B Naveen Teja

Dual Degree in Department of Aerospace Engineering , IIT Kanpur

naveenteja NaveentejaB
naveen-teja-beerakuppam

Academic Qualifications

Year	Qualification	Institute	Performance
2024-Present	MTech	Indian Institute of Technology, Kanpur	**7.7/10**
2020-2024	B.Tech	Indian Institute of Technology, Kanpur	**7.3/10**
2019	IPE(XII)	Sri Chaitanya Junior college, Tirupati	**9.88/10**
2017	SSC(X)	Jaganmatha English Medium School, Tirupati	**10/10**

Work Experience

Upraised *May'24 - Jul'24*

Software Developer Intern

- Spearheaded frontend development using **Next.js**, integrating **Shadcn UI** library, **Tailwind CSS**, & **TypeScript** to create a responsive and visually appealing landing page for an **AI tool**.
- Engineered a sophisticated **chat interface** that unifies **contract summarization** and **authoring** features to enhance user experience and streamline document processing workflows.
- Implemented document upload, parsing for contract summarization, and a dynamic questionnaire for contract generation, showcasing proficiency in complex data flows and **API integrations**.
- Contributed to development of a **conversational AI** system in **Django** using Azure AI. Implemented a thread-id which are unique IDs to ensure context retention across user interactions.

B2Y Infy Solutions Pvt Ltd *Feb'24 - May'24*

Associate Software Developer

project-1 (E-commerce platform)

- Architected and implemented a scalable backend **multi-tenant e-commerce platform** using **Express.js**, enabling multiple vendors to manage their storefronts within a unified system
- Led a team of two engineers in development of **RESTful API** endpoints, concentrating on e-commerce functionalities such as real-time **inventory management** and **order processing**
- Implemented robust **user authentication** and customizable search, enhancing security and user experience across platform

project-2 (Idea-hub platform)

- Engineered a robust backend for an **idea hackathon** using **ExpressJS** & **MongoDB**, implementing role-based access control & JWT-based authentication to ensure secure user interactions
- Employed **RESTful API** endpoints for user idea submission and efficient idea evaluation by admins, and **OTP** authentication
- Developed key administrative interface components using **ReactJS**, creating an intuitive and responsive dashboard for streamlined idea evaluation and efficient user management workflows

Stealth Mode startup *Oct'23 - Dec'23*

AI Tech Intern

- Architected and implemented schema in **MongoDB** using **mongoose**, enhancing the data retrieval performance by 30%.
- Developed **RESTful API** endpoints of apparel inventory management for merchants, implementing CRUD operations and advanced search functionality with custom filters using **Express.js**.
- Optimized the integration between backend API and **React.js** frontend and resolved some major bugs in frontend, resulting in a 10% performance enhancement and improved user experience.
- Contributed to **cloth segmentation** and **human parsing** for high-resolution virtual try-on model based on VIT-HD research.

Skills

Programming: C, C++, JavaScript, Python
Web/App: Express.js, Django (REST), Next.js, React.js, Tailwind CSS, Node.js, TypeScript, RabbitMQ, Apache Kafka
Machine Learning: Pytorch, Tensorflow, Scikit-Learn
DBMS: MySQL, PostgreSQL, MongoDB, SQLite, AWS S3
Tools: Ansys, SimuLink, Fusion360, Blender
Misc : Git, Docker, LaTeX

Thesis Work

Simulation of Transonic Buffet Over OAT15

Prof. Pradeep Moise, IIT Kanpur *May'24-Present*

- Investigating the **separation bubble instability** that occurs in**transonic conditions** and whether it can occur when the **transition is forced** over OAT15A using **Ansys Fluent**.
- Conducted an extensive literature review on **transonic buffet** phenomena for the airfoil, analyzing shock wave/boundary layer interactions, buffet onset conditions, and distinctions between laminar and turbulent mechanisms across various Mach numbers and angles of attack.
- Studied advanced simulation techniques including **RANS** and **large-eddy** simulations, understanding their applications in capturing **flow instabilities**, forced transition effects, and multiple shock wave formations in transonic buffet conditions.

