# Marmik Chaudhari

814-769-6903 | mbc6219@psu.edu | marmik.xyz | Github

## Education

**The Pennsylvania State University** — University Park, PA
*Bachelor of Science in Computer Science* — *Aug. 2023 – May 2027*

## Work Experience

**Machine Learning Researcher** — June 2024 – August 2024
*Buildspace* — *San Francisco, CA*

- Led a 4 person independent research team to develop DenseTeX, a 125M parameter Image2LaTeX model, integrating a DenseNet-169 CNN encoder with a GPT-2 decoder to transcribe complex mathematical expression.
- Implemented the first-of-its-kind 2D Positional Encoding in an Image-to-LaTeX model, enhancing the model's spatial awareness and overall performance on the task.
- Efficiently leveraged high-performance computing resources by training the model on 4xA6000 GPUs for ∼20 hours on a dataset of 1M samples achieving a BLEU benchmark of 0.80 and a validation loss of 0.45 demonstrating reasonable accuracy.

**Machine Learning Developer** — October 2023 – Present
*SmartOCR* — *University Park, PA*

- Implemented Visual Transformers with 91% accuracy for a downstream OCR task with robust data pre-processing pipeline, model fine-tuning and confidence level estimation to minimize errors & hallucinations by 20%.
- Utilized Litestar to build fast & performant APIs for backend enabling seamless integration of the models into production servers and ensuring efficient data flow and scalability of the models.
- Collaborated within a 5-member team actively leveraging agile project development, involving regular code reviews and contributing to the optimization of team workflows.

**Computer Vision Developer** — September 2023 – Present
*RoboX* — *University Park, PA*

- Collaborating with a dynamic team of developers to implement various algorithms for perception, object detection, object tracking with SORT, depth calculation with PnP, IMU data processing & polynomial regression for target motion prediction of a robot.
- Collaborated closely with the Mechanical team to integrate vision algorithms with hardware components, refining system performance through iterative testing & contributing to our top 8 finish in RoboMaster championship.

## Research Publications

- **ICLR'25 Workshop on Sparsity in LLMs** | MoE Lens - An Expert is all you need.

## Projects

**CodeWhisper** | *Python, PyTorch, Typescript, Javascript* — *CalHacks*, October 2024

- Developed CodeWhisper, a VS Code extension using gpt-4o and Whisper models to take natural speech input and perform actions in your IDE extracted from those inputs.
- Designed a comprehensive codebase analysis system that makes real-time intelligent edits and performs various actions across the codebase based on natural speech input.
- Integrated speech-to-text processing with VS Code Extension API enabling intuitive navigation and manipulation of entire codebases and making edits within files.

**IdeaStruct** | *Python, PyTorch, Flask, HTML, CSS, JavaScript* — *HackMIT*, September 2024

- Designed and developed IdeaStruct, a Flask-based web application leveraging knowledge graphs to collect, represent, and summarize complex data relationships.
- Integrated gpt-4o models for natural language processing to enable AI-driven entity extraction, relationship mapping, and automated data ingestion.
- Implemented interactive knowledge graph visualizations with Cytoscape.js and integrated it with Neo4j backend for real-time model-driven graph updates.