

Khanakh Prajapati

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EDUCATION

- **Parul Institute of Engineering and Technology** Vadodara, India
Bachelor of Technology - Information Technology; CGPA: 7.93
Courses: Data Structures & Algorithms, DBMS , Machine Learning, Software Engineering
- **Jawahar Navodaya Vidyalaya** Navsari, India
Senior Secondary(CBSE Board); Percentage: 87.00%
Subjects: Physics, Chemistry, Mathematics
July 2020 - June 2021

SKILLS SUMMARY

- **Programming Languages:** Python, SQL
- **Machine Learning:** Linear Regression, Logistic Regression, Decision Trees, Random Forest, Feature Engineering, Model Evaluation, Cross-Validation
- **Deep Learning:** CNNs, RNNs, Large Language Models(LLMs), Fine-tuning, Transfer Learning, Inference Pipelines
- **Computer Vision:** Object Detection, Image Preprocessing, Video Processing, Real-Time Inference
- **Libraries & Frameworks:** Hugging Face Transformers, PyTorch, TensorFlow, Keras, Pandas, NumPy, Scikit-learn, OpenCV, Matplotlib
- **Robotics & UAV Systems:** Drone Assembly & Disassembly, Flight Controller Calibration, QGroundControl, Sensor Calibration
- **Tools & Platforms:** Git, GitHub

EXPERIENCE

- **IIT Mandi** Onsite
Robotics and Artificial Intelligence Intern
 - **Transformer-Based Language Systems:** Built a GPT-style transformer in PyTorch from the ground up, including token embeddings, positional encodings, and multi-head attention blocks. Fine-tuned GPT-2 for SMS classification by replacing the output head and retraining the top layers on labeled data.
 - **Computer Vision Implementations:** Implemented object tracking using CamShift and MeanShift with HSV color histograms to follow targets in video streams. Worked with ArUco markers for position estimation and used Farneback optical flow to measure camera displacement between frames.
 - **CNN-Based Terrain Detection:** Trained a CNN to identify terrain types for robot navigation. Tested different model architectures under real-time speed requirements and converted the final model to ONNX for deployment on robotic hardware.
- **British Airways** Remote
Data Science Intern
 - **Web Scraping & Sentiment Analysis:** Scrapped customer reviews using Python, cleaned the text data, and used VADER to classify reviews as positive, negative, or neutral to understand overall customer sentiment.
 - **Predictive Modeling:** Built a Random Forest classifier to predict whether customers would book flights based on their browsing and purchase history. Cleaned the dataset and normalized features before training the model.

PROJECTS

- **GPT Implementation from Scratch(GPT Architecture, Multi-Head Attention, PyTorch, Pretrained Weight Loading):** Designed a GPT-style transformer model from scratch including token embedding, positional encodings, multi-head self-attention, feed-forward networks, residual connections, and layer normalization. Verified correctness by loading pretrained weights and performing forward-pass inference for language modeling tasks.
- **SMS Classification via GPT-2 Fine-Tuning (GPT-2, Hugging Face Transformers, PyTorch, Transfer Learning):** Finetuned pretrained GPT-2 Medium for SMS Classification by replacing the language modeling head with a task-specific classification layer and selectively updating the final transformer block and feed-forward layers. Reconfigured tokenization, attention masking, and training using Hugging Face Transformers.
- **Comparative Object Tracking with Failure Detection(OpenCV, CamShift, MeanShift, Real-Time Tracking, Failure Detection):** Compared CamShift and MeanShift object trackers using HSV back-projection and benchmarked tracking performance using FPS and centre-drift metrics. Designed failure detection mechanisms based on area collapse and drift thresholds with automatic re-initialization to recover from tracking loss.
- **Automated Real-Time Terrain Detection for Quadruped Robotics(YOLO, ONNX, Real-Time System):** Developed an end-to-end terrain perception system for quadruped robotics with automated model selection under real-time constraints. Benchmarked multiple YOLO variants mAP and latency profiling, evaluated GPU-synchronized FPS, enforced deployment thresholds programmatically, and exported optimized models to ONNX for edge inference.

COURSES

Building LLMs from Scratch (Vizuara), Python for Computer Vision with OpenCV and Deep Learning (Udemy), 100 Days of Deep Learning (CampusX), Data Science (DevTown)