Rajbir Kataria

✉ raj.kataria@gmail.com
🔗 https://github.com/rajkataria

Education

2016 – Present   🔖 **University of Illinois Urbana-Champaign**
Doctoral Candidate in Computer Science
Advisor: Professor Derek Hoiem

2012 – 2013   🔖 **Stanford University**
M.S. in Electrical Engineering

2001 – 2006   🔖 **University of Waterloo**
B.S. in Computer Engineering

Research Publications

1   **Kataria**, **Rajbir**, Joseph DeGol, and Derek Hoiem. "Improving Structure from Motion with Reliable Resectioning". In: *3DV*. 2020.

2   DeGol, Joseph, Jae Yong Lee, **Rajbir Kataria**, Daniel Yuan, Timothy Bretl, and Derek Hoiem. "FEATS: Synthetic Feature Tracks for Structure from Motion Evaluation". In: *3DV*. 2018.

Academic Projects

2017   🔖 **Computer Vision, University of Illinois**
- Learnt to match SIFT descriptors using a Siamese network
- Trained the network using a dataset labeled using ground truth trajectories and epipolar constraints

🔖 **Cutting-Edge Trends in Deep Learning and Recognition, University of Illinois**
- Learned to identify small objects using a reinforcement learning framework
- Employed a glimpse sensor, trained using policy gradients, to different locations in a image

2016   🔖 **Deep Learning, University of Illinois**
- Implemented a two-stream network that classified activities in videos
- The first network accepted RGB image of the current frame while the second network used optical flow between consecutive frames

2013   🔖 **Applied Vision and Image Systems, Stanford University**
- Explored trade offs between two object removal techniques: Exemplar-based in-painting and seam carving

🔖 **Machine Learning, Stanford University**
- Designed a system to recognize various tennis actions such as backhand, forehand, etc.
- Employed SVMs to classify each action and achieved an accuracy of 85%

2012   🔖 **Interactive Computer Graphics, Stanford University**
- Designed and implemented an OpenGL based 3D Computer game in C++
- Techniques such as motion blurring, non-photo-realistic rendering, and collision detection were used to enhance the game experience

Employment History

2016 – Present ∎ **University of Illinois, Graduate Research Assistant**
- Research on projects in the field of 3D Vision, specifically Structure from Motion (SfM) and Multi-view stereo (MVS)

2020 ∎ **University of Illinois, Teaching Assistant: Learning to Learn**
- Lectured on Metric Learning, specifically on Matching and Prototypical Networks
- Graded in-class presentations and final projects

2018 ∎ **University of Illinois, Teaching Assistant: Deep Learning**
- Designed a project to rank images by learning a similarity measure using classification and triplet losses
- Taught a workshop on PyTorch, specifically on data loaders
- Graded homeworks, exams and final projects

2017 ∎ **Reconstruct Inc., Computer Vision Intern**
- Parallelized Structure-from-Motion by allowing individual clusters of images to be reconstructed on separate nodes and merged them using rotation and translation averaging
- Implemented an algorithm to determine the best image based on the scene camera pose and visible points of a point cloud
- Implemented next-best-view resectioning algorithm to account for entropy of matches

2015-2016 ∎ **Reconstruct Inc., Lead Software Architect**
- Led the efforts to develop a web-based viewer of construction site point cloud and 3D models
- Architected the system for production and scalability by employing technologies such as NoSQL and Node.js
- Mentored students by educating them on different technologies and tools and helped improve their programming skills via extensive code reviews
- Implemented a registration module to align 3D site models to point clouds by using the Three.js graphics library

2014-2015 ∎ **Iodine Inc., Senior Software Engineer**
- Developed a rule-based NLP pipeline to extract pharmaceutical side effect information from unstructured datasets
- Explored semantic analysis techniques to evaluate drug efficacy based on user reviews
- Employed CNNs to recognize pills from user images
- Explored GMMs for foreground/background segmentation for noisy pill images
- Designed and implemented Iodine's iOS app - featured in the App Store

2013-2014 ∎ **LiveMagic Inc., Senior Machine Learning Engineer**
- Implemented the HMM based Truecasing algorithm to determine the correct case of a word in closed captioning data
- Designed and implemented a context-aware spell checker based on the noisy-channel model
- Employed Support Vector Machines to implement a sentence boundary detection algorithm
- Architected and implemented a data collection pipeline using the publish-subscribe model

Employment History (continued)

2006-2012   **Microsoft, Software Engineer**
- Developed chip-level and system-level tests to verify new functionality and diagnose hardware failures
- Optimized specific aspects of the Kinect skeletal tracking algorithm using wMMX assembly and intrinsics
- Led system verification group for new Southbridge silicon that shipped in 2011 Xbox
- Collaborated with chip design/verification teams to assess risks to functionality and schedule
- Travelled to international CMs and repair facilities to support engineering development builds and resolve production issues

Skills

Coding	Python, C++, Matlab, Swift.
Deep Learning Frameworks	Pytorch, TensorFlow.
Databases	MySQL, PostgreSQL, MongoDB, SQLite.
Web Dev	Html, css, JavaScript, React.
Development Tools	Sublime, Git, SSH, Docker