Eric Kim

• Orange, CA •

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RESEARCH INTERESTS

Computer vision, machine learning, graph neural networks, medical imaging. Specific applications: object detection, face recognition, tissue segmentation, visual modeling, and 3D reconstruction.

EDUCATION

University of California, Los Angeles   Computer Science, M.S. (09/2013 – 06/2016)
    Advisors: Professor Demetri Terzopoulos, Dr. M. Alex O. Vasilescu (Tensor Vision Technologies)
    Thesis: "A Part-Based, Multiresolution, TensorFaces Approach to Image-Based Facial Verification"
University of California, Berkeley   Computer Science, B.A. (08/2007 – 12/2011)

PUBLICATIONS

"Toward Transformer-Based Object Detection," Josh Beal, Eric Kim, Eric Tzeng, Dong Huk Park, Andrew Zhai, Dmitry Kislyuk. *arXiv 2020*.

"Bootstrapping Complete The Look at Pinterest," Eileen Li, Eric Kim, Andrew Zhai, Josh Beal, Kunlong Gu. *KDD 2020*.

"Shop The Look: Building a Large Scale Visual Shopping System at Pinterest," Raymond Shiau, Hao-Yu Wu, Eric Kim, Yue Li Du, Anqi Guo, Zhiyuan Zhang, Eileen Li, Kunlong Gu, Charles Rosenberg, Andrew Zhai. *KDD 2020*.

"Complete the Look: Scene-based Complementary Product Recommendation," Wang-Cheng Kang, Eric Kim, Jure Leskovec, Charles Rosenberg, Julian McAuley. *CVPR 2019*.

"Three-dimensional soft tissue analysis of the face following micro-implant-supported maxillary skeletal expansion," Sara Abedini, Islam Elkenawy, Eric Kim, Won Moon. *Progress in Orthodontics*, 2018. *(Accepted, publication pending)*

    Developed a statistical model of shape and appearance to perform bone contour segmentation of 3D medical imaging data. Enhanced accuracy of the model by extending the appearance model and the search algorithm to work well on 3D data. After achieving mesh correspondence via a nonrigid iterative closest point registration algorithm, ran statistical tests on pre/post operation facial structure data to determine statistically significant regions of change.

"Improved Support for Machine-Assisted Ballot-Level Audits," Eric Kim, Nicholas Carlini, Andrew Chang, George Yiu, Kai Wang, David Wagner. *EVT/WOTE 2013*, August 2013.

    Presented improvements to the OpenCount system, which significantly reduce operator effort. Our new techniques yield order-of-magnitude speedups compared to the previous system, and enable us to successfully process elections that would not have reasonably feasible without these improvements.

"Operator-Assisted Tabulation of Optical Scan Ballots," Kai Wang, Eric Kim, Nicholas Carlini, Ivan Motyashov, Daniel Nguyen, David Wagner. *EVT/WOTE 2012*, August 2012.

    Designed and developed the OpenCount software, which allows an operator to efficiently create vote tallies of scanned voted ballots from an election. This is accomplished via a system that interleaves computer vision algorithms and operator assistance to achieve perfect (or near-perfect) accuracy. Successfully applied the tool on several California pilot audits in 2011.

"An Analysis of Write-in Marks on Optical Scan Ballots," Theron Ji, Eric Kim, Raji Srikantan, Alan Tsai, Arel Cordero, and David Wagner. *EVT/WOTE 2011*, August 2011.

    Developed a system to achieve automatic recognition of write-in marks on marked voter ballots. Evaluated the system on a large-scale election in Leon County, Florida, and studied the kinds of write-in marks that are seen in practice.

POSTERS

"OpenCount: Operator-Assisted Tabulation of Optical Scan Ballots", Eric Kim, Nicholas Carlini, Andrew Chang, George Yiu, Zongheng Yang, Kai Wang, David Wagner. *NIST Future of Voting Systems Symposium*, February 2013.

EXPERIENCE

Software Engineer   January 2017 – Present
Pinterest, Inc.   *Advanced Technologies Group*
As lead of the object detection group, I apply the state of the art in computer vision to extract a rich visual understanding

of Pins. Implemented and launched a product feature "Lens your Look" that unifies text search with visual search to recommend outfits, and wrote a blog post describing the technical work. Designed and implemented a scalable, efficient Spark feature extraction pipeline that extracts visual signals on the billions of Pinterest images within hours.

