

Murad Megjhani

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Education

2012-2016 Ph.D., Department of Electrical and Computer Engineering, University of Houston, Houston, TX (3.78/4.0)
2001-2005 B.E., Department of Electrical and Computer Engineering, Chaitanya Bharthi Institute of Technology, Hyderabad, India (4.0/4.0)

Research Interest :

Image analysis, Machine learning, Sparse modelling, Deep learning, Brain computer interface, Computational neuroscience, Multi spectral analysis, Arbor analytics, Behavioral neuroscience, Time series analysis, Neuro-imaging.

Professional Experience

Research Experience

Aug 2016 – Present Postdoctoral Research Scientist, Department of Neurology, Columbia University, NY

1. Applying and developing sparse model using multi-scale dictionary learning method for discovering the hidden trends in the high frequency physiological dataset acquired from the bedside monitors at Neuro-Intensive Care Unit (NICU) at CUMC.
2. Developing Proxy Variable of Clinical Suspicion using Electronics Medical Records (EMR) like labs and medical data using recent advances in natural language processing.
3. Developing deep learning models for online detection of Delayed Cerebral Ischemia (DCI)

Jan 2012 – Aug 2016 Research Scientist at Bio-Image Analytics Lab, University of Houston, TX

1. Developed a sparse-coding/dictionary learning algorithm based software to automatically reconstruct and analyze brain cells
2. Worked with an interdisciplinary team of engineers and biologists to design and implement several new modules in the FARSIGHT toolkit http://www.farsight-toolkit.org/wiki/Main_Page (Bio medical Image Analysis toolkit).
3. Incorporated visualization tools allowing doctors and biologists to interact with the system, interpret algorithm outputs, and visualize convergence metrics.
4. Performed exploratory analysis on full brain with over 200,000 cells.
5. Developed dictionary learning based algorithm to un-mix multispectral tumor dataset

Aug 2014 – Aug 2016 Research Scientist at Brain Machine Interface (BMI) lab, University of Houston, TX

1. Brain on Art : Assaying neural individuality and variation in freely behaving people based on qEEG. (<http://uhbmi.ee.uh.edu/research/neuroaesthetics-and-users-preferences-research/>)
 - a. Analyzed the EEG data collected from museum goers
 - b. Analyzed the performance of different mobile brain and body imaging (MOBI) systems in freely behaving adults
2. Cognitive motor development: Developed algorithms using dictionary-learning methods to identify distinct bio-marker from the EEG dataset acquired from the infants ranging from 6 to 24 months. (<http://uhbmi.ee.uh.edu/research/cognitive-motor-development-research/>)

Industry Experience

Nov 2005 – Jan 2012

1. Lead the team to develop software products for insurance technologies using agile methodologies.
2. Designed and developed insurance rating and underwriting rule based engine
3. Involved in analysis, detailed design to come up with right architecture and implementation of the Business Services.

Teaching Experience

Jan 2013 - May 2013 Teaching assistant - electrical engineering lab at University of Houston, Houston, TX

Aug 2013 – Dec 2013 Teaching assistant – C++

Awards

2015	Future Faculty Fellowship at University of Houston, TX
2012-2016	Tuition Fellowship for PhD program at University of Houston
2005	Distinguished student award. Awarded the state rank for outstanding performance in the curricular activities

Publications

Journal Articles:

1. S. Park, **M. Megjhani**, Jan Claassen, Noemie Elhadad, “Predicting Delayed Cerebral Ischemia after Subarachnoid Hemorrhage Using High Frequency Physiological Data”, *Journal of Clinical and Medical Computing*, 2018; pp 1–11.
2. **M.Megjhani**, K.Terilli, Jan Classen, Nemie Elhadad, S. Park, “Incorporating High Frequency Physiologic data Using Computational Dictionary Learning Improves Prediction of Delayed Cerebral Ischemia Compared to Existing Methods”, *Frontiers in Neurology*, February, 2018.
3. **M.Megjhani**, K.Terilli, A.Martin, A.Velazquez, J.Claassen, S.Park, “Deriving the PRx and CPPopt from 0.2-Hz Data: Establishing Generalizability to Bedmaster Users”, In: Heldt T. (eds) *Intracranial Pressure & Neuromonitoring XVI. Acta Neurochirurgica Supplement*, vol 126. Springer, Cham, 2018.
4. J. Cruz-Garza, J. Brantley, S. Nakagome, K. Konston, **M. Megjhani**, J.C Vidal, “Deployment of Mobile EEG Technology in an Art Museum Setting: Evaluation of Signal Quality and Usability”, *Frontiers in human neuroscience*, November, 2017.

