

EDUCATION

- **University of California, Davis** (Fall, 2015 - Current)
 - PhD in Computer Science Advisor: [Prof. Yong Jae Lee](#)
- **Robotics Institute, Carnegie Mellon University, USA** (August 2013 – December 2014)
 - Masters in Robotics QPA: **4.05** Advisors: [Prof. Alexei Efros](#), [Prof. Kayvon Fatahalian](#)
- **International Institute of Information Technology (IIIT), Hyderabad, India** (August 2009 – May 2013)
 - B.Tech (Honours) in Computer Science and Engineering GPA: **9.07/10** Advisor: [Prof. P. J. Narayanan](#)

INTERESTS

- **Computer Vision and Machine Learning** *esp.* to develop large scale data driven methods for visual recognition systems.

PUBLICATIONS

- **End-to-End Localization and Ranking for Relative Attributes:** Krishna Kumar Singh, Yong Jae Lee. [Appears in European Conference on Computer Vision \(ECCV\), 2016.](#) [[Project Page](#)]
- **Track and Transfer: Watching Videos to Simulate Strong Human Supervision for Weakly-Supervised Object Detection:** Krishna Kumar Singh, Fanyi Xiao, Yong Jae Lee. Presented in [IEEE Conference on Computer Vision and Pattern Recognition \(CVPR\), 2016.](#) [[Project Page](#)]
- **KrishnaCam: Using a Longitudinal, Single-Person, Egocentric Dataset for Scene Understanding Tasks:** Krishna Kumar Singh, Kayvon Fatahalian, Alexei A. Efros. Presented in [Winter Conference on Applications of Computer Vision \(WACV\), 2016.](#) [[Project Page](#)]
- **Storytelling Patches: Predicting Tourist Spots in a City:** Aayush Bansal, Krishna Kumar Singh. *Presented in* [ECCV 2014 1st Workshop on Storytelling with Images and Videos \(VisStory\).](#) [[Link to Paper](#)]
- **Geometry Directed Browser for Personal Photographs:** Aditya Deshpande, Siddharth Choudhary, P J Narayanan, Krishna Kumar Singh, Kaustav Kundu , Aditya Singh and Apurva Kumar. *Appeared in* [Eighth Indian Conference On Vision, Graphics And Image Processing \(ICVGIP\), 2012 \(Oral\).](#) [[Link to Paper](#)]
- **Hybrid Multi-Core Algorithms for Regular Image Filtering Applications:** Shrenik Lad, Krishna Kumar Singh, Kishore Kothapalli and P.J. Narayanan. *Appeared in* [International Conference on High Performance Computing \(HiPC\) Student Research Symposium, 2012.](#) [[Link to Paper](#)]

PATENTS

- **Video Summarization Using Semantic Information:** Patent filed in December 2015 (with Intel Labs).
- **Visual Search and Retrieval Using Semantic Information:** Patent filed in May 2016 (with Intel Labs).

WORK AND TEACHING EXPERIENCE

- Graduate Research Assistant at UC, Davis (Fall 2015 – Current) Advisor: [Prof. Yong Jae Lee](#).
- Computer Vision intern at Intel Labs (Summer, 2015): Worked on video summarization and retrieval.
- Graduate Research Assistant at RI, CMU (Spring 2014 - 2015) Advisors: [Prof. Alexei Efros](#), [Prof. Kayvon Fatahalian](#).
- Research Scholar at RI, CMU (Summer, 2012) Advisor: [Prof. Martial Hebert](#).
- Research Assistant at IIIT-Hyderabad (Summer 2011) and developed DLD virtual lab. Advisor: [Prof. P. J. Narayanan](#).
- Teaching Assistant at IIIT-Hyderabad for Information Retrieval and Extraction, Data Structures and Cloud Computing.

RESEARCH PROJECTS

- **End-to-End Localization and Ranking for Relative Attributes:** We propose an end-to-end deep network to simultaneously rank and localize relative visual attributes. Unlike previous methods, our network jointly learns the attribute's features, localization, and ranker. We show state-of-the-art ranking results on various relative attribute datasets and our approach is much faster than previous methods. (Advisor: [Prof. Yong Jae Lee](#))