Projects

QuickChat : Real-Time chat application *Jan'24 - Feb'24*

Self Project *NaveentejaB/qc*

- Developed a feature-rich chat application using **Express.js**, Socket.io, **Node.js**, and **React.js**, integrating user authentication, advanced **search**, friend requests, and customized alerts
- Implemented robust security measures utilizing **bcrypt** encryption for user registration and login, safeguarding sensitive data and preventing unauthorized access to the application
- Achieved seamless, instantaneous interactivity among users through **Socket.io** integration, facilitating instantaneous messaging upon mutual acceptance of friend requests

MiniMax: Video Streaming Platform *Mar'24 - Jul'24*

Self Project *NaveentejaB/MiniMax*

- Built a full-featured **video streaming platform** using **Next.js**, **Django**, **AWS S3**, implementing **HLS** transcoding for efficient delivery and leveraging Redis caching to enhance performance
- Engineered an asynchronous video processing pipeline utilizing **Celery workers** and **Redis queues**, ensuring seamless handling of transcoding tasks and optimizing system resources
- Implemented a robust user engagement system, incorporating **watch history** tracking and intuitive **video resume** functionality to significantly improve user retention and satisfaction
- Created a **personalized recommendation** system using **machine learning** algorithms, integrating user watch history and preferences to enhance content discovery and engagement

GreenNexus: Enviromental Action Platform *Mar'24 - Present*

Self Project *NaveentejaB/gn*

- Engineered highly scalable RESTful APIs using **Express.js**, implementing **microservice** architecture with **layered** structure in each service and **minimized coupling** between components
- Designed intuitive **UI/UX** in **Figma**, translating core functionality into a visually appealing interface aligned with **theme**
- Developed a comprehensive environmental action platform using **Next.js**, featuring authentication, **event** management, community management & **challenge-reward** system functionalities
- Implemented **map** functionality with **Leaflet.js**, incorporating customizable filters for locating initiatives based on user criteria
- Implemented **notification** and **mailing** services to keep users informed about posts, interactions, and initiatives, activities fostering active community engagement using **RabbitMQ**
- Implemented a robust user-following & **recommendation systems**, leveraging user interactions and follower lists to provide personalized content suggestions enhancing user engagement

Projects

Language Translation AI Model *Apr'24 - May'24*
Self Project *NaveentejaB/LTM*

- Developed a sophisticated Seq2Seq neural machine translation model from scratch using PyTorch, converting German sentences to English with a 30,000 word multilingual dataset.
- Engineered robust data pipeline to preprocess raw text, tokenize input, and generate contextual word embeddings, enabling the model to capture nuanced semantic relationships effectively.
- Implemented and improved model architecture, progressing from attention-based LSTM encoder-decoder to state-of-the-art Transformer for enhanced translation.

Taxi Trip Duration Prediction *Jun'24 - Jul'24*
Self Project *NaveentejaB/ttdp*

- Developed an **XGBoost regression model** with **k-fold cross-validation** to accurately predict taxi trip durations, incorporating feature engineering and external datasets.
- Engineered **features** from timestamp data and geographic coordinates, calculating **Haversine** and **Manhattan distances** to improve model accuracy and performance significantly.
- Conducted comprehensive **exploratory data analysis** using various visualization techniques, including scatter plots, heatmaps, and violin plots to identify patterns and relationships.
- Applied advanced techniques such as **PCA** for **dimensionality reduction** & **K-Means clustering** for location-based analysis, optimizing model performance through hyperparameter tuning.

