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Girik Malik

Curriculum Vitae

Summary

Self driven, passionate about computer applications leading to useful social outcomes with a keen interest in Mathematics, Biology, Neuroscience, Data Science and Machine Learning. Key accomplishments: novel data storage method (PCT/IB2015/057964), novel data compression algorithm (~83% more efficient than the current best, analogous to non-neural network based autoencoder) (PCT/IB2016/054294), secure multi-level electronic authentication techniques (Indian patent office ref 201711022812).

Interests

Computer Vision (Recognition, Detection and Classification Problems), Machine Learning, Pattern Recognition, Deep Learning, Data Compression, Data Security, Big Data Analytics, Graph Theory, Algorithms, Programming, Visual Analytics, Bioinformatics, Protein Structure Modeling

Education

2018-Present **Ph.D. in Computer Science**, *Northeastern University*, Boston, MA, USA.

Focus Areas: AI, Machine Learning, Robotics, Neurosciences

Advisors: Robert Platt Jr., Ennio Mingolla

2013-2017 **Bachelors of Technology in Computer Science**, *Shiv Nadar University*, Greater Noida, India, **GPA: 8.51/10. 100% Tuition Scholarship. Top 5 in class of 120.**

Visiting Research Scholar, The Ohio State University, Columbus, Ohio, USA {Summer 2015, Summer 2016, Spring 2017 (Invited for thesis)}

Thesis: "*Development of a Neonatal Tactile Connectome using Graph Theory for the prediction of Neurobehavioural adaptation in early childhood*"

Research Experience

Sep 2017 - **Worked with Professor Irina A. Buhimschi(Director, Center for Perinatal**

Mar 2018 **Research, The Research Institute at Nationwide Childrens Hospital), Unsupervised Clustering Methods for the analysis of mass-spectrometry protein data for detection of early-biomarkers for different sub-phenotypes of pre-eclampsia.**

- Mar 2017 - **Worked with Dr. Mark E. Hester (PI, Center for Perinatal Research, The Research Institute at Nationwide Childrens Hospital) and Professor Irina A. Buhimschi(Director, Center for Perinatal Research, The Research Institute at Nationwide Childrens Hospital),** *Development of Neural Network and Analysis of the Neuronal Spike Data for neurons from induced pluripotent stem cells (iPS).*
 Sep 2017
- May 2016 - **Worked with Professor Andrzej Kloczkowski (The Ohio State University) and Dr. Naithalie L. Maitre (Neonatal Center, The Research Institute at Nationwide Childrens Hospital),** *Analysis of the "Baby Connectome" for Pre-term diseases using EEG Signals.*
 June 2017
- May 2016 - **Worked with Professor Andrzej Kloczkowski (The Ohio State University) and Professor Irina A. Buhimschi(Director, Center for Perinatal Research, The Research Institute at Nationwide Childrens Hospital),** *Machine Learning Methods for ultrasonographic images placental imaging and prediction of pre-eclampsia.*
 July 2016
- Oct 2015 - **Worked with Professor Pawan K. Dhar (Jawaharlal Nehru University),** *Method of Big Data Compression and Decompression (Patent Pending).*
 Apr 2016
 ○ Ref: PCT/IB2016/054294, Apr 28, 2016
- May 2015 - **Worked with Professor Andrzej Kloczkowski (The Ohio State University) and Dr. Anirban Banerji,** *Deciphering Physical Properties of the Binding Sites of Protein Exterior.*
 Oct 2015
- May 2015 - **Worked with Professor Andrzej Kloczkowski (The Ohio State University) Professor Irina A. Buhimschi(Director, Center for Perinatal Research, The Research Institute at Nationwide Childrens Hospital),** *Analysis and extraction of information from ultrasonographic images with possible applications to placental imaging and prediction of pre-eclampsia.*
 Oct 2015
- Dec 2014 - **Worked with Professor Andrzej Kloczkowski (The Ohio State University) and Dr. Anirban Banerji,** *Finding Maximal Common Subgraph on Protein Network Structure.*
 May 2015
- Aug 2014 - **Hypo Webserver (Hypothetical-protein-turned-pseudogene prediction),** *Algorithm developer and web server coder.*
 Mar 2015
 ○ www.bioclues.org/hypo/
- Jul 2014 - **Worked with Professor Pawan K. Dhar (Jawaharlal Nehru University),** *Data to protein conversion and storage.*
 Sep 2014
- Mar 2014 - **Worked with Professor Pawan K. Dhar (Jawaharlal Nehru University),** *A Biomolecule based Data Storage System (Patent Pending).*
 Jun 2014
 ○ Ref: PCT/IB2015/057964, Oct. 16, 2015
 ○ www.snu.edu.in/pdf/Girik-Malik-Best-Poster-Award.pdf

Professional Experience

- Apr 2019 - **Artificial Intelligence Intern, Host: Ben Chandler, PhD and Ryan Burt, PhD.**
 Aug 2019 Bosch Center for Artificial Intelligence, Robert Bosch LLC, Sunnyvale, CA 94085
- Sep 2017 - **Visiting Research Scholar, Host: Prof. Irina A. Buhimschi.**
 Mar 2018 Center for Perinatal Research, The Research Institute at Nationwide Childrens Hospital, The Ohio State University Medical School, Columbus, OH 43205

