Bhavik Vijay Patel

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Computer Science and Engineering
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ACADEMIC DETAILS

Degree	Specialization	Institute	Year	CPI/%
B.Tech.	*Computer Science and Engineering*	IIT Gandhinagar	2022-Present	8.49
Class XII	*Physics, Chemistry, Maths*	St. Paul School, Nagpur	2021-2022	90.5
Class X		Priyadarshini School, Nagpur	2019-2020	96.8

INTERNSHIP EXPERIENCE

- **Member of Technical Staff Intern | DevRev** [May '24 – July '24]
  Sandbox Configuration Export Tool (Internal Platform) | Project Presentation
  - Designed and built a CLI-based configuration export tool to replicate DevRev environments across organizations using **Pulumi (Infrastructure as Code)**.
  - Implemented a scalable **Golang-based serialization engine** to convert platform resources into dependency-safe Pulumi YAML configurations.
  - Collaborated across multiple internal platform teams to serialize, align, and integrate independently owned resources into a unified export pipeline and long-term extensibility.
  - Extended backend functionality and improved system reliability by adding required APIs and fixing issues discovered during development.

PROJECTS

- **Large Integer Addition using AVX-512 & ARM NEON SIMD** [Aug '25-Nov '25]
  (Prof. Abhishek Bichhawat, IIT Gandhinagar) | Poster
  - Designed a parallel multi-stage algorithm for large integer addition using SIMD vectorization on **AVX-512 (x86)** and **NEON (ARM)** architectures.
  - Implemented a queue-based addition strategy to efficiently handle carry propagation across wide integers.
  - Leveraged SIMD intrinsics and multi-core parallelism to achieve significant speedups over sequential addition.
  - Evaluated performance across architectures, analyzing scalability with compiler optimizations and parallel execution.

- **Smart Guard IoT Application** [Mar '25 – May '25]
  (Prof. Sameer Kulkarni, IIT Gandhinagar) | *Project Link*
  - Developed an ESP32-based IoT monitoring system with a Node.js/Express backend and PostgreSQL database.
  - Built a React + Vite dashboard for live data visualization and alert management.
  - Designed RESTful APIs for sensor data retrieval and threshold-based alerts.
  - Containerized frontend and backend; created a Makefile for streamlined development.

- **Number Conversion Simulator And IEEE-754 Convertor** [Oct '24 - Nov '24]
  (Prof. Sameer Kulkarni, IIT Gandhinagar) | *Project Link* | *App Link*
  - Built a GUI-based tool using React.js to teach concepts such as number system conversion process and IEEE-754 conversion process.
  - Implemented real-time visualization of the conversion steps of the number system, including fractional and base-to-base conversions.

- **Algorithmic Solutions of various Games using data structures** [Sept '23 - Nov '23]
  (Prof. Balagopal Komarath, IIT Gandhinagar) | *Project Link*
  - Implemented functions for optimal move selection in two-player games such as Connect4, Game of Sim, and Tic-Tac-Toe using graph traversal algorithms.
  - Developed solutions for games like Up-it-Up, puzzle8, and 2x2x2 Rubik's Cube Solver, employing efficient numeric encoding strategies to minimize computational complexity in storing moves and board positions.

- **Text Generator based on next character prediction using MLP** [Feb '24 - Mar '24]
  (Prof. Nipun Batra, IIT Gandhinagar) | *Project Link* | *App Link*
  - Developed and deployed a character prediction pipeline using context from preceding characters for text generation.
  - Trained models on diverse corpora including Shakespeare's writings and LaTeX code, with extensive hyperparameter tuning to evaluate and compare model performance.
  - Deployed a Streamlit application for interactive selection of hyperparameters such as block size and embedding size, providing real-time output visualization of the trained models.

- **Human Activity Recognizer Analysis** [Mar '24 - Apr '24]
  (Prof. Nipun Batra, IIT Gandhinagar) | *Project Link*
  - Analyzed and processed the UCI-HAR dataset, featuring time-series accelerometer data from thirty subjects engaged in six activities: walking, sitting, standing, running up, running straight, and running down.
  - Leveraged TSFEL library to extract out features from the time-series, performed Principal Component Analysis (PCA) for dimensionality reduction.

- Trained a Decision Tree model on featurized data and achieved a 76% accuracy on activity classification using data collected from the Physics Toolbox Suite app for testing.

TECHNICAL SKILLS

- **Programming Languages:** Python, C++, Verilog, HTML, CSS, SQL, Javascript, Go.
- **Tools:** : Xilinx Vivado, LATEX, Git, Arduino UNO, Docker, AWS.
- **Libraries:** : Numpy, SciPy, Pandas, Matplotlib, Seaborn, TensorFlow, Tensorboard, Scikit-Learn, Stramlit, Flask, React.js, Pulumi(IaC).

ACHIEVEMENTS

- Felicitated with **Dean's List Award** IITGN for **Semester I, II** for excellent academic performance.
- Secured **5th Rank** in Competitive Programming Section of HackRush, IITGN's Annual Hackathon
- Secured an All India Rank of **7001** in the Joint Entrance Exam (Advanced).

RELEVANT COURSES

- **Institute Courses:** Machine Learning, Data Structures and Algorithms, Data Centric Computing, Probability Statistics and Data Visualization, Calculus of a single variable and Algebra, Calculus of Several Variables, Discrete Mathematics, Natural Language Processing, Computer Organization and Architecture, Computer Networks and Security, Foundation of AI - Multiagent Systems, Operating System, Computer Networks, Data Science.