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RUTGERS UNIVERSITY

Assistant Professor (tenure-track), Department of Library and Information Science
Associate Member of Graduate Faculty, Department of Computer Science.
Associate Faculty Member, WINLAB.
Director, Behavioral Informatics Lab.

New Brunswick, NJ

Sep 2014 –

- Classes taught: Data Analytics for Information Professionals, Social Informatics, Foundations of Data Science.
- Research Interests: Computational Social Science, Multimedia Information Systems, Data Analytics.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Visiting Professor, The Media Lab

Cambridge, MA

Sep 2014 – Aug 2016

- Collaborative research on understanding and shaping human behavior using social, behavioral, ‘big’ data.

PROFESSIONAL PREPARATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Post-Doctoral Associate, Human Dynamics Group, MIT Media Lab

Cambridge, MA

Sep 2012-Aug 2014

- Research Focus: Understanding and influencing human behavior using social, behavioral, ‘big’ data.
(Mentor: Professor Alex ‘Sandy’ Pentland)
- Research Interests: Social Reality Mining, Computational Social Science, Personal Data Analytics.

UNIVERSITY OF CALIFORNIA, IRVINE

Ph.D., Information and Computer Science

Irvine, CA

2007-2012

- Thesis Topic: “Personalized Situation Recognition” (Advisor: Professor Ramesh Jain)
- Graduation: Aug 2012.
- Research Interests: Personalized Decision Systems, Multimedia Systems, Social Media.

NATIONAL UNIVERSITY OF SINGAPORE

Master of Computing, (Computer Science)

Singapore

2003-2005

Bachelor of Engineering, (Computer Engineering)

1998-2002

- Master’s Thesis: “Coopetitive multi-camera surveillance using model predictive control”.
- Fully sponsored for undergraduate studies under the SIA-NOL scholarship. (One of 25 candidates selected from over 8,000 applicants nation-wide in India).

RESEARCH EXPERIENCE

RUTGERS UNIVERSITY

New Brunswick, NJ

Director, Behavioral Informatics Lab

2014-

- **Cyberbullying Detection and Mitigation:** Pushing the envelope on text-analysis based cyberbullying detection approaches to also leverage the social network properties (e.g. number of common friends, network embeddedness) that may be predictive of the bullying relationship between two individuals. I am working with an inter-disciplinary team involving sociologists, school counsellors, and information scientists to deploy both qualitative and quantitative approaches to better understand and counter the challenges of cyberbullying.
- **Socio-Mobile Metadata for Predicting and Influencing Wellbeing**
Investigating the interconnections between individual health/wellbeing and socio-mobility metadata. The underlying idea is to identify the composites of long-term behavioral traits (e.g. diverse social activity) that may be predictive of wellbeing-related traits like mental health or cooperative attitude. A longitudinal study involving communication and mobility meta-data and surveys for about 100 participants for 10 weeks was conducted in Spring 15. Data analyses, and follow up qualitative interviews are currently underway.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Cambridge, MA

Post-doctoral Associate and Visiting Professor

2012-

- **Social Reality Mining:** Analyzed the social interaction patterns of a community of users to study the effect of social behavior on other facets of their life. One study has found correlations between the *social behavior* of participants measured via different modalities like call, SMS, Bluetooth, and GPS logs and their *spending behavior*. Second study has found that the network topology, information flow, and cohesion in a community can be used to predict the average happiness level in the community. Work in progress to utilize these data to generate explicit and implicit nudges for users to undertake different actions in various wellbeing settings.
- **Privacy of Personal Data:** Designed and developed of a framework that allows users to share their personal information with different service providers while maintaining certain guarantees on their privacy. One spoke of this work has shown the bounds of privacy in terms of unicity of human spending data. We have found that only knowing only 4 points of information is enough to re-identify a consumer amongst millions of other consumers in a credit card spending dataset. Second line of work is quantifying the effect of peer pressure on preventing information leakage in social settings.

