in a 1-meter range via sound waves.

## ACHIEVEMENTS

- Achieved a LeetCode Contest Rating of 1565, ranking in the top 28% globally.
- Solved 300+ DSA problems across arrays, linked lists, trees, graphs, and other algorithmic domains.
- Participated in 22+ LeetCode contests, consistently improving ranking and problem-solving efficiency.
- Secured a top 50 rank out of 1,000 participants in an intra-college coding challenge.

## EDUCATION

### VIT Bhopal University

*Bachelor of Technology in Computer Science and Engineering*

Bhopal, MP

Nov 2022 – Present

### GGPS (CBSE)

*Senior Secondary (12<sup>th</sup>)*

Bokaro, Jharkhand

April 2020 - July 2021

### St. Clare's (ICSE)

*High School (10<sup>th</sup>)*

Koderma, Jharkhand

April 2018 - April 2019