Kaushik Koneripalli

Email | Linkedin | Github

Education

Arizona State University — Tempe, AZ, USA
Master of Science in Electrical Engineering — *Aug. 2017 – Aug 2019*

PES Institute of Technology — Bangalore, KA, India
Bachelor of Engineering, Telecommunication Engineering — *Aug. 2013 – May 2017*

Professional Experience

Research Engineer — Oct. 2019 – Present
Siemens Technology — *Princeton, NJ*

- Working on various government and business funded projects in the domain of 2D, 3D computer vision using deep learning.

Graduate Research Assistant — Aug. 2018 – Aug. 2019
Arizona State University — *Tempe, AZ*

- Explored disentanglement of latent spaces in autoencoder (regular and generative) models for computer vision and time-series applications.
- Published Master's thesis titled "Structured disentangling networks for learning deformation invariant latent spaces"
- Advisor: Prof. Pavan Turaga

Cyber Intern — May 2018 – Aug 2018
Honeywell International — *Phoenix, AZ*

- Explored regular and LSTM autoencoder models for detection of DNS exfiltration which is an anomaly detection problem. Used Wireshark for data simulation.
- Manager: Dr. Raj Rajagopalan

Research Intern — Jan 2016 - May 2016
Indian Institute of Science — *Bangalore, KA, India*

- Exploring genetic algorithm for mode selection problem between cellular and Device-to-device mode of communications.
- Advisor: Prof. Chandra Murthy

Technical Skills

Languages: Python, C++, C#
Developer Tools: Git, Docker, VS Code, Visual Studio
Libraries and Software: Pytorch, Tensorflow, OpenCV, Scikit-learn, Point Cloud Library (PCL), Unity

Publications

- **K. Koneripalli**, S. Lohit, R. Anirudh and P. Turaga, "Rate-Invariant Autoencoding of Time-Series," ICASSP 2020 - 2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Barcelona, Spain, 2020, pp. 3732-3736. [Paper]
- A. Roy, I. Akrotirianakis, A. Kannan, D. Fradkin, A. Canedo, **K. Koneripalli**, T Kulahcioglu, "Diag2graph: Representing Deep Learning Diagrams In Research Papers As Knowledge Graphs," 2020 IEEE International Conference on Image Processing (ICIP), Abu Dhabi, United Arab Emirates, 2020, pp. 2581-2585. [Paper]
- **K. Koneripalli**. "Structured Disentangling Networks for Learning Deformation Invariant Latent Spaces." Diss. Arizona State University, 2019. [Thesis]
- **K. Koneripalli** and J. Manikandan, "SAR image compression using optimum threshold based support vector machines," 2016 IEEE Annual India Conference (INDICON), Bangalore, 2016, pp. 1-6. [Paper]

Key Projects

Automated Railhead Flaw Characterization | *Pytorch* Aug. 2020 – present

- This is a FRA funded [Link] project where the goal is to automatically predict flaws and remaining-life of rail tracks.
- Implementing a computer vision based solution to do visual anomaly detection of B-scan rail data.

Semi-supervised pose regression for 3D reconstruction | *PyTorch* Jan. 2020 – Apr. 2020

- This is a DARPA Physics of AI project where one of the goals was to integrate physics constraints to make latent variables more interpretable.
- The application is to perform 3D reconstruction of molecules, given only images of their projection at random orientations. Furthermore, its very difficult to collect many of these images as the imaging process (Cryo-EM) is very noisy.
- Proposed a disentangled VAE architecture to learn the mapping image-pose-image. This can be used to generate more images at intermediate poses using latent space interpolation.
- Advised by Prof. Peter Doerschuk, Cornell University and Dr. Ti-Chiun Chang, Siemens Technology.

Mesh Edge Detection and Toolpath Generation | *PCL, C++, SiemensNX* Nov. 2019 – Aug. 2020

- This is an ARM funded [Link] project to automate finishing tasks in manufacturing processes. Here we address the specific problem of edge deburring.
- Proposed a two stage pipeline to address this problem: a) perform edge detection on the mesh b) generate the toolpath for the machine.

Object Detection for Accountability in Manufacturing Processes | *Pytorch* Nov. 2019 – Dec. 2019

- This is an ARM funded [Link] project where the goal is to create an automated tracking and traceable solution for part accountability in manufacturing processes. Infrared imaging was used to scan parts.
- Implemented and delivered a Yolo-v3 based object detection method to address the requirements of the project.

Other Projects

- **Attention guided anomaly localization in images:** Implemented and built upon the ECCV 2020 paper [Link] "Attention Guided Anomaly Localization in Images" to perform semi-supervised anomaly localization for a business use-case.
- **Generative models for high-precision estimation problems:** Explored different generative models (VAEs, GANs and their flavors) to achieve high precision generation for image and point-cloud data.
- **Reconstruction of images from compressively sensed measurements:** Implemented the paper Reconnet [Link] to perform image reconstruction from compressively-sensed measurements. [github]
- **Online Video summarization:** Implemented a two-stage procedue to perform video summarization. The first stage is a feature extractor for which a convolutional autoencoder was used. The second stage is k-medoids clustering with a diversity promoting cost function.
- **Active Learning on graphs:** Using multi-scale representation of graphs to perform semi-supervised learning of labels on a graph in the presence of budget constraints. [github]
- **Machine Learning algorithms from scratch:** Implemented kNN, SVM, ConvNets and FCNs from scratch in Python. [github]
- **Seq2seq for English to French Machine Translation:** Implemented a Deep LSTM Seq2Seq network for machine translation . [github]

Relevant Courses

Computer Vision and Pattern Recognition, Random Processes, Digital Image Processing, Numerical Optimization, Bayesian Methods in Machine Learning (Coursera), Neural Networks and Deep Learning (Coursera)