Navnoor Singh

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Education

Indraprastha Institute of Information Technology — New Delhi, India
Bachelor of Technology in Computer Science and Social Science — *2021 – 2025*

Venkateshar International School — New Delhi, India
CBSE — *2008– 2021*

Experience

Undergraduate Researcher (B.Tech. Project) — Aug. 2024 – May 2025
Indraprastha Institute of Information Technology — *New Delhi, India*

- Conducted mixed-methods research under Dr. Paro Mishra on the sociomedical landscape of Postpartum Depression (PPD), analyzing systemic gaps in care and proposing digital solutions.
- Designed and executed primary research, including qualitative interviews with medical practitioners and quantitative surveys with mothers, to investigate PPD awareness, lived experiences, and support needs.
- Analyzed extensive qualitative and quantitative data to identify diagnostic challenges, sociocultural influences, and the role of informal/digital support networks in managing PPD in India.
- Co-authored the B.Tech. Project report, ”Understanding Postpartum Depression: The Parental Awareness and Self-Perception,” and conceptualized ”Seriva,” a human-centered digital platform (using Double Diamond framework) to address identified care gaps.

Intern — May 2024 – July 2024
Defence Research and Development Organisation(DRDO) — *New Delhi, India*

- Developed and fine-tuned machine learning models to analyze relationships between multiple parameters in an artillery shot dataset.
- Optimized feature selection and hyperparameters, improving model accuracy and predictive capabilities.
- Applied Python-based data analysis to extract actionable insights for defense applications.

Graphic Design Intern — Jun. 2023 – Sep. 2023
ECE Labs, IIITD — *New Delhi, India*

- Designed a series of visually engaging posters and informational graphics to simplify and promote complex ECE concepts among students.
- Focused on creating clear, aesthetically pleasing materials that encouraged student interaction and enhanced understanding of lab activities and research.

Video Editor Intern — Jan. 2023 – Mar. 2023
Spur — *Remote*

- Conceptualized, edited, and produced a compelling brand video for Spur’s Shopify store, incorporating motion graphics and storytelling elements.
- The video significantly contributed to increased brand visibility and a measurable boost in online sales and customer engagement.

Projects

Deep Learning for Sequence Tagging (Legal and Review Data) | *Python, PyTorch, TensorFlow, Keras, gensim*

- Developed advanced NLP sequence tagging models for Named Entity Recognition (NER) in legal judgments and Aspect Term Extraction (ATE) from product reviews.
- Implemented and rigorously evaluated 18 distinct deep learning models, including Vanilla RNNs, LSTMs, and GRUs, alongside a Bi-directional LSTM-CRF architecture.

- Utilized 3 different pre-trained word embeddings (Word2Vec, GloVe, FastText) to capture nuanced semantic relationships in text data.
- Achieved a peak macro F1-score of **0.8125** and an accuracy of **0.9377** for legal NER using the Bi-LSTM-CRF model with Word2Vec embeddings.
- Orchestrated comprehensive data preprocessing, including BIO chunking and tokenization, for two distinct datasets to prepare data for model training.

Predictive Modeling for Hospital Length of Stay (MIMIC-III) | *Python, PyTorch, Transformers, Scikit-learn, Pandas*

- Engineered a hybrid machine learning system predicting categorized hospital Length of Stay (LOS) from the MIMIC-III dataset, integrating BERT for clinical note analysis with Random Forest for structured data insights.
- Spearheaded hyperparameter tuning for both BERT and Random Forest components, contributing to the hybrid model achieving 96% predictive accuracy across 4 LOS categories.
- Executed feature importance analysis on diverse patient data (demographics, admission details, ICD codes), enhancing model interpretability and guiding selection of key predictors for the Random Forest model.
- Orchestrated comprehensive data preprocessing and feature engineering on the complex MIMIC-III dataset, involving cleaning and transforming over 7 interconnected tables for effective model training.

Butter Me Up Dairy Co. (Inventory Management System) | *Python (Flask), MySQL, HTML, CSS, JavaScript*

- Architected and developed a full-stack web application for comprehensive dairy inventory and operations management, providing distinct, role-based interfaces for warehouse managers and shop employees.
- Constructed a normalized MySQL database schema with over 8 tables and implemented Python (Flask) backend API endpoints for robust CRUD operations on products, inventory, orders, and customer data.
- Implemented core functionalities enabling real-time inventory tracking, seamless stock updates across multiple locations, streamlined order processing, and automated delivery management.

SADAT: Secure Distributed File Storage System | *Electron, Python, Node.js, Firebase, HTML/CSS/JS*

- Developed a desktop application for secure file archival, implementing file segmentation, RSA 2048-bit encryption for each segment, and distribution across 4 distinct Firebase instances to enhance data resilience.
- Built the Electron-based UI for file upload/download and orchestrated Node.js for file system operations, including inter-process communication with Python scripts managing cryptographic tasks.
- Designed a secure retrieval process involving fetching encrypted segments from distributed cloud storage, performing local decryption, and accurately reassembling segments into the original file.

