**- SAMRAJYA THAPA** –

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**SKILLS:**

Python, C/C++, Java | **ML Frameworks:** Pytorch, Keras, Tensorflow, Hugging Face, SciKitLearn | **Data Visualization:** Pandas, Seaborn, Plotly, R | **Computer Vision**: OpenCV, FFMPEG | **LLM Fine-Tuning** | **Big Data**: Spark, Hadoop | **ETL**: Amazon Glue, Azure | **Cloud**: AWS, Docker, GCP | **DBMS**: SQL, PostGRE, MongoDB | **Unit Testing** | **Embedded Systems**: NVIDIA Jetson | **DevOps**: Git, CI/CD | **Web Development**: Django, Flask, React, Next.js, Node, Go | **Agile** | **Scrum**

**WORK EXPERIENCE**

**Musco Sports Lighting**, Urbandale, IA • R&D Intern AI/ML 02/2023 – 12/2023

Musco is based in Iowa but has offices located worldwide. Musco holds dominant share of Sports Lightning industry in the US and lights international events such as the Olympics, F1 races, etc. Musco leads in innovation in both lighting and tech.

* Applying problem solving, statistical analysis, and research in Computer Vision applications in Sport
* Independent and Collaborative contribution in development of Automated Umpire Assist Product
* Performed calibration of Stereoscopic setup of high FPS cameras to triangulate 3D objects
* Application of OpenCV and FFMPEG for streaming and recording games in high fps with manipulation of intrinsic camera settings (LUCID Cameras – 60FPS, Axis Cameras – 30 FPS)
* Executed Unit Testing and Integration Testing of features for CI/CD Pipeline
* Facilitated the integration of application endpoints with AWS services (DynamoDB, S3, and Lambda)
* Developed Sports Classification Model for various sports within any given field under Musco Lighting
* Developed Camera Switching Framework for Baseball and Softball in Pytorch with Yolo Model, implemented Heuristical Algorithm with Kalman Tracker to track/identitfy movement of players
* Deployment of Product in NVIDIA Jetsons (Xavier, Orin)
* Participate in code review and proper CI/CD guidelines before merging code in Git

**Iowa State University**, Ames, IA • Graduate Research Assistant 05/2022 - Present

Research in the field of Multimodality, Explainable AI, and Medical Imaging. Seed Funded by the University leading to NSF Fund. Work under advisor [Dr. Wei](https://weile.work/)

* Novel approach in Contrastive Multimodal Pre-training with Large Scale Datasets in Medical Domain
* Implemented State-of-the-art Vision Transformer Model (ViT) and Large Language Model (LLM) like Bert, Llama for modeling Xray, Ecg Data, and Diagnostic Report for diagnosing medical conditions
* Conducted extensive Signal Processing and Modeling of Ecg Data, and fine-tuning of LLM in multimodal setting for clinical notes
* Demonstrated a notable 20 - 25% increase in performance with custom pretrained weights for multimodal tasks, compared to standard ImageNet pretrained weights, and 5-10% improvement in AUROC to baselines
* Research Paper Under Review in Prestigious Conference

**Iowa State University**, Ames, IA • Graduate Teaching Assistant 08/2021 – 12/2023

* Assisted in teaching Algorithms and Design course, covering key topics like sorting, searching, graph algorithms, dynamic programming, divide and conquer, and greedy methods.
* Supervised and guided students in programming assignments.

**PROJECTS**

**Movie Recommendation System and Web Application**

* Matrix Factorization with Collaborative Filtering for existing users and Content Filtering for new users
* Web-App built with Django and PostGRE dbms

**US 2016 Obesity Analysis**

* In-depth analysis of Obesity trends in the US in 2016 in R-programming, focusing on correlations with education, income, race, and health activities.
* Employed web scraping techniques to gather relevant information, ensuring comprehensive analysis.
* Created series of interactive maps, graphs, and plots to visualize the findings, highlighting key trends

**Causal Inference in Medical Imaging**

* Transformer Encoder-Decoder Architecture specialized for Causal Disentanglement of spurious features in Xray images for enhanced classification accuracy and concise attention plots

**Poetry** **Generation**

* LSTM/GRU encoder-decoder architecture to learn pattern from sample work from Poets and generate new poems. GloVe embedding for vocabs

**Image Generation with Diffusion**

* Image Generation with Diffusion model in Pytorch with addition of EMA (Exponential Moving Average) and CFG (Classifier Free Guidance) for better generalization.

**Portfolio Web-app**

* Portfolio web application created with Next.js and Tailwind CSS <https://svthapa-portfolio-app.vercel.app/>

**EDUCATION**

**Bachelor’s in Science (BS)** • The University of Mississippi – Ole Miss, Oxford MS  
Graduation Year (2017 - 2021) GPA: 3.79

**Master’s in science (MS)** • Iowa State University, Ames IA  
Graduation Year (2021 - 2024) GPA: 3.71