

# Yan Ke

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<http://www.yanke.org/>

## About Me

Interested in working on big, interesting problems that fundamentally change people's lives. Works well with researchers to transfer research into products. Expertise in applied machine learning, and large-scale data analysis, and computer vision.

## Education

Ph.D. in Computer Science April 2008  
Carnegie Mellon University, Pittsburgh, PA  
Thesis: "Volumetric Features for Video Event Detection"  
Advisors: Martial Hebert and Rahul Sukthankar

M.S. in Electrical and Computer Engineering May 2002  
B.S. in Computer Science, GPA: 4.0/4.0 May 2001  
Carnegie Mellon University, Pittsburgh, PA

## Work Experience

**Bing Search** **April 2008 – Present**  
Microsoft Corporation Senior Software Development Engineer

I developed and shipped the web page selection algorithm that drives the Bing web index. In collaboration with MSR, we used machine learning to train a ranker on a variety of features that indicate page importance to select and rank web pages. This algorithm revolutionized how we do web index selection and significantly improved the index relevance across all query sets and markets. Gold Star Awards 2008, 2009, Technical Leadership Select 2010.

## Research Experience

**Event Detection in Video** **Jan 2004 – April 2008**  
Carnegie Mellon & Intel Research Advisors: M. Hebert and R. Sukthankar

Developed volumetric features for event detection in crowded videos. We use 3D shape and flow features to find human actions such as picking up an object from the ground, waving for the bus, sitting down, etc. The method works despite significant clutter and motion in the video (published in IJCV 2010, ICCV 2007, ICCV 2005).

**Photo Quality Assessment** **Summer Internship, 2005**  
Microsoft Research Asia, Beijing, China Mentor: Xiaoou Tang

Developed high-level semantic features to assess the quality of photographs. The system can classify between photographs taken by professionals versus snapshots taken by amateurs. A web image search engine can use the quality metric to place the best quality photographs near the top, giving the user the most relevant results (published in CVPR 2006).

**Music Identification** **Summer Internship, 2004**  
Intel Research, Pittsburgh, PA Mentor: Rahul Sukthankar

Used machine learning techniques to develop an audio fingerprinting algorithm for music identification. Given ten seconds of low-quality music recorded through a phone, our system can robustly identify the song in a large database of songs (published in CVPR 2005).

**Image Retrieval with PCA-SIFT** **May 2003 – Dec 2003**  
Carnegie Mellon Univ. & Intel Research Pittsburgh Mentor: Rahul Sukthankar

Developed a more distinctive local image descriptor for image retrieval. Combined PCA-SIFT with locality sensitive hashing to enable fast and accurate sub-image retrieval over tens of thousands of image. The application can be used for image copyright enforcement (published in CVPR 2004, ACM MM 2004).

**Wide Area Sensor Networks** **August 2002 – August 2003**  
Carnegie Mellon Univ. & Intel Research Pittsburgh Advisor: M. Satyanarayanan

Used computer vision algorithms facilitate the automatic calibration of a large camera-based sensor network. This enables automatic service discovery of such a network, where cameras can figure out what locations are in their field of view, and the system can search for all cameras that look at particular locations.

**Distributed File Systems** **Summer Internship, 2002**  
Intel Research, Pittsburgh, PA Mentor: Michael Kozuch

Worked on the Internet Suspend and Resume Project. Analyzed the effects of wide area caching and prefetching on workloads running inside a virtual machine architecture. Did performance studies on the impact of running workloads in a VM.

**Computer Assisted Language Learning** **Internships, 1999 - 2001**  
Carnegie Speech, Pittsburgh, PA Mentor: Maxine Eskenazi

Founding member of the startup Carnegie Speech. Developed algorithms for using the SPHINX speech recognition engine to identify correct and inaccurate pronunciations of English words. The program helps foreigners remove their native accents (published in Speech Communication, 2002).

## Publications

T. Lei, R. Cai, J.-M. Yang, **Y. Ke**, X. Fan, and L. Zhang. A Pattern Tree-based Approach to Learning URL Normalization Rules. WWW, 2010.

**Y. Ke**, R. Sukthankar, and M. Hebert. *Volumetric Features for Video Event Detection*. International Journal of Computer Vision, 2010.

**Y. Ke**, R. Sukthankar, and M. Hebert. *Event Detection in Crowded Videos*. IEEE International Conference on Computer Vision, 2007.

**Y. Ke**, R. Sukthankar, and M. Hebert. *Spatio-temporal Shape and Flow Correlation for Action Recognition*. Visual Surveillance Workshop, 2007.

**Y. Ke**, X. Tang, and F. Jing. *The Design of High-Level Features for Photo Quality Assessment*. IEEE Conference on Computer Vision and Pattern Recognition, 2006.

