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Institutional Interviews : 2009 : Face Recognition Research, the Top 20 Institutions

INSTITUTIONAL INTERVIEWS - 2009

April 2009



Face Recognition Research, the Top 20 Institutions

A featured institution selection from *Essential Science Indicators*SM

This month, ScienceWatch.com presents a listing of the top 20 institutions which, according to our Special Topic on face recognition, attracted the highest total citations to their papers published on the topic in Thomson Reuters-indexed journals.

These institutions are the top 20 ranked by total cites out of a pool of 2,674 institutions publishing on this topic, based on a keyword search for "face recog" OR "face ident*" OR "face detect*" OR "view-based recog*" OR "object recog*" in the titles, abstracts, and keywords sections of original articles, reviews, and proceedings papers. The data pool was also narrowed by field.*

The resulting list of institutions shows that face recognition technology is of international interest; fourteen of the institutions are US-based, three are from Europe, two from Asia, and one is from Canada. Research is being conducted by universities, government organizations, and the private sector. Fifteen of the organizations are academic, two are governmental, two are industrial, and one is an academic/governmental partnership.

Seven of these institutions also made an appearance in the *ScienceWatch.com* feature on the top 20 institutions in the field of Computer Science from the *Essential Science Indicators*SM from Thomson Reuters database. These are: MIT, the University of California, San Diego, the University of Illinois, Carnegie Mellon University, IBM, AT&T, and the University of California, Berkeley.

Ranking at #1 is MIT, with 114 papers cited a total of 2,429 times—almost 1,000 more citations than the next institution on the list. One of MIT's top researchers in this area is Tomaso Poggio, who ranks at #5 on our list of the top 20 scientists. Areas under exploration at MIT include multidimensional morphable models, view-based human face detection, cortex-like mechanisms, and object detection by components.

Coming in at #2 is Michigan State University, with 43 papers cited a total of 1,467 times. An overwhelming majority of these papers were authored or co-authored by Anil K. Jain, who ranks at #1 by citations on the top 20 scientists list. Among Michigan's highly cited research are papers on data clustering, statistical pattern recognition, face detection in color images, the use of faces and fingerprints for personal identification, and kernel principal component analysis.

The institution ranked at #3 is the University of California, San Diego, with 50 papers cited a total of 1,404 times. UCSD's papers examine the use of shape contexts for object recognition, slow feature analysis, classifying facial actions, and face recognition using independent component analysis. David Kriegman, who ranks at #6 on our list of the top 20 scientists, is affiliated with UCSD—he is also affiliated with the next institution on our list.

The #4 slot belongs to the University of Illinois, with 121 papers cited a total of 906 times. Illumination cone models, geometrical face models, detecting objects with sparse partial representation, and graph embedding and extensions are some of the areas being researched here.

Carnegie Mellon University ranks at #5, with 158 papers cited a total of 904 times. Highly cited papers for CMU include such topics as neural network based face detection, the use of spin images, the LDA algorithm, and deciphering objects in complex or cluttered 3D scenes.

Coming in at #6 is the US Army, with 41 papers cited 896 times. The Army's most-cited work concerns the FERET evaluation methodology, a program that was managed by Jonathon Phillips, who is now at the National Institute of Standards and Technology (NIST). Other Army projects involve targeting and intelligence recognition programs.

Ranking at #7 is the first of the European institutions: Delft University of Technology with 15 papers cited a total of 722 times. Delft's research includes automated analysis of facial expressions, image processing with neural networks, auto video logo detection, and object recognition through one-class learning.

We're back in the US with #8—Ohio State University with 37 papers cited 702 times. Neural computing, precision range image recognition, and analyses of the LDA algorithm are in focus at OSU.

The University of Amsterdam ranks at #9 in our analysis, with 32 papers cited 697 times. Amsterdam's research includes human-computer interactions, face detection by aggregated Bayesian network classifiers, and dynamic programming for matching shapes.

Rounding out the top 10 is the University of British Columbia, with 29 papers cited a total of 662 times. Image features from scale-invariant keypoints, matching words and pictures, vision-based navigation, and probabilistic models for object recognition are among the topics being explored at this institution.

The remaining institutions on the list include four US universities (the University of Connecticut at #15, George Mason University at #17, CUNY at #18, and the University of California, Berkeley at #19), one US government agency (NIST at #11), two US corporations (IBM at #12 and AT&T at #14), the third European organization (Max Planck Society at #13), and the two Asian institutions (Hong Kong Polytechnic University at #16 and Nanjing University of Science & Technology at #20).

The full list of the top 20 institutions in face recognition by total cites is as follows:

Citations				
Rank	Institution	Citations	Papers	Citations Per Paper
1	MIT	2429	114	21.31
2	Michigan State Univ	1467	43	34.12
3	UNIV CALIF SAN DIEGO	1404	50	28.08
4	UNIV ILLINOIS	906	121	7.49
5	Carnegie Mellon Univ	904	158	5.72
6	US ARMY	896	41	21.85
7	DELFT UNIV TECHNOL	722	15	48.13
8	Ohio State Univ	702	37	18.97
9	UNIV AMSTERDAM	697	32	21.78
10	UNIV BRITISH COLUMBIA	662	29	22.83
11	NATL INST STAND & TECHNOL	645	22	29.32
12	IBM Corp	608	23	26.43
13	Max Planck Society	584	22	26.55
14	AT&T	574	11	52.18
15	Univ Connecticut	561	51	11.00
16	HONG KONG POLYTECH UNIV	553	129	4.29
17	GEORGE MASON UNIV	508	32	15.88
18	CUNY	476	17	28.00
19	Univ Calif Berkeley	461	35	13.17
20	NANJING UNIV SCI & TECHNOL	430	64	6.72

Full citation details for all these institutions can be found in *Essential Science Indicators* from Thomson Reuters. ■

Keywords: FACE RECOGNITION, FERET, AUTOMATIC FACE RECOGNITION, FACE RECOGNITION ALGORITHMS, FRONTAL IMAGE, MORPHABLE IMAGE .

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