# Vaibhav Singh

Data Scientist/Developer

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## SUMMARY

**Results-driven Data Science Intern** with proven expertise in architecting AI-driven chatbots, deploying scalable APIs, and engineering end-to-end machine learning pipelines. **Proficient in Python, PyTorch, FastAPI, and cutting-edge NLP/speech technologies** such as BERT, NVIDIA NeMo, and Pyannote. Adept at real-time application development with a robust foundation in data manipulation, machine learning, and web engineering. **Specialized in integrating LLMs and prompt engineering to drive impactful solutions**. Demonstrated excellence through high-impact internship, with a track record of effectively communicating complex technical solutions.

## WORK EXPERIENCE

**Data Science Intern, OriServe, Noida, India** **Jul 2024 - Present**

( Python, PyTorch, FastAPI, LLMs, Prompting, etc )

- Collaborated on AI-driven chatbot development and automation solutions, leveraging models like **BERT**, **Pyannote**, **NVIDIA NeMo**, etc and frameworks like **Pandas**, **Pytorch**, **Plotly**, etc to enhance user engagement and operational efficiency by ~20%.
- Designed and deployed scalable **FastAPI** services to integrate AI and streaming functionalities, ensuring optimized system performance and seamless user experiences
- Designed robust **pipelines** for **TTS**(text-to-speech) and **STT**(speech-to-text) datasets, enabling efficient preprocessing, training, and evaluation with advanced speech techniques.
- Applied **prompt engineering** techniques to enhance response quality across varied use-cases, while managing a **NER-based voice chatbot** tailored for a bar and restaurant setting, gaining hands-on experience in **LLM response optimization**.
- Authored an article on Medium: ***Building High-Fidelity Datasets for Superior Text-to-Speech Fine-Tuning***, offering insights on best practices, challenges, and strategies for ensuring superior audio output quality.
- Engineered and optimized PyTorch scripts to fine-tune and train diverse ML/DL and Transformer-based models such as BERT, XTTSv2 (VQ-VAE, GPT-2), Whisper, etc.
- **Evaluated** and **benchmarked** multiple open-source ASR(NeMo, pyannote) and TTS(XTTS, Orpheus-TTS) models and platforms(Deepgram, Sarvam.ai, ElevenLabs) for performance, accuracy, and deployment feasibility on .

**Summer Intern, Directorate of Research, Innovation and Development (DRID), JIIT, Noida** **May 2024 - Jul 2024**

(OpenCV, cvzone, PyTorch Lightning, Pygame, NumPy, scikit-learn)

- Engineered an accessible Connect Four game controlled exclusively through American Sign Language (ASL) hand gestures, enabling players with speech or motor impairments to enjoy gaming without traditional input devices.
- Implemented real-time **computer vision** tracking utilizing **OpenCV** and cvzone's HandTrackingModule to detect, isolate, and process hand positions from webcam input with optimized performance on consumer hardware.
- Designed and trained a custom CNN model achieving **99%** accuracy in **PyTorch Lightning** to classify ASL hand gestures, orchestrating multiple convolutional layers to enable precise recognition of "A", "B", and "C" signs as game controls.

**Participant, HACKATHONS & CLOUD ( BITBOX, Google Cloud Study Jams )**

- Participated in BITBOX by GDSC JIIT 128, a 12-hour hackathon fostering team collaboration and stress management in a pro environment.
- Earned ***badges*** in Generative AI Arcade Game, Google Cloud Computing Foundations, and more via Google Cloud Study Jams.

## EDUCATION

**JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY, Noida, India** - *B.Tech, Computer Science & Engineering - GPA: 7.3* **Sep 2021 - Jun 2025**

**Dehradun Public School, GZB, India** - *XII, - GPA: 90%* **2018 - 2020**

## PROJECTS

**CRYPTONIX**

- Built a cryptic toolkit with cipher solvers, encryption-decryption, steganography, and password strength checker.
- Applied DSA concepts like maps, vectors, recursion, hashing, and collision handling.

**PYTONE – REAL-TIME SPEECH EMOTION RECOGNITION**

- Developed emotion recognition system using real-time speech and text analysis via ML models to enhance interaction quality.

**BCI Games–Brain − ControlledInterfaceGame**

- Designed and built a brain-computer interface using EEG signals, enabling real-time in-game actions through smile detection
- Achieved 95% command execution accuracy, reducing cognitive load and enhancing user experience.

**AID FOR SPEECH AND HEARING IMPAIRED**

- Developed real-time ISL translator using speech-to-text and SIGML-based animations for inclusive communication support.

## SKILLS

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|---|---|---|
| **Programming Languages** | **:** | Python, C++, SQL, C, Html, CSS, Javascript |
| **Data Manipulation** | **:** | Pandas |
| **Web Development** | **:** | FastAPI, Flask, Django, Websockets |
| **Machine Learning** | **:** | torch, lightning, tensorflow, Opencsv, scikit-learn |
| **Other Tools** | **:** | Shell, PowerBI |