Graduate Researcher September 2014 – June 2016

University of California, Los Angeles *Department of Computer Science*

Tensor Vision Technologies

Developed a novel facial verification system. By analyzing faces in a multiresolution, part-based multilinear framework, we improved verification results by 13% on the "Labeled Faces in the Wild" dataset relative to a previous multilinear approach (79% overall).

This work matured into my MS thesis, titled: "A Part-Based, Multiresolution, TensorFaces Approach to Image-Based Facial Verification". Advisors: Professor Demetri Terzopoulos (UCLA), Dr. M. Alex O. Vasilescu (Tensor Vision Technologies).

Research Programmer January 2016 – December 2016

University of California, Los Angeles *School of Dentistry*

Developed a statistical model of shape and appearance to perform bone contour segmentation of 3D medical imaging data. Enhanced accuracy of the model by extending the appearance model and the search algorithm to work well on 3D data. This work led to a publication.

Research Engineer January 2012 – August 2013

Research Assistant August 2010 – January 2012

University of California, Berkeley *Department of Computer Science*

Designed and developed the election auditing software "OpenCount". Involved the use of computer vision and image processing techniques: image registration, digit recognition, automatic visual barcode decoding, and "human-in-the-loop" processing for efficient data entry. Successfully performed several pilot audit programs in several California counties.

Teaching Experience

Teaching Assistant (CS 61A) May 2012 – August 2012

Teaching Assistant (CS 61A) August 2011 – December 2011

Teaching Assistant (CS 3L) May 2011 – August 2011

Teaching Assistant (CS 61A) January 2011 – May 2011

Teaching Assistant (CS 61A) August 2010 – December 2010

Teaching Assistant (CS 61BL) May 2010 – August 2010

University of California, Berkeley *Department of Computer Science*

Teaching Assistant (CS 33) April 2015 – June 2015

Teaching Assistant (PIC 10A) January 2016 – March 2016

Teaching Assistant (PIC 10A) March 2016 – June 2016

University of California, Los Angeles *Department of Computer Science*

Taught several undergraduate computer science courses. Duties included holding weekly sections, writing and grading exams, holding office hours, and developing course material. Additional teaching details here.

Projects

- FourVoices: An automatic music generator. Using principles of music theory, I transformed the music generation problem into a set of constraints and variables, which I solve with a general-purpose constraint satisfaction solver. Hosted on GitHub, the project features a wiki and tutorials on usage. (Python)

- Handwriting recognition: Utilized adaptive splines to recognize handwritten characters. To recognize a handwritten character, a deformable spline model is fit to the character via an iterative deformation algorithm. The algorithm outputs a deformation cost which is used for recognition: the label of the spline model with smallest cost is declared the output label. (Matlab)

- Efficient barcode decoder for the Interleaved 2-of-5 format. (Python, OpenCV)

- Wrote a popular tutorial to kernel methods as used in machine learning: *"Everything You Wanted to Know about the Kernel Trick (But Were Too Afraid to Ask)"*.

Key Skills

Technical Skills

Programming Languages: Python, C/C++, Matlab, Java, Scala, Javascript, HTML, CSS, php, Scheme, Assembly (MIPS, x86_64)

Specializations: Deep learning, computer vision, object detection, image classification, face recognition, medical imaging, machine learning, nonlinear optimization, automatic landmark detection, data analysis.
Libraries: Caffe, Caffe2, Tensorflow, pytorch, OpenCV, numpy, scipy, Spark
Productivity: Version control (svn, git, mercurial), UNIX toolset, LaTeX

GRADUATE COURSEWORK

Machine Perception	Linear Programming	Convex Optimization
Reasoning with Partial Beliefs	Large Scale Optimization	Applied Probability
	Visual Modeling	

UNDERGRADUATE COURSEWORK

Algorithms	Discrete Math	Data Structures
Machine Structures	Operating Systems	Artificial Intelligence
Machine Learning	Compilers	Computer Security
Linear Algebra	Computer Networks	Computer Graphics