- **Track and Transfer: Watching Videos to Simulate Strong Human Supervision for Weakly-Supervised Object Detection:** We transfer tracked object boxes from weakly-labeled videos to weakly-labeled images to automatically generate pseudo ground-truth boxes, which replace manually annotated bounding boxes. We obtain state-of-the-art weakly-supervised detection results on the PASCAL 2007 and 2010 datasets. (Advisor: [Prof. Yong Jae Lee](#))
- **Data-Driven Prediction of Egocentric Camera Movement (Master's Thesis):** We record, and analyze, and present to the community, KrishnaCam, a large (7.6 million frames, 70 hours) egocentric video stream along with GPS position, acceleration and body orientation data spanning nine months of the life of a computer vision graduate student. We explore and exploit the inherent redundancies in this rich visual data stream to answer simple scene understanding questions such as: How much novel visual information does the student see each day? Given a single egocentric photograph of a scene, can we predict where the student might walk next? (Advisors: [Prof. Alexei Efros](#), [Prof. Kayvon Fatahalian](#))
- **Predicting Tourist Spots in a City:** In this work we find tourist spot in the city by using Google street view images. We assume tourist spots have discriminative visual elements which are not present in rest of the city. We use mid-level patches based discriminative clustering approach to find these visual elements. We find tourist spots for Paris and Pittsburgh.
- **Object Recognition in Different Illumination Conditions:** Built a model which captures variations in colors due to different illumination conditions while doing object recognition. Used distance from color convex hull (which captures all possible colors of object) as new distance measure for color based template matching. Also pipelined our model with existing Robust Line2D method. (Advisor: [Prof. Martial Hebert](#)) [[Link to Poster](#)]
- **Geometry Directed Browser for Personal Photographs:** Developed a geometry directed photo browser that enables users to browse their personal pictures with the underlying geometry of the space to guide the process. Images are localized to the monument space using state-of-the-art fast localization method. (Advisor: [Prof. P. J. Narayanan](#))
- **Digital Logic Design (DLD) Virtual Labs:** Designed an interactive web tool on simulation of digital logical circuit for the [virtual labs](#) project. It includes adder circuit, multiplexers, decoders, flip-flops, registers, counters etc. Virtual Labs is initiative of Ministry of Human Resources and Development, Gov. of India. Shown in R&D showcase, 2012 at IIIT-H. Currently hosted at this [link](#) and used in various educational institutions in India. (Advisor: [Prof. P. J. Narayanan](#))

COURSE PROJECTS

- **Detecting and Tracking Object Carried by Pedestrian:** Implemented a system to detect and track objects carried by pedestrians in a video stream. Used methods like background subtraction, Kalman filter based tracking, human body symmetrical and periodicity analysis.
- **Correlation Between FMRI and Visual Features:** Constructed a correlation matrix between images using their FMRI responses and tried to find visual features which will give the most similar correlation matrix. We tried low level features like GIST, color histogram, texon and higher level semantic features like object banks and deep features.
- **Fast Nearest Neighbors computation in Videos:** For any given frame, accelerated the computation of nearest neighbors (visually similar frames) in large video collection. Exploited temporal coherency & redundancy present in videos and use an algorithm similar to "[PatchMatch](#)" to compute approximate nearest neighbors.
- **Graphics API Design Like OpenGL:** Developed an OpenGL like graphics API having complete Graphics pipeline functions from modelling, viewing to viewport clipping.
- **Search Engine for Wikipedia:** Developed a mini search engine on ~24 GB Wikipedia dump. Primary (~1.7 GB) and Secondary Index (~65MB) was built on page content, title, category, links and info-box.
- **Classification of the Tweets and Community Detection in Twitter:** Built a text-classification system which classifies tweets into different topical categories. Also detected community and established relation in the Twitter.

TECHNICAL SKILLS

Programming/Scripting Languages	C, C++, Python (moderate), Java, Lua
Vision/Deep Learning/Graphics	Matlab, OpenCV(moderate), Caffe, Torch, OpenGL
Parallel Programming	CudaC, OpenCL(basic), OpenMP, MKL(basic)
Web development	Web2py, HTML5, CSS, PHP(basic), JSP(basic), Java Applet
Database	PL/SQL, MYSQL, SQLite
Cloud Technologies	Hadoop, EC2
Miscellaneous	FFmpeg, Eclipse, Netbeans, Vim, SVN/Git

RELEVANT COURSEWORK

- **Graduate Coursework:** Computer Vision, Machine Learning, The Visual World as seen by the Neurons and Machines, Big Data Approaches in Computer Vision, Visual Recognition, Visual Computing Systems, Math Fundamentals for Robotics.
- **Undergraduate Coursework:** Computer Vision, Digital Image Processing, Machine Learning, Statistical Methods in Artificial Intelligence, Artificial Intelligence, Computer Graphics, Information Extraction and Retrieval.

ACADEMIC ACHIEVEMENTS AND AWARDS

- **AWS Research Grant**, Amazon Web Services, Inc., 2016.
- **Dean's List of Academic Excellence** for all the undergraduate academic years.
- **IIIT-H Research Award**, 2012 – in recognition of research contribution by an undergraduate.
- **Best Poster Award** (Using GPU technologies) from **Nvidia** in Student Research Symposium, **HiPC** (International Conference on High Performance Computing), 2012.
- **All India Rank 1902 (99.8 percentile)** in All India Engineering Entrance Examination (AIEEE) 2009 (**962,119 candidates**).
- **Certificate of Merit**, National **top 0.1%** in CBSE Class XII Information Practices Examination.
- Awarded silver medal in **National Science Olympiad** (2008) & bronze medal in **National Cyber Olympiad** (2007).