

# Siddhant Garg

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## EDUCATION

### 🎓 University of Massachusetts Amherst

Master of Science – Computer Science | GPA: 4.0/4.0 | Sep 2021 - May 2023

Amherst, MA

### 🎓 Indian Institute of Technology Kanpur (IIT Kanpur)

Bachelor of Science – Maths and Scientific Computing | GPA: 9.2/10 | Aug 2015 - May 2019

Kanpur, India

## SELECTED COURSEWORK

Computer Vision  
Reinforcement Learning

Systems for Data Science  
3D Deep Learning

Natural Language Processing  
Probabilistic Graph Models

## TECHNICAL SKILLS

**Languages:** Python, C++, JAVA, SQL

**Frameworks:** PyTorch, TensorFlow, PySpark

## WORK EXPERIENCE

### Senior Software Engineer | Samsung R&D

Bangalore, India | Jun 2019 - Aug 2021

#### Self-Attention MobileNets for On-Device Image Tilt Correction

- . Invented Self-Attention MobileNet in **Tensorflow** to support real-time inference on smartphones.
- . Achieved **68% latency improvement**, **50% memory reduction** and **10% accuracy improvement** for the task of Image Tilt Correction over traditional MobileNetV3 models.
- . Reduced training time from **7 days to 1 day** by inheriting a subset of weights from MobileNetV3 model.
- . Trained the model on a large-scale distributed GPU cluster, utilizing CUDA-optimized TensorFlow code.
- . **Deployed** the model worldwide on Samsung Galaxy S22 series.

#### Object Detection of ID Cards

- . ID Cards detection using **Tensorflow MobileDet** Object Detection Model with MIDV and COCO datasets.
- . **Reduced False Positives by 91.43%** and improved mean Intersection Over Union for ID Cards.

### Research Scientist Intern | Adobe Research

San Jose, US | May 2022 - Aug 2022

#### Video Corpus Creation Using CLIP

- . Developed a **privacy-preserving** benchmark validation dataset that is similar to the distribution of **1M** real-user videos of Adobe Rush to assess the accuracy of AI/ML models trained on those user videos.
- . Ensured the users' privacy by only using dense vector representations to curate the validation videos from **1M** MERLOT-Reserve video dataset that closely match the user videos using **FAISS** vector search.
- . Used a **Visual-Language model** called CLIP to extract dense vector representations of video frames.
- . Used a video-processing API called **Decord** for faster sub-sampling of video frames.
- . Developed a **system to visualize** 3-4 validation videos that are similar to an input user video using **PyTorch**.
- . Worked with **AWS** Simple Storage Service (S3) and Adobe Sensei Cloud for large-scale parallel processing.
- . Contributed in Agile environment and used JIRA to propose feature improvements on the Sensei cloud framework.

## ACADEMIC RESEARCH PROJECTS

### PartNet Semantic Shape Segmentation with Cross-shape Attention (3D Deep Learning)

- . Implemented **self-attention** and **cross-attention** over point-clouds for **semantic shape segmentation**.
- . Identified a set of relevant shapes using K-NN and clustering for encoding point cloud features across shapes.
- . Surpassed the state-of-the-art Mean-Intersection-Over-Union (mIoU) by **1.5%** on PartNet dataset.

### Self-Supervised Learning of Point-Cloud Transformers (3D Deep Learning)

*preprint, Code*

- . Guided the representation learning by regenerating noise-free point clouds from the distorted point clouds.
- . Implemented **Point-Cloud Transformer-Autoencoder** in **PyTorch** for model pre-training.
- . Achieved accuracy improvement of **1.62%** on ModelNet40 and by **1.54%** on ShapeNet.

### Pruning Multi-Task Models for Computer Vision (Efficient Deep Learning)

*preprint, Code*

- . Invented a novel **convolutional filter ranking algorithm** for pruning deep multi-task neural networks.
- . **Achieved 70% computation reduction** of model without performance loss on NYUv2 dataset.

## PUBLICATION AND AWARD

- **Publication:** Garg, Siddhant, et al. "A Simple Approach to Image Tilt Correction with Self-Attention MobileNet for Smartphones.". In: British Machine Vision Conference (BMVC) (2021) [🔗](#)
- **Award:** Samsung Spot Award for excellent project work, Samsung, India - 2020