UNIVERSITY OF CALIFORNIA, IRVINE

Irvine, CA

Ph.D. candidate

2007-2012

- **Situation Recognition:** Designed a framework for translating social media and other location-based streams into personalized situations. It allows users of varying expertise levels to model different situations of interest by selecting, combining, visualizing, and analyzing heterogeneous data streams (e.g. Twitter, mobile sensors, images, weather, traffic). The developed system (EventShop) can be graphically configured to detect situations and generate personalized alerts for millions of end users. Applications studied include Thailand Flood mitigation, Daily Asthma recommendations, and new business store location analysis. Sandbox version of EventShop is available at <http://auge.ics.uci.edu/eventshop/>.
- **Tele-Presence Systems:** Designed and implemented a system for connecting multiple environments over the Web. The system detects different situations in each environment and automatically switches to the most suitable devices (cameras, microphones, speakers, display), thus allowing the users to focus on interaction rather than the device constraints.
- **Social Dynamics:** Created a Game-theoretic model of user behavior on social media sites. The model can estimate the optimal contribution strategy for each rational user, resultant community behavior, and allows the system designer to exploit the selfishness of end users to design incentive mechanisms which will optimize system performance while still benefiting the users.

KODAK RESEARCH LABS

Rochester, NY

Research Intern

2010

- **Shared Media Reliving:** Designed and developed a system which allows each user to have a personalized reliving experience from media collections shared over social networks. The system creates audio-visual shows which are aesthetically pleasing, yet interactive and semantically drivable based on people, locations, time, and events discovered in the media collection; thus allowing each user to relive experiences from their own perspective.

NATIONAL UNIVERSITY OF SINGAPORE

Singapore

Research Assistant

2002, 2007

- **Video Surveillance:** Developed a multi-camera surveillance system that countered delay problems in multi-sensor environments by combining Model Predictive Control with a cooperative-competition strategy.
- **Interactive Story-telling:** Developed an environment to allow users to collaboratively write stories in natural language which were dynamically converted into animated stories by matching user text with a corpus of video clips and descriptions.

AWARDS AND ACHIEVEMENTS

- **Distinguished Achievement in Research** Award, Library and Information Science Department, Rutgers University, 2015.
- Selected as a **“Rising Star” Speaker** for the inaugural Frontiers of Multimedia workshop at ACM International Conference on Multimedia, 2015. This includes a \$1,000.00 travel grant.
- **1st prize** for predicting crime patterns in London in ***Datathon on “Big Data for Social Good”*** organized by O₂, MIT, Telefonica and Open Data Institute, at Campus Party, London, Sep 2013.
- Selected as an **“Emerging Leader in Multimedia Research”**, by *IBM Research Labs, NY*. One of 10 selected world-wide in 2009.
- **Best Paper Award** at ACM Workshop on Social Media (WSM 2009) co-located with ACM Multimedia Conference.
- **Best Student Paper** at IEEE Workshop on Situation Management (SIMA 2009), co-located with IEEE Military Communications conference.

RESEARCH GRANTS

- National Science Foundation, CRII: CHS: Cyberbullying Detection Using Content and Social Network Analysis, Role: (Sole) PI, 2015-2017. \$174, 248.00.
- Google Research Award, Predicting Search Behavior Using Physical and Online Explorations, Role; 2016, Co-PI, PI: Chirag Shah, \$62,813.00.
- SCI Research Development Grant, Predicting User Well-being via Socio-Mobile data, Role: (Sole) PI, 2015-2015. \$7,500.00.
- SCI Research Development Grant, Real-time Diversity Analytics, Role: (Sole) PI, 2016-2016. \$3,500.00.