5. **M. Megjhani**, B. Roysam, "Morphological Constraint Spectral Unmixing of Biological tissues using confocal microscopy" *Bioinformatics*, (2017), March 2017
6. E Barton, Y. Lu, **M. Megjhani**, M. Maynard, P. Kulkarni, B. Roysam, J.L Leasure, "Binge Alcohol Alters Exercise-Driven Neuroplasticity", *Neuroscience* 343, February 2017.
7. **M. Megjhani** *,Kontson K*, Cruz-Garza JG, Brantley JA, Robleto D,Contreras-Vidal JL " Your Brain on Art: Emergent Cortical Dynamics During Aesthetic Experiences". *Frontiers in Human Neuroscience*, Nov. 2015
8. **M. Megjhani**, N. Rey-Villamizar, A. Merouane, Y. Lu, A. Mukherjee, K. Trett, P. Chong, C. Harris, W. Shain, and B. Roysam, "Population-scale Three-dimensional Reconstruction and Quantitative Profiling of Microglia Arbors.," *Bioinformatics*, 31 (2015), pp. 2190–2198, Feb. 2015
9. Y.Xu, **M. Megjhani**, W. Shain, B. Roysam and Z. Han, "Unsupervised Profiling of Microglial Arbor Morphologies and Distribution using a Nonparametric Bayesian Approach", *IEEE Journal of Selected Topics in Signal Processing*, Jan. 2015
10. N. Rey, V. Somasundar, **M. Megjhani**, Y. Xu, Y. Lu, W. Shain and B. Roysam, "Large-scale Automated Image Analysis for Computational Profiling of Brain Tissue Surrounding Implanted Neuroprosthetic Devices using Python", *Frontiers in Neuroinformatics*, vol. 8, no. 39, Apr. 2014
11. **M. Megjhani**, K. Terilli, S. Park, "Heart Rate Variability as a Biomarker of Neurocardiogenic Injury after Subarachnoid Hemorrhage" (Submitted).
12. **M. Megjhani**, J. Cruz-Garza, Z. Hernandez, J. Arenas-Castellanos, J.C Vidal " Decoding Behavioral actions and identifying bio-markers from Electroencephalography (EEG) in freely behaving infants" (In Progress).

Conference Articles:

13. J. Ford, **M. Megjhani**, K. Terilli, A. Bohemie, S. Park, "Brain Tissue Oxygenation as an Adjunctive Monitor for Determining Optimal Cerebral Perfusion Pressure in Subarachnoid Hemorrhage Patients", *American Academy of Neurology*, April 2018.
14. **M. Megjhani** , B. Roysam, "3-D Cellular-scale Profiling of Brain Tissue Surrounding Implanted Devices", Society for Neuroscience: Neuroscience 2015. October 17, 2015: Chicago, IL.
15. Cruz-Garza JG, Hernandez ZR, **Megjhani M**, Abibullaev B, Tse TW, Caducoy E, Contreras-Vidal JL. "Neural development of social cognition in the first two years of life: Early findings from a cross-sectional study". Society for Neuroscience: Neuroscience 2015. October 17, 2015: Chicago, IL.
16. Cruz-Garza JG, Kontson K, **Megjhani M**, Brantley J, Robleto D, White M, Civillico E, Contreras-Vidal JL. "Your Brain On Art : Bringing Research to Public Settings to Increase Brain Awareness and Acquire Big Data." Society for Neuroscience: Neuroscience 2015. October 17, 2015: Chicago, IL.
17. Kontson K, **Megjhani M**, Brantley J, Cruz-Garza JG, Nakagome S, Robleto D, White M, Civillico E, Contreras-Vidal JL. "Emergent cortical dynamics during aesthetic experiences." Society for Neuroscience: Neuroscience 2015. October 17, 2015: Chicago, IL.

18. Arenas-Castellanos AJ, Hernandez ZR, Cruz-Garza JG, **Megjhani M**, Abibullaev B, Maddi SRP, Tse T, Armstrong C, Long W, Contreras-Vidal JL. "A developmental analysis of behavior related to the mirror neuron system in 6-24 months infants". Ninth Biennial Meeting of the Cognitive Development Society. October 7, 2015. Columbus, OH
19. **M. Megjhani**, Y. Lu, "Profiling of Brain Tissue Surrounding Implanted Devices", International Conference on Computational Photography, ICCP 2014, Houston, TX.