

Neela Sawant

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Research Interests

Multimedia content analysis, Image processing, Computer vision, Machine learning and data mining, Information retrieval

Educational Record and Academic Achievements

- **University Graduate Fellow** of the Pennsylvania State University for year 2008-2009
- Ph. D. (Information Sciences and Technology) from **Pennsylvania State University**, GPA **3.96** (Aug 2008 - present)
- M. Tech. (Computer Science) from **Indian Institute of Technology Bombay**, CPI **8.8** (2004 - 2006)
- Ranked **130** out of 35019 candidates in the **Graduate Aptitude Test in Engineering** (Computer Science) conducted by Indian Institute of Technology (2004)
- B. E. (Information Technology) from Sardar Patel College of Engineering, Mumbai University with **distinction**, 70% (2000 - 2004)
- Recipient of the **National Talent Search Scholarship** awarded by the Government of India (1998)

Work Experience

Yahoo! R&D (India), Technology Research Group - Multimedia Division : (Aug 2006 - Jul 2008)

As a research engineer, I was involved in the algorithmic design as well as implementation of multimedia technologies for Yahoo! products. I chiefly worked on insertion and contextual selection of video advertisements, identification of near-duplicate images and videos, adult image detection, features and indexing mechanisms for large scale content based image retrieval (CBIR).

Publications and Patents

- Finding Near-duplicate Images on the Web using Fingerprints (**ACM Multimedia 2008**)
S. H. Srinivasan, Neela Sawant.
- *vADeo* : Video Advertising System (**ACM Multimedia 2007**)
S. H. Srinivasan, Neela Sawant and Smita Wadhwa.
- Retrieving Images for Remote Sensing Applications (**ICVGIP 2006**)
Neela Sawant, Sharat Chandran and B. K. Mohan.
- Indian Institute of Technology, Bombay at TRECVID 2006 (**NIST TRECVID Workshop 2006**)
M. Nithya, Neela Sawant, Aman Parnami, Srikanth Lignamneni and Sharat Chandran.
- Indian Institute of Technology, Bombay at TRECVID 2005 (**NIST TRECVID Workshop 2005**)
M. Nithya, Neela Sawant, Deepali Singla and Sharat Chandran.
- Patent: Method and System for Determining Near-duplicate Images (filed in Sept 2008)
- Patent: Cost-effective Image Metadata Creation using Near-duplicate Image Detection (filed in Jan 2008)

Research Experience

- **Content Based Image Retrieval**
 - **CBIR for Remotely Sensed and Aerial Imagery (ICVGIP, 2006)**
(Masters Thesis under Prof. B. K. Mohan and Prof. Sharat Chandran - *Jan 2005 - Jul 2006*)
The low structural detail, high variability of images and high data volume render CBIR for remote sensing difficult. I proposed a texton feature highly robust to changes in illumination, scale and orientation. I further developed a semantic classifier system for different land cover classes.
 - **Multiple Cue Combination for Effective Image Retrieval**
I carried out a detailed survey of feature combination strategies to increase image retrieval performance.
 - **Adult Image Detection for Safe Search**
I worked on a color and texture based classifier for adult image detection. I further implemented a revised skin color model based on the skin distribution from faces detected in images.

- **NIST's Trec Video Retrieval (TrecVid, 2005 & 2006)**

As part of the IIT Bombay team participating in TrecVid shot boundary detection task, my work was focused on using wavelet features to reduce false shot breaks due to jerky camera motion, lighting changes and flashes. I presented a poster on this work at the the 'Indian Vision Showcase' at **ACCV, 2006**.

- **vADeo : Video Ad insertion (ACM Multimedia, 2007)**

To make video advertisements less intrusive, we proposed selection of logical scene breaks as ad insertion points and identified the same using scale-space analysis of audio-visual features. We further matched advertisements of the specific celebrity featured in the main video using a face recognition module.

- **Near-duplicate Detection**

- **Near-duplicate Detection for Images (ACM Multimedia, 2008)**

The traditional near-duplicate detection systems developed for digital photo management and copyright protection are not applicable for the de-duplication of large-scale web image corpus. I worked on a fast, accurate and highly scalable image fingerprinting technique suited for the web-scale. The image fingerprint is a compact 130 bit representation computed using Fourier-Mellin transform. Near-duplicate images are detected in $O(1)$ time using fingerprint equality. I also designed and deployed a near-duplicate detection system for graphic advertisements.

- **Near-duplicate Video Detection**

Duplicate video detection is necessary to deal with problems of copyright violation, data management and user experience. I developed a prototype for de-duplication of small videos dealing with changes in aspect ratio, frame rate and bit rate, shot reordering as well as small temporal cropping of videos.

Reviewing

- Journal of Mathematical Imaging and Vision
- Journal of Computational Intelligence

Teaching Experience at IIT Bombay

- Teaching assistant for undergraduate course 'Principles of Programming Languages' under Prof. R. K. Joshi
- Guest lecturer for 'Advances in CBIR', part of graduate level course on Image Processing under Prof. B. K. Mohan
- Instructor for 'Matlab for Image Processing', part of graduate level Image Processing lab under Prof. B. K. Mohan

Relevant Courses

Image Processing, Computer Vision, Statistical Foundations of Machine Learning, Data Mining, Algorithms and Complexities, Combinatorics, Artificial Intelligence, Advanced Databases

Extra-Curricular Activities

- Actor and member of the Curtain Call drama club at the Pennsylvania State University.
- Organizing committee member for the IST Graduate Symposium 2010, at the Pennsylvania State University.
- Organizing committee member for the SecNet 2006, Workshop on Computer Security organized by IIT Bombay.
- Organizing committee member of inter-college cultural events SPACE and technical event Nirmaan of Sardar Patel Engineering College in 2003.
- Interested in hiking, trekking, music, literature and traveling.