

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** Pittsburgh, PA
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)