PROFESSIONAL SERVICE

- **Conference/Workshop Organization**

- Tutorials Chair, ACM International Conference on Multimedia, (forthcoming, 2017).
- Technical Program Committee, Associate Chair, ACM Computer Supported Cooperative Work Conference, Systems track, (forthcoming, 2017).
- Panels Chair, ACM/IEEE International Joint Conference on Digital Libraries, 2016.
- Technical Program Committee Area Co-Chair: IEEE International Conference on Multimedia and Expo, Area: Mobile Multimedia, 2015, Torino, Italy.
- Technical Program Committee Area Co-Chair: ACM International Conference on Multimedia, Area: Big and Broad Multimedia Streams, 2014, Orlando, Florida, USA.
- Co-organizer: Temporal Networks, Human Dynamics and Social Physics NetSci'14 Symposium, Berkeley California, June 2-6 2014
- General Co-Chair: First ACM Workshop on 'Personal Data Meets Distributed Multimedia', co-located with ACM Multimedia Conference, Oct 2013, Barcelona, Spain.

- **Editor/Guest editing**

- Guest Co-editor: IEEE Multimedia magazine, Special Issue on New Signals in Multimedia Systems and Applications: Sensing and Understanding Human Behavior and Interactions, (forthcoming, 2017).
- Guest Co-Editor: ACM Transactions on Internet Technology Special Section on Advances in Social Computing, 2016.
- Co-Editor: Geo-Intelligence and Visualization through Big Data Trends, IGI Publishers, 2015.
- Guest Co-Editor: IEEE Internet Computing Special Issue: Physical-Cyber-Social Computing, 2015

- **Program Committee Member:**

- ACM International Conference on Web Science, 2016
- IEEE International Conference on Multimedia and Expo, 2014, 2015, 2016
- ACM Multimedia Conference, 2013, 2014, 2015
- ACM International Conference on Multimedia Retrieval, 2013, 2016
- WWW: workshop on Real-Time Analysis and Mining of Social Streams, 2013,
- ICWSM: workshop on Real-Time Analysis and Mining of Social Streams, 2012,
- PerCom: workshop on Semantic Ambient Multimedia Experiences 2012,
- ACM Multimedia: workshop on Socially Aware Multimedia 2012, 2014
- Multimedia and Ubiquitous Engineering Conference, 2012.

TEACHING

- **Teaching at Rutgers University:**

2014-

- Fall 2014
Data Analytics for Information Professionals: Ratings: 4.60/5.00 (undergrad); 4. 57/5.00 (graduate)
- Spring 2015
Data Analytics for Information Professionals: Ratings: 4.57/5.00 (undergrad); 4. 50/5.00 (graduate)
- Fall 2015
Data Analytics for Information Professionals (Online Class) 4.55/5.00 (undergrad); 3.89/5.00 (graduate)
Social Informatics (Hybrid: Online/In-Person Class). Rating: 4.33/5.00 (undergrad)

- **Teaching at Institute of Technical Education, Singapore**

2002-2006

Four years of full-time teaching experience as a Lecturer. Classes taught (at post-secondary education level) included Web Programming, Multimedia Production, and Database Systems. Duties included developing the curriculum, delivering lectures, leading laboratory sessions, and mentoring students on various internal and external projects.

PUBLICATIONS

Authored and Edited Books

1. Bozkaya, B., & **Singh, V.K.** *Geo-Intelligence and Visualization through Big Data Trends* (edited book). Hershey, PA: IGI Global. doi 10.4018/978-1-4666-8465-2, pp. 1-349, 2015
2. **Singh, V.K.**, & Jain, R., *Situation Recognition Using EventShop* (co-authored monograph), Springer, pp. 1-150, ISBN: 978-3-319-30535-6 / 3319305352 (Published: June 2016.)

