Prakhar Kulshreshtha

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Education

- **Carnegie Mellon University - School of Computer Science** — Pittsburgh, PA
  *Master of Science in Computer Vision (CGPA **4.15**/4.33)* — *Dec 2020*
- **Indian Institute of Technology Kanpur (IIT Kanpur)** — Kanpur, India
  B.Tech in Electrical Engineering (minors in AI & Linguistic Theory); (CGPA 9.0/10.0) — *Jun 2017*

Industrial Experience

- **Amazon Lab126** — *MSCV Capstone project* [link]
  with Prof. Michael Kaess, Robotics Institute, CMU — *Jan 2020 - Dec 2020*
  - Exploring better map representations for keyframe-based localization and mapping robust against low-dynamic objects and textureless surfaces for long term SLAM in dynamic indoor environment
- **PathAI, Inc.** — Boston, MA
  Machine Learning Intern — *May 2020 - Aug 2020*
  - Self-supervised representation learning on gigapixel histopathology images for patient outcome prediction in Multiple Instance Learning (MIL) paradigm
  - Contributed to bug-fixing in an ML research branch leading to 20% improvement in metrics on MIL E2E tasks
  - Achieved 13% improvement compared to training from scratch, and on par performance to ImageNet pretraining.
- **Samsung R&D Institute Bangalore (SRI-B)** — Bengaluru, India
  Senior Software Engineer (Research) — *Apr 2019 - Jul 2019*
  Software Engineer (Research) — *Jul 2017 - Mar 2019*
  - Led a team of 3 'intrapreneurs' to develop a smartphone app for automatic food-grain assaying
  - Designed and developed novel data collection and generation strategies to train U-Net and MobileNetV2 for on-device instance segmentation on a smartphone, without manual annotation **[IPO patent app** 201841024812]
  - Achieved particle mAP 0.74 and 92% classification accuracy (86% accuracy in dim lighting)
  - Developed a light-weight, fast and efficient N-gram language model in C++ for Samsung Keyboard, which got commercialized as Beta in flagship devices

Publications

- **P. Kulshreshtha**, T. Guha, "Dynamic Character Graph via Online Face Clustering for Movie Analysis" In Multimedia Tools and Applications (impact-factor 2019-20: 2.6) **[web][pdf]**
- A. Kar*, **P. Kulshreshtha***, A. Agrawal*, S. Palakkal, L. Boregowda, "Annotation-free Quality Estimation of Food Grains using Deep Neural Network" In British Machine Vision Conference (BMVC) 2019, Cardiff, Sep 2019. **[paper][blog][video]**
- **P Kulshreshtha**, T. Guha, "An Online Algorithm for Constrained Face Clustering in Videos" In IEEE International Conference on Image Processing (ICIP) 2018, Athens, Oct 2018. **[paper][poster][code]**

Academic Research

- **Selected Projects**
  Course Projects at CMU and IITK
  - Deep Fundamental Matrix estimation from noisy correspondences
  - Unsupervised Adaptation for Semantic Human Mesh Reconstruction from 2D RGB image [link]
  - Implementing Binary Weight Networks (BWN) of XNOR-Net from scratch [link]
  - Modifying Stacked Attention Networks Architecture For VQA using different attention mechanisms [link]
- **Character Graphs using Online Face Clustering for Movie Analysis** — *Bachelors project*
  Prof. Tanaya Guha, Dept. of EE, IIT Kanpur — *Dec 2016 - Apr 2017*
  - Designed an online face clustering algorithm using spatio-temporal constraints on facetrack representations obtained by leveraging FaceNet features embeddings [published in ICIP]
  - Built character graphs using face clusters to identify major characters and act boundaries [published in MMTA]

Technical Skills

- **Programming Languages**: Python, C++, MATLAB, JAVA(familiar)
- **Libraries/Frameworks**: Pytorch, OpenCV, TensorFlow, Sklearn, Visual Studio, CLion, Keras(familiar)

Relevant Courses

Geometry based Methods for Vision*, Multimodal Machine Learning*, Visual Learning & Recognition, Localization and Mapping, Computer Vision, Math Fundamentals for Robotics, Intro to Machine Learning, Modeling and Representation Techniques for Images, Bayesian Machine Learning, Data Structures and Algorithms ***(*-ongoing)***