Nitish Kumar

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nitishkumar | nitishkumar | portfolio

Education

Year	Degree/Certificate	Institute	CPI/%
2023-Present	M.Tech (Computer Science & Engg.)	Indian Institute of Technology, Kanpur	7.50/10
2019-2023	B.Tech (Computer Science & Engg.)	Bakhtiyarpur College of Engineering, Patna	8.69/10
2019	HSC (Bihar School Examination Board)	College of Commerce, Arts and Science, Patna	83.40%
2017	SSC (Bihar School Examination Board)	Anugrah Inter School, Aurangabad	80.80%

Experience

- **Person Re-Identification using mmWave Radar Sensor** (M.Tech Thesis) Guide: Prof. Priyanka Bagade (*May'24-Present*)
  - Utilizing **TI IWR1843BOOST** mmWave radar sensor and mmWave Visualizer to acquire high-resolution point cloud data.
  - Implementing Python-based data collection and processing pipeline, handling over **2,000** images of **50** individuals in one environment and **30** individuals in another, synchronized with radar data.
  - Incorporating a **Kalman filter** for enhanced tracking and prediction of individuals' movements.
  - Developing real-time visualization tools using **PyQt5** and **pyqtgraph**, enabling interactive 3D visualizations of radar data.
  - **Reseach Area : IoT, Computer Vision, Machine Learning and Natural Language Processing**
- **Machine Learning Intern :** Azure Skynet Solutions Pvt Ltd (*Dec'22-Feb'23*)
- **Software Developer Intern :** Geminid Systems, Inc., CA 94065, United States (*August 2020*)

Projects

- **Linguistics for Indian Languages** (Course Project: CS689) Guide: Prof. Arnab Bhattacharya (*Jan'24-Apr'24*)
  - Adopted **Unicode correction** on mother tongue corpus; analyzed **unigram** and **bi-gram** frequencies with **BPE, mBERT, indicBERT** and **White-space tokenizers** to identify word groups and syllables.
  - Fine-tuned and reviewed **IndicBERT and IndicNER models** for named entity recognition. Evaluated machine translation models **NLLB-200, IndicBART** and **ChatGPT** for English-Indian language translations & reported **BLEU** and **ROUGE** scores.
- **Audio Aura** (Course Project: CS661) Guide: Prof. Soumya Dutta (*Jan'24-Apr'24*)
  - Conducted comprehensive analysis of global music trends, utilizing advanced **data visualization techniques** to uncover insights on genre preferences, artist popularity, and emerging musical trends.
  - Deployed a **KNN-based music recommendation system**, using attributes like Danceability, Energy, Valence, and Tempo to suggest songs, with support for **dynamic SQL querying** to refine recommendations across **67 countries**.
- **Linear CARPUF** (Course Project: CS771) Guide: Prof. Purushottam Kar (*Jan'24-Apr'24*)
  - Proposed a **Linear CARPUF (Challenge and Response Physical Unclonable Function)** model leveraging machine learning to enhance cryptographic security, simulating the concept of unique, unclonable device-specific "handshakes".
  - Refined logistic regression algorithms by incorporating the **Khatri-Rao product**, resulting in a **30% increase** in operational efficiency and allowing the generation of challenge-response pairs for complex scenarios in real time.
- **Chiron Framework : Kachua** (Course Project: CS639) Guide: Prof. Subhajit Roy (*Aug'23-Nov'23*)
  - Applied **symbolic execution** and the **Z3 theorem prover** for **program synthesis**, identifying constant assignments to establish semantic equivalence between two programs with constraints.
  - Examined a **Spectrum-Based Fault Localization (SBFL)** technique using **Density Diversity Uniqueness (DDU)** and **Suspiciousness with Ochiai metric** to detect and localize program bugs.
- **Edu-360: Academic & Innovation Hub** (Self Project) (*Feb'21-Apr'21*)
  - Implemented key features like **Learn Space** for study resources, **Exam Space** for PYQs, and a **Blog Section** for user-generated content, all built using **PHP**, **HTML**, **CSS**, and **Bootstrap**, and **SAWO Labs API**.

Technical Skills and Relevant Courses

- **Programming Languages and Web Technologies :** C, C++, Python, HTML5, CSS3, ES6, Node.js, PHP, React, Bootstrap, Django.
- **Libraries, Tools & Technologies :** Numpy, Pandas, Matplotlib, Scikit-learn, NLTK, SQLite, RESTful APIs, Git, Github.
- **Courses :** Introduction to ML, Program Analysis Verification and Testing, Data Structures & Algorithms, Design and Analysis of Algorithms, Object Oriented Programming using C++, Operating Systems, Computer Networks, Database Management Systems.

Positions of Responsibility

- **E-masters Teaching Assistant :** Guided **30** students in **AI in IoT** and **41** in **Embedded Cyber Physical Systems & IoT Security** with their assignments and course Work. (*Jul'24-Sep'24*)
- **Teaching Assistant:** Assisted **100** students in **Fundamentals of Computing** and Guiding **31** students in **Introduction to IoT** across **3** semesters, focusing on doubt resolution, lab sessions, and academic support. (*Aug'23-Present*)
- **Club Officer, Toastmasters International Club 4 IIT Kanpur:** Chairing and facilitating engaging club meetings. (*Jul'24-Present*)
- **Student Guide, ICS IIT Kanpur:** Mentoring 8 master's freshmen to acclimate to the institute's environment. (*Jul'24-Present*)

Extra-Curricular Achievements & Certifications

- **Google Developer Student Club :** Conducted sessions and Supervised **500+** students to get better with new tech stacks.
- **Google Cloud Ready Facilitator :** Earned **38** badges through hands-on training on **Google Cloud Platform**.
- **Open Source Contribution :** Merged **6** successful pull requests in the **Hacktoberfest**.
- **Winner of Photography Competition :** Secured **1st** position in Photography Competition on World Environment Day.