Journals Articles and Book Chapters: Published

1. **Singh, V. K.**, Fernandes, D., Kankanhalli, M., & Haenselmann, T. (2016). Decoupled Multicamera Sensing for Flexible View Generation. *Journal of Sensors*, 501, 8137859.
2. Almaatouq, A., Alabdulkareem, A., Nouh, M., Shmueli, E., Alsaleh, M., **Singh, V. K.**, Alarifi, A., Alfaris, A & Pentland, A. S. If It Looks Like a Spammer and Behaves Like a Spammer, It Must Be a Spammer: Analysis and Detection of Microblogging Spam, *International Journal of Information Security*, 2016.
3. de Montjoye, Y. A., Radaelli, L., **Singh, V. K.**, & Pentland, A. (2015). Unique in the shopping mall: On the reidentifiability of credit card metadata. *Science*, 347(6221), 536-539.
4. **Singh, V. K.**, Bozkaya, B., & Pentland, A. (2015). Money Walks: Implicit Mobility Behavior and Financial Well-Being. *PloS one*, 10(8), e0136628.
5. Barnaghi, P., Sheth, A., **Singh, V.**, & Hauswirth, M. (2015). Physical-Cyber-Social Computing: Looking Back, Looking Forward (Guest Editorial). *Internet Computing, IEEE*, 19(3), 7-11.
6. Srivastav, K.A., **Singh, V. K.**, Bozkaya, B., & Pentland, A. (2015). Assessing Financial Wellbeing of Merchants by Analyzing Behavioral Patterns in Historical Transactions in *Geo-Intelligence and Visualization through Big Data Trends*, pp. (76-93), IGI Global, PA.
7. **Singh, V. K.**, Mani, A., & Pentland, A. (2014). Social Persuasion in Online and Physical Networks. *Proceedings of the IEEE*, 102(12), 1903-1910.
8. Shmueli, E., **Singh, V. K.**, Lepri, B., & Pentland, A. (2014). Sensing, Understanding, and Shaping Social Behavior. *Computational Social Systems, IEEE Transactions on*, 1(1), 22-34.
9. **Singh, V. K.**, Freeman, L., Lepri, B., & Pentland, A. S. (2013). Classifying spending behavior using socio-mobile data. *HUMAN*, 2(2), pp-99.
10. **Singh, V. K.**, Jain, R., & Kankanhalli, M. (2011). Mechanism design for incentivizing social media contributions. In *Social media modeling and computing* (pp. 121-143). Springer London.
11. **Singh, V. K.**, Pirsiavash, H., Rishabh, I., & Jain, R. (2009). Towards environment-to-environment (e2e) multimedia communication systems. *Multimedia Tools and Applications*, 44(3), 361-388.
12. **Singh, V. K.**, & Kankanhalli, M. S. (2009). Adversary aware surveillance systems. *Information Forensics and Security, IEEE Transactions on*, 4(3), 552-563.
13. **Singh, V. K.**, Atray, P. K., & Kankanhalli, M. S. (2008). Cooperative multi-camera surveillance using model predictive control. *Machine Vision and applications*, 19(5-6), 375-393.

Journals Articles and Book Chapters: Under Submission

14. Huang, Q., **Singh, V. K.**, & Atray, P. K.. Cyber Bullying Detection Using Social Network Analysis, Submitted to: *IEEE Transactions on Computational Social Systems*, 2016.
15. Dong, X., Suhara, Y., Bozkaya, B., **Singh, V. K.**, & Pentland, A. Social Bridges in Community Purchase Behavior, Submitted to: *IEEE Transactions on Big Data*, 2016.

