Patrick A. Cole

https://patrickacole.github.io/

Email: pacole2@illinois.edu
Mobile: (765) 635-5719

EDUCATION

- **University of Illinois in Urbana-Champaign, IL** — Expected Graduation Date: May 2020
  Expected Degree: Master of Science in Computer Science (Focusing in Machine Learning and Computer Vision)
  Course Work: Machine Learning, Deep Learning, Computer Vision, Optimizations in Learning, Numerical Analysis, Graphics
  GPA: 4.00/4.00

- **Purdue University in West Lafayette, IN** — Graduation Date: May 2018
  Acquired Degrees: Bachelors of Science in Computer Engineering and Minor in Mathematics
  Course Work: Probabilistic Methods, Machine Learning and Pattern Recognition, Linear Algebra
  GPA: 3.96/4.00

EXPERIENCE

- **NVIDIA** — Santa Clara, CA
  Image Processing Software Intern — Summer 2019
  - Optimized methods for calculating tangents and control points to be used in Cubic Hermite spline algorithm for cascaded mapping curve for pixel values
  - Developed a tool for viewing various YUV output formats
  - Wrote an auto plugin for camera applications for calculating auto white balance and auto exposure
  - Debugged demosaic and lens shading algorithms

- **NVIDIA** — Santa Clara, CA
  Software Intern — Summer 2017, 2018
  - Wrote a sample plugin for calculating auto white balance and auto exposure using histogram and local averaging statistics from an image frame
  - Added features to image processing pipeline components
  - Developed new features to be used in the automotive camera test applications
  - Helped develop scripts to test image quality of camera applications

RESEARCH

- *Image Super Resolution with Frequency Correction* — Fall 2019 - Present
  - Upscale image in spatial domain using autoencoder network
  - Use the frequency domain to learn residual frequency between an upscaled image and ground truth
  - Add residual to upscaled image to correct frequencies that the autoencoder has trouble learning

- *Generative Neural Networks: Synthesizing a CT Study from a Single Frontal X-Ray* — Spring 2019 - Present
  - Predict the 3D representation (CT Study) from a 2D image (X-Ray)
  - Utilize segmentation networks with residual dilated connections for sparse features
  - Develop losses based off of projections of the 3D shape into 2D planes
  - Presenting at RSNA Conference in December 2019

TEACHING

- Graduate Teaching Assistant for Machine Learning at University of Illinois — Aug 2019 - Present
- Graduate Teaching Assistant for Data Structures and Algorithms at University of Illinois — Aug 2018 - May 2019

PROJECTS

- *Show and Tell: Image Captioning*
  - Created an LSTM model with image encodings to predict a caption for an image
  - Trained on COCO image captioning dataset
- *CycleGAN with Segmentation*
  - Developed a CycleGAN for unpaired image to image translation
  - Used a 'soft mask' for reduce bleeding effect from a class leaking out
- *Image Denoising and Super Resolution for X-Rays*
  - Created an autoencoder network with residual connections for denoising
  - Implemented Sub-Pixel layer for super resolution
- *Automatic Attendance Camera for Classrooms*
  - Used facial recognition to determine the attendance of a classroom
  - Designed an easy to use and cost-effective training method for end user

RELATED SKILLS

- *Programming Languages:* Python, C++, C, Matlab, Bash
- *Libraries:* NumPy/SciPy, PyTorch, TensorFlow, Keras, OpenCv
- *Tools:* Git, Perforce, LaTeX, Microsoft Azure, Amazon Web Services, Google Cloud Platform