Discord Bot - Stalin | *Python, discord.py, asyncpraw, aiohttp, requests*

- Created a multi-functional Discord bot providing moderation, utility (e.g., information lookup), and entertainment features to enhance server engagement for over 200+ users across multiple servers.
- Leveraged the Reddit API (via 'asyncpraw') for dynamic content fetching (e.g., memes) and implemented asynchronous event handling using 'aiohttp' for responsive performance.
- Engineered a modular command system supporting over 20 distinct commands for user moderation, automated responses, and interactive utilities.

Review Summarization using GPT-2 | *Python, PyTorch, Hugging Face, NLTK, BeautifulSoup*

- Constructed an abstractive text summarization model by fine-tuning a pre-trained GPT-2 architecture on the Amazon Fine Food Reviews dataset, comprising over 500,000 reviews.
- Implemented custom text preprocessing pipelines using NLTK and BeautifulSoup for data cleaning, tokenization, and normalization, improving input quality for the model.
- Validated model performance, achieving ROUGE-1, ROUGE-2, and ROUGE-L F1-scores of 0.77, 0.57, and 0.71 respectively, indicating strong content overlap with reference summaries.

Custom Shell Utilities | *Bash, Shell Scripting*

- Authored a collection of 15+ custom Bash scripts designed to significantly enhance command-line productivity and automate repetitive tasks in Unix-like environments.
- Streamlined command-line operations by implementing utilities for advanced file/directory management, system information retrieval, network diagnostics, and efficient text processing.

- Designed modular and reusable shell functions, promoting code maintainability and ease of integration into daily workflows for system administration tasks.

Information Retrieval System (Cranfield Dataset) | *Python, NLTK, scikit-learn, NumPy, pandas*

- Built an Information Retrieval system capable of querying and ranking documents from the Cranfield collection, a standard aerospace test dataset of 1400 documents and 225 queries.
- Executed and systematically compared 4 distinct retrieval models: TF-IDF, Boolean Model, Vector Space Model (VSM) with cosine similarity, and Latent Semantic Indexing (LSI).
- Crafted text preprocessing pipelines leveraging NLTK for tokenization, stemming, and stop-word removal to optimize document representation for retrieval tasks.

16-bit ISA Assembler & Simulator | *Python*

- Architected and built a complete two-pass assembler and functional simulator for a custom-defined 16-bit Instruction Set Architecture (ISA) with 16 unique instructions.
- The assembler translated assembly language programs into 16-bit machine code, incorporating symbol table management, forward reference handling, and comprehensive error checking for syntax and operand validity.
- The simulator accurately emulated CPU behavior, executing machine code by manipulating registers (e.g., 7 general-purpose, FLAGS), memory (256 words), and program counter, with a full execution trace.

Awards & Achievements

2nd Runner Up, Anveshan Hackathon, IIITD, 2024

First Prize, Synergy Skillathon, SGT University, 2021

Second Prize, Drone Competition, SGT University, 2019

Third Prize, RoboWar Competition, Pragati Public School, 2019

Participant, 'Artificial Intelligence for Sustainability' Conclave by ICEAST & India-Japan Science, 2019

First Prize, Innovation with Waste Material Challenge, Delhi Traffic Police, 2018

State Rank 52, Smart Kid General Knowledge Olympiad, 2016

Distinction in Mathematics & Science, International Benchmark Test (IBT), 2015

Positions of Responsibility

NSS IIITD (National Service Scheme)

- Mentor
- General Secretary
- Joint Secretary

IIITD Major Fests

- Creatives Lead, Coverage Lead, Socials Lead – Astra'23 (Sports Fest)
- PR Organizing Committee – Odyssey'24 (Cultural Fest)
- Video Editor & Theater Event Lead – Odyssey'23 (Cultural Fest)

IIITD Student Clubs & Bodies

- Video Editor – TedxIIITD, Ecell, Finnexia (finance club), Machaan (theater club), ACM, Owasp, d4rkcode (cybersec soc.), Tasveer (media club), DesignHub (design club)
- Design Lead – Sports Council
- Design Team – WIT

IIITD Institutional Roles

- Video Editor & Videographer – Media Service Committee IIITD
- Design Organizing Committee – M.Tech/PhD & B.Tech Inductions

Ambassadorships

- IIITD Ambassador – Skoar by Digit Program
- Senior Ambassador – Atal Tinkering Lab

Technical Skills

Languages: Python, JavaScript, SQL (MySQL), HTML/CSS, R, Bash

Frameworks & Libraries: PyTorch, Hugging Face Transformers, scikit-learn, Flask, React.js, Express.js, Node.js, Electron.js, Axios, NumPy, pandas, Matplotlib, NLTK, PyCryptodome, Seaborn, Streamlit, TensorFlow, Keras, gensim

Tools: Git, Postman, VS Code, PyCharm, Excel, Figma, Latex, Linux/Unix Shell, Firebase, Google Colab, Davinci Resolve, Adobe Creative Suite (Photoshop, Premiere Pro)

Soft Skills: Critical Thinking, Negotiation, Stakeholder Management, Adaptability, Resilience