Peer-Reviewed Conferences and Workshops: Proceedings Published

16. **Singh, V.K.**, Radford, M., Huang, Q., and Furrer, S., "They basically like destroyed the school one day": On Newer App Affordances and Cyberbullying in Schools, To appear: *ACM International Conference on Computer Supported Collaborative Work and Social Computing*, 2017
17. **Singh, V.K.**, Huang, Q., and Atrey, P., Automated Cyberbullying Detection Using Probabilistic Socio-Textual Information, *ACM/IEEE International Conference on Advances in Social Networks Analysis and Mining*, 2016
18. Choi, D., Shah, C., & **Singh, V.K.**, Probing the Interconnections Between Geo-Exploration and Information Exploration Behavior, *ACM Ubiquitous Computing Conference*, 2016.
19. **Singh, V.K.** and Agarwal, R., Cooperative Phoneotypes: Exploring Phone-based Behavioral Markers of Cooperation, *ACM Ubiquitous Computing Conference*, 2016.
20. Almaatouq, A., Alabdulkareem, A., Nouh, M., Shmueli, E., Alsaleh, M., **Singh, V. K.**, Alarifi, A., Alfaris, A., & Pentland, A. S. (2014, June). Twitter: who gets caught? observed trends in social micro-blogging spam. In *Proceedings of the 2014 ACM conference on Web science* (pp. 33-41). ACM.
21. Huang, Q., **Singh, V. K.**, & Atrey, P. K. (2014, November). Cyber Bullying Detection Using Social and Textual Analysis. In *Proceedings of the 3rd International Workshop on Socially-Aware Multimedia* (pp. 3-6). ACM.
22. **Singh, V. K.**, Freeman, L., Lepri, B., & Pentland, A. S. (2013, September). Predicting spending behavior using socio-mobile features. In *Social Computing (SocialCom), 2013 International Conference on* (pp. 174-179). IEEE.
23. Pongpaichet, S., **Singh, V. K.**, Jain, R., & Pentland, A. P. (2013). Situation fencing: making geo-fencing personal and dynamic. In *Workshop on Personal Data Meets Distributed Multimedia* (pp. 3-10), ACM.
24. **Singh, V. K.**, Gao, M., & Jain, R. (2012, October). Situation recognition: an evolving problem for heterogeneous dynamic big multimedia data. In *Proceedings of the 20th ACM international conference on Multimedia* (pp. 1209-1218). ACM.
25. Gao, M., **Singh, V. K.**, & Jain, R. (2012, June). Eventshop: from heterogeneous web streams to personalized situation detection and control. In *Proceedings of the 4th Annual ACM Web Science Conference* (pp. 105-108). ACM.
26. **Singh, V. K.**, Luo, J., Joshi, D., Lei, P., Das, M., & Stubler, P. (2011, November). Reliving on demand: a total viewer experience. In *Proceedings of the 19th ACM international conference on Multimedia* (pp. 333-342). ACM.
27. **Singh, V. K.** (2011, November). From multimedia data to situation detection. In *Proceedings of the 19th ACM international conference on Multimedia* (pp. 875-876). ACM.
28. R. Jain, **V.K. Singh**, and M. Gao, (2011) Social Life Networks, In *Proceedings of the WWW Workshop on Social Media Engagement*.
29. **Singh, V. K.**, Gao, M., & Jain, R. (2010, October). Social pixels: genesis and evaluation. In *Proceedings of the international conference on Multimedia* (pp. 481-490). ACM.
30. **Singh, V. K.**, & Jain, R. (2010, April). Structural analysis of the emerging event-web. In *Proceedings of the 19th international conference on World wide web* (pp. 1183-1184). ACM.
31. **Singh, V. K.**, Jain, R., & Kankanhalli, M. S. (2009, October). Motivating contributors in social media networks. In *Proceedings of the first SIGMM workshop on Social media* (pp. 11-18). ACM. **(Best Paper Award)**
32. Singh, V. K., & Jain, R. (2009, October). Situation based control for cyber-physical environments. In *Military Communications Conference, 2009. MILCOM 2009. IEEE* (pp. 1-7). IEEE. **(Best Student Paper)**
33. Paleari, M. L., **Singh, V.**, Huet, B., & Jain, R. (2009, October). Toward environment-to-environment (E2E) affective sensitive communication systems. In *Proceedings of the first ACM international workshop on Multimedia technologies for distance learning* (pp. 19-26). ACM.
34. Saini, M. K., **Singh, V. K.**, Jain, R. C., & Kankanhalli, M. S. (2008, October). Multimodal observation systems. In *Proceedings of the 16th ACM international conference on Multimedia* (pp. 933-936). ACM.
35. **Singh, V. K.**, Pirsivash, H., Rishabh, I., & Jain, R. (2008, October). Towards environment-to-environment (e2e) multimedia communication systems. In *Proceedings of the 1st ACM international workshop on Semantic ambient media experiences*. (pp. 31-40). ACM.
36. **Singh, V. K.**, & Kankanhalli, M. S. (2007, July). Towards adversary aware surveillance systems. In *Multimedia and Expo, 2007 IEEE International Conference on* (pp. 2038-2041). IEEE.
37. **Singh, V. K.**, Atrey, P. K., & Kankanhalli, M. S. (2006). Coopetitive multimedia surveillance. In *Advances in Multimedia Modeling* (pp. 343-352). Springer Berlin Heidelberg.