- Jan 2017 - **Visiting Research Scholar**, *Host: Dr. Nathalie L. Maitre.*
- Jun 2017 Center for Perinatal Research, The Research Institute at Nationwide Childrens Hospital, The Ohio State University Medical School, Columbus, OH 43205
- May 2016 - **Visiting Research Scholar**, *Host: Prof. Andrzej Kloczkowski.*
- Aug 2016 Battelle Center for Mathematical Medicine, The Research Institute at Nationwide Childrens Hospital, The Ohio State University Medical School, Columbus, OH 43205
- Jul 2015 - **Visiting Research Scholar**, *Host: Prof. Andrzej Kloczkowski.*
- Oct 2015 Battelle Center for Mathematical Medicine, The Research Institute at Nationwide Childrens Hospital, The Ohio State University Medical School, Columbus, OH 43205
- Summer 2014 **Intern, Software Developer**, *Shiv Nadar Foundation.*
Developed Hostel Management System using Zend Framework

Honors and Awards

- 2018 **Travel Award**, *Education Committee Travel Award*, 62nd Annual Meeting of The Biophysical Society, San Francisco, California, USA.
- 2017 **Invited talk**, *"Prediction of Protein Aggregation Propensities: A Deep Learning approach"*, 31st Annual Symposium of The Protein Society, Montréal, Québec, Canada.
- 2017 **Travel Award**, *Finn Wold and Protein Science Travel Award*, 31st Annual Symposium of The Protein Society, Montréal, Québec, Canada.
- 2017 **Fellowship**, *NSF Sponsored*, From Computational Biophysics to Systems Biology (CBSB 2017), University of Cincinnati, Cincinnati, Ohio, USA.
- 2016 **Invited talk**, *"A Novel technique for the conversion of digital data into DNA sequence"*, Bioinformatics Center at Birla Institute of Scientific Research, Jaipur, Rajasthan, India. **Host: Prashanth Suravajhala, PhD.**
- 2016 **Invited for Spotlight Presentation**, *"Deciphering General Characteristics of Residues constituting Allosteric Communication Paths"*, The Third International Conference on Mathematical and Computational Medicine, Columbus, Ohio, USA.
- 2014 **Second Best Poster Award**, *Data to DNA*, IMTECH Chandigarh.
- 2013 **100% tuition Scholarship**, *INR 940,000*, Shiv Nadar University, India.

Publications

- 2019 **Malik, G.**, Banerji A., Kouza M., Buhimschi I. A., and Kloczkowski A., *"Deciphering general characteristics of residues constituting allosteric communication paths"*, International Work-Conference on Bioinformatics and Biomedical Engineering, pp. 245-258, Springer, Cham, ISBN: 978-3-030-17935-9.
https://doi.org/10.1007/978-3-030-17935-9_23
- 2019 Ijaq J., **Malik G.**, Kumar A., et al., *"A Model to Predict the Function of Hypothetical Proteins through Nine Point Classification Scoring Schema"*, BMC Bioinformatics, 20(1), p.14.
<https://doi.org/10.1186/s12859-018-2554-y>

- 2018 Sundararajan V.S., **Malik G.**, Ijaq J., Kumar A., Das P.S., Shidhi P.R., Nair A.S., Suravajhala P., Dhar P.K. , "*HYPO: A database of hypothetical human proteins*", Protein & Peptide Letters, <http://dx.doi.org/10.2174/0929866525666180828110444>.
<http://dx.doi.org/10.1101/202887>
- 2018 Kumar, A., Pandeya, A., **Malik, G.**, et al., "*A web resource for nutrient use efficiency-related genes, quantitative trait loci and microRNAs in important cereals and model plants*", F1000Research, Volume 7, 29 May 2018.
<http://dx.doi.org/10.12688/f1000research.14561.1>
- 2018 **Malik, G.**, Banerji, A., Kouza, M., Buhimschi, I. A., Kloczkowski, A., "*Deciphering general characteristics of residues constituting allosteric communication paths*", arXiv preprint arXiv:1802.10207, 27 February 2018.
<https://arxiv.org/abs/1802.10207>
- 2018 **Malik, G.**, Kloczkowski, A., "*Classification of Allostery in Proteins: A Deep Learning Approach*", Biophysical Journal, Volume 114, Issue 3, Supplement 1, 2 February 2018, Page 422a, ISSN 0006-3495.
<http://dx.doi.org/10.1016/j.bpj.2017.11.2393>
- 2018 Kloczkowski, A., Kouza, M., **Malik, G.**, Buhimschi, I., Faraggi, E. , "*Combining Prediction of Protein Aggregation Propensities with Prediction of Other One-Dimensional Properties*", Biophysical Journal, Volume 114, Issue 3, Supplement 1, 2 February 2018, Page 432a, ISSN 0006-3495.
<http://dx.doi.org/10.1016/j.bpj.2017.11.2393>
- 2017 **Malik G.**, Banerji A., Kloczkowski A., "*Deciphering General Characteristics of Residues Constituting Allosteric Communication Paths*", Biophysical Journal, Volume 112, Issue 3, Supplement 1, 3 February 2017, Page 499a, ISSN 0006-3495.
<http://dx.doi.org/10.1016/j.bpj.2016.11.2698>
- 2017 Kouza M., **Malik G.**, Faraggi E., Kolinski A., Buhimschi I., Kloczkowski A., "*Prediction of Protein Aggregation Propensities using GOR Method*", Biophysical Journal, Volume 112, Issue 3, Supplement 1, 3 February 2017, Pages 198a-199a, ISSN 0006-3495.
<http://dx.doi.org/10.1016/j.bpj.2016.11.1100>
- 2016 Poster - **Malik G.**, Banerji A., Kloczkowski A., "*Deciphering general characteristics of residues constituting allosteric communication paths*", The Third International Conference on Mathematical and Computational Medicine, Columbus, Ohio, USA.
- 2016 Poster - **Malik G.**, Berryman K., Buhimschi C., Kloczkowski A., Buhimschi I., "*Analysis and extraction of information from ultrasonographic images with possible applications to placental imaging and prediction of pre-eclampsia*", The Third International Conference on Mathematical and Computational Medicine, Columbus, Ohio, USA.
- 2015 Poster - **Malik G.**, Dubey B., "*Protein structure graph: Dissipating new rules for similarity analysis*", Interdisciplinary Conference of Science And Application Of Networks - 2015, Shiv Nadar University, India.

