

# Dhairya Patel

M.Tech – Machine Learning

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## Education

**Dhirubhai Ambani University**

CPI: 7.81

2024 - Present

Gandhinagar, Gujarat

**B.Tech Dr. D. Y. Patil Institute of Engineering, Management and Research**

CGPA:8.02

2020 - 2024

Pune, Maharashtra

**12th School Name (GHSEB)**

Percentage:70.46

2019 - 2020

Gandhinagar, Gujarat

**10th School Name (GSEB)**

Percentage:84

2017 - 2018

Gandhinagar, Gujarat

## Experience

**Suvidha Foudation (Remote)**

Machine Learning Intern

Feb 2023 – March 2023

Pune, Maharashtra

- Trained machine learning models using a mix of traditional and neural NLP techniques, including Seq2Seq architectures, TF-IDF, and Word2Vec embeddings.
- Focused on building text generation and representation systems, gaining hands-on experience with model training and text data pipelines.

## Projects

**LOW IMAGE ENHANCEMENT** | Python, PyTorch, NAFNet



- Developed diffusion-based RAW image enhancement system for extreme low-light conditions (100× exposure amplification)
- Engineered custom NAFNet architecture with optimized reverse diffusion process (1000→20 timesteps)
- Processed Sony SID dataset with specialized Bayer pattern handling for RAW sensor data
- Implemented multi-metric evaluation (PSNR/SSIM/LPIPS) revealing key optimization opportunities: Baseline PSNR: 5.70 dB (indicating extreme noise challenge) SSIM: 0.075 (highlighting structural similarity limitations) LPIPS: 0.747 (quantifying perceptual quality gap)
- Identified data preprocessing bottlenecks through metric patterns across 20 test samples
- Proposed three-phase improvement plan: perceptual loss weighting, exposure-aware conditioning, and progressive denoising

**VIT(Vision Transformer) sketching** | PyTorch, CUDA, OpenCV



- Designed a memory-efficient ViT using attention sketching (Gaussian/Count Sketch), cutting CPU memory by 15% for high-res images
- Trained a hybrid model (full + sketched attention) that matched standard ViT accuracy (90% vs 92.1%) with 1.2x-1.5xfaster inference
- Implemented weight fusion for deployment, reducing model size by 30% with very minute difference in accuracy

**CNN from scratch** | Python, NumPy, OpenCV



- Built a CNN from scratch using only NumPy, replicating core operations (convolution, pooling, backpropagation) without frameworks

**AI-Based Multimodal Blood Cell Analysis and Disease Recommendation System** | Python, NumPy, pandas, tensorflow, sklearn



- Developed end-to-end multimodal AI pipeline analyzing blood smear images + patient symptoms to predict hematological disorders
- Engineered YOLOv8 detection and U-Net segmentation and Efficient net classification models processing 50+ cells/sec, reducing manual microscopy time by 70%
- Trained 9-class CNN classifiers for each RBC/WBC pathology using Raabin-WBC/Elsafy datasets (F1-score: 0.89)
- Built disease recommendation engine (Scikit-learn MLP) combining image features + 10+ clinical symptoms

Technical Skills

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**Languages:** Python, SQL (Beginner)  
**ML Frameworks:** PyTorch, TensorFlow, Keras, Scikit-learn, OpenCV  
**Frameworks:** FastAPI, Streamlit  
**Computer Vision:** CNN, Vision Transformers, Diffusion Models, GEN-AI, etc  
**NLP:** Hugging Face, LLM Fine-Tuning, Traditional NLP algorithms  
**Image Processing:** SIFT, SURF, ORB, HOG, Canny Edge, Sobel, Hough Transform, Thresholding, Harris Corner  
**Web Scraping:** Data-extraction, tools(BeautifulSoup, Scrapy, Selenium, etc) & automation  
**Core Subjects:** Data Structures and Algorithms (Basic), Statistics, Hypothesis Testing, Linear Algebra, Mathematical Optimization  
**Areas of Interest:** System Design, AI/ML, Distributed Systems

Position Of Responsibility

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<b>Core Member</b> <i>Research Club DAU</i>	July 2025 - Present
<ul style="list-style-type: none"><li>Recently joined the college Research Club; currently working with the AI Club to plan and organize events that encourage collaboration and interest in AI research.</li></ul>	
<b>Team Member</b> <i>AI Club DAU</i>	Sep 2024 - Present
<ul style="list-style-type: none"><li>Contributing to the development of a campus-wide AI chatbot (DAU) aimed at streamlining student queries and automating responses to common administrative tasks.</li><li>Collaborating on an AI-based notes generation tool that extracts transcripts from YouTube lectures and converts them into structured, easy-to-read notes.</li></ul>	

Achievements

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- 1st Rank - Smart India Hackathon (SIH) 2023 (Intercollege)
- Winner - TECHNOV6 Hackathon by Ainnov8 DGI