

# Marmik Chaudhari

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## EDUCATION

### The Pennsylvania State University

Bachelor of Science in Computer Science

University Park, PA

Aug. 2023 – May 2027

## WORK EXPERIENCE

### Machine Learning Researcher

June 2024 – August 2024

Buildspace

Remote

- Independently conceptualized and implemented DenseTeX, a novel 95M parameter Image2LaTeX model, integrating a DenseNet-169 CNN encoder with a GPT-2 decoder to tackle complex mathematical expression transcription.
- Pioneered the first implementation of 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 ~10 hours on a dataset of 1M samples achieving a BLEU benchmark of 0.25 and a validation loss of 0.45 demonstrating reasonable accuracy.

### Machine Learning Developer/Intern

October 2023 – Present

SmartOCR

State College, PA

- Implemented Visual Transformers for an OCR application to enhance transcript automation process along with robust data pre-processing pipeline, fine-tuning on the dataset and confidence level estimation to minimize errors & hallucinations.
- Utilized Litestar to build fast & performant APIs for backend enabling seamless integration of ML 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.

## PROJECTS

### Chat with Research papers | PyTorch, HuggingFace Transformers, Streamlit

May 2024

- Developed a RAG application for efficient information retrieval from research papers using vector embeddings.
- Implemented a vector database to store and retrieve research paper embeddings and Vector Similarity search for accurate document retrieval based on user queries.
- Integrated document indexing and real-time chat with Streamlit and utilized reranker models to enhance relevance and accuracy in conversational queries.

### Cookipedia | Python, PyTorch, OpenCV, Flask, HTML, CSS, JavaScript

October 2023

- Utilized Segment Anything (SAM) model to segment images into individual ingredients & InceptionV3 to identify and understand individual ingredients from images.
- Implemented a personalized recommendation system by fine-tuning GPT to generate dish suggestions from recognized ingredients, taking into account the user's preferred cuisine.
- Integrated the frontend of the website with the Machine Learning model using Flask

## TECHNICAL SKILLS

**Languages:** Python, JavaScript, HTML/CSS

**Frameworks:** PyTorch, Flask, Django, Git

**Libraries:** Keras, OpenCV, NumPy, TensorFlow, Matplotlib