2014 Book - Bhandari S., **Malik G.**, Shankar S., *"An Enchanting Trail Through Wilderness, Insights into the Web of Life"*, San Francisco, CA: *Blurb Inc.*, 2014, ISBN: 1320132715. Print.

📄 www.amazon.com/Enchanting-Trail-through-Wilderness/dp/132013274X/

2014 Poster - **Malik G.**, Dhar P. K., Suravajhala P., *"Big Data Storage Solutions: Data to DNA"*, Conference on Big Data Mining, *IMTECH, Chandigarh, India*.
Won the second best poster award

Patents

2017 Patent - **Malik G.**, Malik G., *"Secure multi-level electronic authentication techniques"*.

Ref: 201711022812 (Indian Patent office), Submitted: Jun 29, 2017

2016 Patent - **Malik G.**, Dhar P. K., *"Method of Data Compression and Decompression"*.

Ref: PCT/IB2016/054294, Submitted: Apr 28, 2016

google.com/patents/WO2017187244A1

2014 Patent - **Malik G.**, Dhar P. K., *"A Biomolecule based Data Storage System"*.

Ref: PCT/IB2015/057964, Submitted: Oct 16, 2015

google.com/patents/WO2016059610A1

Service

2017 **Program Committee**, *Indian Conference on Bioinformatics (INBIX '17)*, Bioinformatics Center at Birla Institute of Scientific Research, *Jaipur, Rajasthan, India*.

2017 **Reviewer**, *4th International Conference on Physiological Computing Systems (PhyCS 2017)*, *Madrid, Spain*.

2015 **Membership Chair and Founding Member**, *ACM, Shiv Nadar University Chapter, Greater Noida, India*.

Aug 2012 - **Navjyoti Community College, Navjyoti India Foundation, New Delhi**, *Taught*

Nov 2012 *Fundamentals of Computer Science to the under-privileged children.*

Entrepreneurship

Apr 2016 - **Labrynthe**, *CoFounder and Chief of Technology*, Innovative R&D and education startup with an aim of imparting astronomy education at all levels, Catered to 2500+ students in 20+ schools in India.

📄 www.labrynthe.com

Aug 2014 - **BrainWeave**, *CoFounder and CEO*, Data Analytics startup for 360° improvement of schools, Successfully completed two trials for 500+ kids, their teachers and administrators in New Delhi, India..

Aug 2013 - **FreezePix**, *Founder and CEO*, An intra university based image sharing social network.
Jul 2014

Computer Skills

| | | | |
|---------------------------|---|------------------------|---|
| Languages Known | C/C++, Python, MATLAB, Java, SQL, XML, CSS, Javascript, JQuery, Ajax, PHP | Type Setting | L ^A T _E X, Open Office, MS Office |
| Frequently Used | C, C++, Python, PHP | Web Programming | HTML, PHP, JavaScript, JQuery |
| Mobile Programming | Android (Basic) | Libraries | PyTorch, Tensorflow, Numpy, Scipy, OpenCV |

References

Robert Platt Jr., Assistant Professor, Computer Science, Northeastern University, Boston MA, rplatt@ccs.neu.edu

Ennio Mingolla, Professor, Psychology, Northeastern University, Boston MA, e.mingolla@northeastern.edu

Andrzej Kloczkowski, Professor and PI, Battelle Center for Mathematical Medicine and The Ohio State University College of Medicine, Andrzej.Kloczkowski@nationwidechildrens.org

Harish Karnick, Professor, Computer Science, Indian Institute of Technology - Kanpur, hk@cse.iitk.ac.in

Amber Habib, Professor and Head, Mathematics, Shiv Nadar University, amber.habib@snu.edu.in