R. Sukthankar, **Y. Ke**, and D. Hoiem. *Semantic Learning for Audio Applications: A Computer Vision Approach*. International Workshop on Semantic Learning Applications in Multimedia, 2006.

**Y. Ke**, R. Sukthankar, and M. Hebert. *Temporal Mean Shift for Activity Recognition in Video*. Recognition and Discovery of Activities and Interactions Workshop, 2005.

**Y. Ke**, R. Sukthankar, and M. Hebert. *Efficient Visual Event Detection using Volumetric Features*. IEEE International Conference on Computer Vision, 2005.

L. Huston, R. Sukthankar, and **Y. Ke**. *Evaluating Keypoint Methods for Content-based Copyright Protection of Digital Images*. IEEE International Conference on

Multimedia & Expo, 2005.

**Y. Ke**, D. Hoiem, and R. Sukthankar. *Computer Vision for Music Identification*. IEEE Conference on Computer Vision and Pattern Recognition, 2005.

D. Hoiem, **Y. Ke**, and R. Sukthankar. *SOLAR: Sound Object Localization and Retrieval in Complex Audio*. IEEE International Conference on Acoustics, Speech, and Signal Processing, 2005.

S. Nath, **Y. Ke**, P. B. Gibbons, B. Karp, and S. Seshan. *A Distributed Filtering Architecture for Multimedia Sensors*. Workshop on Broadband Advanced Sensor Networks, 2004.

**Y. Ke**, R. Sukthankar, and L. Huston. *Efficient Near-duplicate Detection and Sub-image Retrieval*. ACM Multimedia, 2004.

P. Pillai, **Y. Ke**, and J. Campbell. *Multi-fidelity Storage*. ACM Workshop on Video Surveillance and Sensor Networks, 2004.

**Y. Ke** and R. Sukthankar. *PCA-SIFT: A More Distinctive Representation for Local Image Descriptors*. IEEE Conference on Computer Vision and Pattern Recognition, 2004.

P. B. Gibbons, B. Karp, **Y. Ke**, S. Nath, and S. Seshan. *IrisNet: An Architecture for a World-Wide Sensor Web*. IEEE Pervasive Computing, 2003.

K. Probst, **Y. Ke**, and M. Eskenazi. *Enhancing Foreign Language Tutors – In Search of the Golden Speaker*. Speech Communication, 37(3), 2002.

M. Eskenazi, **Y. Ke**, J. Albornoz, and K. Probst. *The Fluency Pronunciation Trainer: Update and User Issues*. Speech Technology in Language Learning Workshop, 2000.

## Talks

“Efficient Near-duplicate Detection and Sub-image Retrieval”, ACM Multimedia, New York, 2004.

“Efficient Near-duplicate Detection and Sub-image Retrieval”, Student Seminar Series, Carnegie Mellon University, 2004.

“Privacy Preserving Image Processing in IrisNet”, Carnegie Mellon University Privacy in DATA Workshop, 2003.

## Teaching

**Teaching Assistant** at Carnegie Mellon University

Computer Vision

Spring, 2006

Fundamental Data Structures and Algorithms

Fall, 2004

Energy Aware Computing

Spring, 2002

**Mentor** for Undergraduate Students at Carnegie Mellon University

Tolga Birdal, Object recognition using 2D shape matching

Fall, 2007

Sam Kaplan, 3D shape matching with Chamfer and Hausdorff dists.

Summer, 2007

Eujern Lim, Visualization of video in 3D using VRML

Summer, 2006

Gregory Peng, Integrating FFMPEG with OPENCV

Spring, 2006

## Leadership & Service

**Journal Reviewer**

IEEE Signal Processing Letters

2008

Computer Vision and Image Understanding

2007

IET Computer Vision

2007

IEEE Transactions on Multimedia Journal

2007

IEEE Transactions on Pattern Analysis and Machine Intelligence

2007

**Conference Reviewer**

IEEE Conference on Computer Vision and Pattern Recognition	2008
IEEE/RSJ International Conference on Intelligent Robots and Systems	2007
ACM/IEEE International Conference on Distributed Smart Cameras	2007
Association for the Advancement of Artificial Intelligence	2007
International Conference on Machine Learning	2006
IEEE International Conference on Computer Vision	2005
IEEE Conference on Computer Vision and Pattern Recognition	2005

**Founder and Photographer**, Shoot for the Cure 2007  
Raised over \$2000 benefiting the Susan G. Komen Foundation for breast cancer research.

**Judge**, Pittsburgh Regional Science & Engineering Fair 2004 - 2006

**Honors**

Microsoft Technical Leadership Select	2010
Microsoft Gold Star Award	2008, 2009
NSF Grant -- Volumetric Features for Large-Scale Video Processing	2006 - 2008
NSF IGERT Fellowship in Assistive Technology	2005 - 2006
Finalist, Microsoft Research Graduate Fellowship	2005
Intel Research Scholar	2005

**References**

Available upon request.