Prakhar Kulshreshtha

www.linkedin.com/in/prakharkulsh/ pkulshre@cs.cmu.edu (412) 897 4004

Education

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

Publications

- 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]**

Experience

Samsung R&D Institute Bangalore (SRI-B) Bengaluru, India

- *Senior Software Engineer (Research)* *Apr 2019 - Jul 2019*
  Software Engineer (Research) *Jul 2017 - Mar 2019*
  - **Quality Estimation of Food Grains using On-Device Computer Vision** Creative Lab (C-Lab)
    - Led a team of 3 'intrapreneurs' and 5 interns to develop a smartphone app for quality estimation of food-grains, to help farmers get correct price for their produce and automate the entire agricultural supply chain from farm to fork
    - Designed and developed novel data collection and generation strategies to train U-Net and MobileNetV2 for instance segmentation without manually annotated data
    - Implemented boundary-aware U-Net using TensorFlow and image processing APIs in C++ using OpenCV
    - Patent pending in India Patent Office; publication in BMVC'19; Demoed at Suwon C-Lab Fair
  - **Input Intelligence in Samsung Keyboard Engine** Advanced Technology Labs (ATL)
    - Implemented Minimum Jerk Trajectory(MJT) based swipe generation algorithm for training Keyboard Swipe engine
    - Designed and developed C++ architecture for a light-weight N-gram LM for text intelligence in Indian languages (commercialized in *Samsung Keyboard Neural Beta* in Galaxy S9)

Student Trainee, Web Services team *May 2016 – Jul 2016*

- Contributed in profiling of VR pipeline, analysis of Rendering, bug fixes and in refining the interface layer for Tizen based VR Engine Core, intended to be embedded in Web Browser for various Samsung Devices like GearVR, etc

Academic Projects

- **Online Face Clustering and Movie Analysis** *Bachelors project*
  Dr. Tanaya Guha, Dept. of EE, IIT Kanpur *Dec 2016 - Apr 2017*
  - Designed a shot-wise online face clustering algorithm that uses several spatio-temporal constraints, along with FaceNet features, to obtain a robust representation of the facetracks (published in ICIP'18)
  - Temporal dynamics of the character-clusters formed are utilized in two movie analysis tasks: (i) segmentation of a movie into its high level semantic structures (acts), and (ii) retrieval of major characters in a movie (under review)
- **Selected Course Projects**
  IIT Kanpur *Aug 2016 - Apr 2017*
  - Review of Compressed-Sensing for reconstruction of MR images from undersampled K-Space data [BPA]
  - Modifying Stacked Attention Networks Architecture For VQA by trying different attention mechanisms on query-vector and image features
  - Stochastic Variational Inference(SVI) for scaling up Hierarchical PMF to large datasets
  - Image Processing to distinguish wheat grain from foreign matter (88% accuracy) from sample image [BPA]

([BPA] - Best Project Award)

Technical Skills

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

Relevant Courses

Computer Vision*, Math Fundamentals for Robotics*, Intro to Machine Learning*, Recent Advances in Computer Vision, Modeling and Representation Techniques for Images, Digital Image Processing, Bayesian Machine Learning, Online Learning and Optimization, Data Structures and Algorithms ***(*-ongoing)***

Achievements

• Won SRI-B C-Lab Entrepreneurial Ideation Contest (out of 244 pitches) • Cleared 'Professional' level of Samsung Global Software Competency (SWC) test (passing rate: 5%) • All India Rank 465 in JEE-Advanced 2013 out of 1.4m candidates