

# TUSHAR TYAGI

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## EDUCATION

### Georgia Institute of Technology

MS Computer Science (ML Specialization)

Atlanta, GA

August 2024 - Present

- **GPA:** 4.0
- **Relevant Courses:** Machine Learning(ML), ML for Trading, Large Language Models(LLMs) and AI Agents Research, Deep Reinforcement Learning, Computer Vision, Large-Scale and Real-Time Visual Analysis

### Indian Institute of Technology Mandi

B.Tech in Computer Science (Minor in Management)

Himachal Pradesh, India

August 2017 - May 2021

- **GPA:** 3.36
- (Top Computer Science program in India, **acceptance rate 0.15%**)
- **Teaching Assistant:** IC 152 - Data Science
- **Relevant Courses:** Pattern Recognition, Linear Algebra,, Advanced Datastructures and Algorithms, Applied Databases Practicum, Mathematical Foundations of Computer Science, Probability Statistics and Random Processes, Data Handling and Visualization

## Patent

- **US20240404070A1 (First Author):** Precise book page boundary detection using deep ML model and image processing algorithms. [Published: September 2024]

## PROFESSIONAL EXPERIENCE

### Adobe

Machine Learning Engineer 2

Noida, India

July 2021 – July 2025

Document Classification Model

- Engineered a real-time document classification model with **90% accuracy**, **boosting feature MAU by 50%**.
- Designed a downsampling algorithm with **90% accuracy** (comparable to Lanczos) and a **10x speed-up**. (Image Classification, Model Optimizations, Image Processing, Keras)

ML Model and Inferencing Pipeline Optimizations

- Reduced Adobe Scan's ML model sizes via quantization, **increasing monthly downloads by 50k**
- Modified the MobileNetV2-based document detection model, **reviving 3M+ dormant users monthly**.
- Achieved **3X performance improvement** with **4X model size reduction** using GPU acceleration and TFLite CustomOps.
- Elevated boundary detection model performance by **25.6%** through CustomOps in TensorFlow Lite.
- Implemented a **model pre-loading pipeline**, eliminating user-facing lag of 3 sec during GPU model loading. (Quantization, Pruning, Hardware acceleration)

Boundary Detection (Segmentation)

- Increased ML model accuracy by **30%**, enabling launch of new 'Bulk Capturing Mode'.
- Optimized MobileNetV2 architecture for higher model capacity while preserving mobile efficiency.
- Designed data generation and augmentation pipelines to accelerate experimentation cycles. (PyTorch, Computer Vision, Segmentation Models, Image Processing)

Book Mode

- Spearheaded 'Book Mode' in Adobe Scan for efficient dual-page capture, **adopted by 5% of monthly users**.
- Collaborated with the research team on a new segmentation model, **boosting accuracy by 20% and 2x performance**.
- Improved dewarping accuracy **from 70% to 80%**, significantly enhancing scan quality. (Image Processing, PyTorch, Segmentation Models, Computer Vision)

Cleanup 2.0 Model

- Built a segmentation model for form field detection in scanned documents (**70% beta accuracy**).
- Conducted algorithmic experiments to identify the optimal downsampling algorithm for the data pipeline. (Keras, Segmentation Models, Computer Vision, Image Processing)

Acrobat AI Assistant

- Architected an **LLM-based Actions Module Pipeline**, creating a modular, platform-agnostic system to map user queries to Acrobat functions with proper arguments.
- Applied **Chain-of-Thoughts Prompting** to increase complex user queries accuracy by **40%**.
- Pioneered a compact encoded format, delivering significant performance gains (**66%**) and enabling migration to larger LLM models.
- Delivered a real-time agentic solution for troubleshooting queries within Acrobat. (Prompt Engineering, LLM, ChatGPT, Agentic AI)

### Furrble

Product Development Intern

Bengaluru, India

January 2021 – February 2021

- Implemented CRUD API endpoints for the mobile application using **GoLang**.

## Adobe

*Product Development Intern*

**Noida, India**

*May 2020 – July 2020*

- Built intelligent image-cleaning tools using OpenCV and deep learning (Keras).
- Authored VBA scripts in Word to generate synthetic training data.

## OPEN SOURCE EXPERIENCE

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### EinsteinPy Organization

*Volunteer Contributor*

**Noida, India**

*August 2018 - November 2018*

- Implemented the translations across different coordinate systems [Python]

## CERTIFICATIONS

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- **MLOps Specialization** [[DeepLearning.AI](#)]: Introduction to MLOps, ML Data Lifecycle in Production, ML Modelling Pipelines in Production, Deploying ML Models in Production.
- **Sequence Models** [[DeepLearning.AI](#)]

## PROJECTS & OUTSIDE EXPERIENCE

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### PROPEL: PROpensity-based-Position-bias-Elimination-for-LLMs

**Atlanta, GA**

*Student Researcher*

*May 2025 - July 2025*

- Proposed and researched PROPEL, a model-agnostic, training-free framework using empirical bias profiling and inverse propensity weighting to mitigate position bias in LLM-based re-ranking systems.
- Improved recommendation accuracy by up to **26.7% in NDCG@1** and **28% in NDCG@20** across multiple real-world datasets through bias-aware aggregation of randomized candidate list permutations.
- Created an explainable and auditable debiasing pipeline with transparent bias coefficients and position-wise correction, enhancing fairness, stability, and transparency in black-box LLM recommendation deployments.

## Technical Skills

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**Programming Languages:** C, C++, Python, GoLang, SQL, Scheme, VBA

**Frameworks & Libraries:** TensorFlow, PyTorch, Keras, MLFlow, TFLite, OpenCV, Pandas, NumPy, Matplotlib, Scikit Learn

**Tools & Platforms:** Docker, Kubernetes, Flask, Qt, TFExtended, Jupyter Notebook

**Concepts:** Artificial Intelligence, Machine Learning, Prompt Engineering, Computer Vision, Image Processing, Visual Analytics, MLOps, Neural Networks, REST APIs, Database, Agile Methodology, Version Control, Computer Engineering, Experimental Design, Predictive Model, Natural Language Processing, Mathematical Skills

**Soft Skills:** Goal Oriented, Cross Team Communication, User Feedback Loops, Ownership

## Achievements and Awards

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- **Adobe Awards:** Runner-Up: Document Cloud India Hackweek(Dec 2023); Winner: Acrobat Desktop Ideathon(Jun 2023); Star of the Month Award(Sep 2022); Spot Award, (Nov 2021,Oct 2024); Good Works Award(Aug 2022)
- **Adobe Talks:** Talk on “Book Mode” selected for Document Cloud summit. [8/200 applications were selected]. Presented in front of leadership and staff engineers.
- **IIT Mandi:** 3rd position, Freshmen Innovation Challenge ”Aavishkar 2018”.

## ACTIVITIES & LEADERSHIP

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### Cultural Affairs Secretary

*Student Gymkhanam IIT Mandi*

**Mandi, India**

*August 2020 - April 2021*

### Astrophotography Head

*Astronomy Club, IIT Mandi*

**Mandi, India**

*August 2018 - April 2020*

### Multimedia Head

*Exodia(Techno-Cultural Fest), IIT Mandi*

**Mandi, India**

*August 2018 - April 2019*