

# 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

### Movie Recommender System

- Developed a hybrid movie recommendation engine combining collaborative filtering and content-based techniques for improved relevance.
- Implemented user- and item-based collaborative filtering using cosine similarity and Pearson correlation to capture behavioral patterns.
- Extracted content features (genres, keywords, cast) and engineered TF-IDF vectors for content-based similarity scoring.
- Built modular pipelines with Pandas and scikit-learn for preprocessing, feature extraction, model training, and evaluation.
- Provided reproducibility via a requirements.txt and clear project structure (data/, src/, models/, notebooks/) with evaluation metrics (precision@K, recall@K, RMSE).

### Student Performance Prediction using Machine Learning

- Built a machine learning pipeline to predict student academic performance using a structured CSV dataset containing demographic details, study behavior, and classroom engagement metrics.
- Performed data preprocessing and feature analysis on factors such as nationality, grade level, attendance, hours studied, and classroom interaction (hands raised).
- Implemented and evaluated multiple classification models to identify the most influential factors affecting student grades and achieve optimal prediction accuracy.
- Visualized model performance and data relationships using confusion matrices, heatmaps, and analytical graphs to demonstrate data modeling and feature impact.

### ChatConnect

- Built a real-time chat application using the MERN stack and Socket.IO to enable low-latency messaging.
- Implemented private (one-to-one) and group chat rooms with real-time message delivery and presence indicators.
- Added JWT-based user authentication and role-aware access control to secure endpoints and sockets.
- Designed a responsive UI in React with Tailwind CSS, including message threads, typing indicators, and read receipts.
- Optimized backend for scale: used Redis for socket session store, implemented message pagination, and indexed MongoDB collections for fast queries.

## ACHIEVEMENTS

- Achieved a LeetCode Contest Rating of 1650, ranking in the top 20% globally.
- Solved 450+ DSA problems across arrays, linked lists, trees, graphs, and other algorithmic domains.
- Participated in 25+ 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*