BankNote Authenticator *May'24 - Jun'24*
Self Project *NaveentejaB/bna*

- Implemented and optimized multiple machine learning algorithms including **Decision Tree**, **Random Forest**, **KNN**, and **SVM** for banknote authentication, achieving up to 99.27% accuracy.
- Engineered features from banknote images using **wavelet transform**, extracting critical attributes such as variance, skewness, curtosis, and entropy for comprehensive model inputs.
- Conducted **comparative analysis** of various ML models performance, evaluating their effectiveness in distinguishing genuine from counterfeit banknotes using a dataset of 1372 instances.

Absenteeism Model *Jan'23 - Feb'23*
Self Project *NaveentejaB/an*

- Developed a comprehensive predictive model using **NumPy**, **Pandas**, and **Scikit-learn** to forecast employee absences based on individual characteristics and organizational factors.
- Visualized and analyzed model outputs using **Tableau** to derive actionable insights on workforce attendance patterns.

HyperSonicRamp *Course Project - ACFD*
Prof. Rajesh Ranjan, IIT Kanpur *NaveentejaB/AE661-project*

- Conducted comprehensive **CFD simulation** of Mach 7 **hypersonic flow** over a 15° ramp using **PRAVAH code** developed in **Fortran**, analyzing shock wave formation & flow characteristics.
- Performed detailed **grid convergence study**, evaluating multiple grid sizes ranging from 61x41 to 181x121, and determined 91x61 as optimal for accuracy and computational efficiency.
- Analyzed pressure, density, and velocity contours, demonstrating proficiency in interpreting fluid dynamics data.
- Calculated **shock wave angle (21.68°)**, closely matching analytical solution **(21.59°)**, validating simulation accuracy.
- Compared results with NASA CFD data, verifying consistency in hypersonic flow predictions.

LMiT(Last Mile Transporter) *Course Project-EACPS*
Prof. Indranil Saha, IIT Kanpur *NaveentejaB/CS637-project*

- Leading a team of 3 UG students to build Last Mile Transporter(LMiT) from scratch with the aim of automating and solving indoor last-mile delivery problems at IITK.
- Completed the infrastructure of the model after optimizing for the POC.
- Demonstrated technical skills in CAD modeling (Fusion 360, SolidWorks), machining, and fabrication.

Projects

Simulation of flow over NACA0012 *May'24 - Jun'24*
Self Project *NaveentejaB/ansys-NACA0012*

- Conducted **CFD analysis** on **NACA 0012** airfoil using **ANSYS Fluent**, implementing **Spalart-Allmaras turbulence** model for accurate boundary layer simulation at Reynolds number 6 million.
- Performed comparative study between simulation results and NASA validation data for 0° and 10° angles of attack, demonstrating proficiency in aerodynamic analysis.
- Utilized advanced meshing techniques to achieve **y+ values less than 1.0**, ensuring high-fidelity near-wall flow resolution for precise pressure and velocity profile predictions.
- Analyzed **drag** and **lift coefficients** for different angles of attack, validating results against NASA data and demonstrating strong understanding of airfoil performance characteristics.

Positions of Responsibility

Web Head : Society of Aerospace Engineers *Mar'23 - present*
society of aerospace engineers

- Redesigned and developed a versatile student community platform using **Next.js**, **Express.js** framework, and **MongoDB**.
- Integrated **ts-particles** library to create a starfield background, optimizing frame rate control for device-specific performance.
- Crafted an admin panel and **RESTful API** endpoints to enhance content management efficiency for administrators.

Extra-Curricular Activities

- Part of **IIT Kanpur Weightlifting Team** (*Jun'22-Oct'23*)
- Participated in **Udhgosh 22** IITK Inter College Sports Fest in **Weightlifting** and **Powerlifting** events.
- Represented **IIT kanpur** in **Weightlifting event** in **56'th INTER-IIT MEET** under 62kgs catergory.

Relevant Courses *Ongoing

Fundamentals of Computing
Image Processing
Complex Variables
Gen AI and cloud computing-GDSC
Introduction to Machine Learning
Embedded And Cyber-Physical Systems(EACPS)
Applied Computational Fluid Dynamics(ACFD)