38. Ram, S., Ramakrishnan, K. R., Atrey, P. K., **Singh, V. K.**, & Kankanhalli, M. S. (2006, October). A design methodology for selection and placement of sensors in multimedia surveillance systems. In *Proceedings of the 4th ACM international workshop on Video surveillance and sensor networks* (pp. 121-130). ACM
39. **Singh, V. K.**, & Atrey, P. K. (2005, November). Cooperative visual surveillance using model predictive control. In *Proceedings of the third ACM international workshop on Video surveillance & sensor networks* (pp. 149-158). ACM.

PATENT

Lou, J., Joshi, D., Stubler, P., Das, M., Lei, P. & **Singh, V.K.** Method for Media Reliving Playback, *U.S. Patent No. 8879890: Issued November 4, 2014.*

INVITED TALKS

- **Keynote Talk:** *Sensing, Understanding, and Shaping Human Behavior*, ACM International Workshop on Computational Models of Social Interactions: Human-Computer-Media Communication, co-located with ACM Multimedia Conference, Brisbane, Australia, 2015.
- *Sensing, Understanding, and Shaping Human Behavior*, Connective Media Seminar, CornellTech, NYC, 2015.
- *Sensing, Understanding, and Shaping Human Behavior*, Human Dynamics Group Seminar, MIT Media Lab, Cambridge, MA, 2015.
- *Sensing, Understanding, and Shaping Human Behavior*, National Institute on Standards and Technology, 2015.
- *Sensing, Understanding, and Shaping Human Behavior*, Bay Area Multimedia Forum, Stanford, CA, 2014.

MEDIA COVERAGE OF RESEARCH ACTIVITIES

- New York Times, With a Few Bits of Data, Researchers Identify ‘Anonymous’ People, <http://bits.blogs.nytimes.com/2015/01/29/with-a-few-bits-of-data-researchers-identify-anonymous-people/>, 2015
- BBC News, Mobile location data 'present anonymity risk', <http://www.bbc.com/news/science-environment-21923360>, 2015.
- Wall Street Journal, Metadata Can Expose Person’s Identity Even Without Name, <http://www.wsj.com/articles/metadata-can-expose-persons-identity-even-when-name-isnt-1422558349>, 2015
- Nature News, People identified through credit-card use alone, <http://www.nature.com/news/people-identified-through-credit-card-use-alone-1.16817>
- Harvard Business Review, There’s No Such Thing as Anonymous Data, <https://hbr.org/2015/02/theres-no-such-thing-as-anonymous-data>, 2015
- More coverage: MIT Technology Review, PBS, Le Monde (FR), Die Zeit (DE), Die Spiegel (DE), El Pais (ES), RT, The Hill, Telegraph (UK), Scientific American, New Scientist, Five Thirty Eight, Gizmodo, Fast Company, Computer World, ZDNet, Tom's guide, Popular Mechanics, Motherboard, US News, NBC, CNBC, Huffington Post (US), IEEE Spectrum, Phys.org, Radio Canada (FR), Le Vif (FR), Slate (FR), Trends-Tendance (FR), Science et vie (FR).
- Rutgers CommInfo Public Relations, Appellate Court Cites Vivek Singh’s Study in Decision Against the NSA, <https://comminfo.rutgers.edu/news/appellate-court-cites-vivek-singhs-study-in-decision-against-the-nsa.html>
- ACM Tech News, University Receives Grant to Prevent Cyberbullying, <http://cacm.acm.org/news/185388-university-receives-grant-to-prevent-cyberbullying/fulltext>