

MUHAMMAD AHMAD

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EDUCATION

Doctor of Philosophy (Computer Science) Lahore University of Management Sciences (LUMS), Pakistan	2017 - 2023
Master of Science (Computer Science) Lahore University of Management Sciences (LUMS), Pakistan	2014 - 2016
Bachelor of Science (Computer Science) National University of Computer and Emerging Sciences (FAST-NUCES), Pakistan	2010 - 2014

THESIS

Title : Immunization and Summarization of Large Graphs
Supervisor : Dr. Imdadullah Khan, Associate Professor, LUMS
Co-Supervisor : Dr. Asim Karim, Professor, LUMS

Research Projects

- Network Immunization:** Proposed an efficient approximation algorithm to immunize a subset of nodes such that the virus spread is minimum in the network. Quality evaluation based on virus spread and reduction in network vulnerability shows that our approach performs better than state of the art solution.
- Graph Summarization:** Developed an efficient randomized algorithm to compute a summary graph of a large graph such that the graph reconstructed from the summary is *close* to the original graph. We evaluate our approach based on the closeness of the reconstructed and original graph and the accuracy in query answers.
- Data Analytics on Relative Similarity Information:** Performed data analysis on similarity information represented as directed graphs. We perform data analysis tasks such as neighbor intersection, nearest neighborhood based clustering, k - nearest neighbors based classification.
- Kernal Computation for Sequential Data:** Developed an approximation scheme to compute similarity among sequential data. Various machine learning tasks such as SVM-based classification and clustering are then performed using the similarity information.

RESEARCH PUBLICATIONS

Journal Publications

- SsAG: Summarization and Sparsification of Attributed Graphs** in ACM Transactions on Knowledge Discovery from Data, 2024 ([link](#))
- Combinatorial Trace Method for Network Immunization** in Information Sciences, 2020 ([link](#))
- Spectral Methods for Immunization of Large Networks** in Australasian Journal of Information Systems, 2017 ([link](#))

Conference Publications

- Efficient Data Analytics on Augmented Similarity Triplets** in IEEE International Conference on Big Data, 2022 ([link](#))
- Scalable Approximation Algorithm for Graph Summarization** in Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD), 2018 ([link](#))
- Scalable Approximation Algorithm for Network Immunization** in Pacific Asia Conference on Information Systems (PACIS), 2017 ([link](#))
- Who Should Receive the Vaccine?** in The Australasian Data Mining Conference (AusDM), 2016 ([link](#))

TEACHING EXPERIENCE

Head Teaching Assistant at Lahore University of Management Sciences (LUMS)

- Data Structures (CS-202) Spring 2021
- Introduction to Programming (CS-200) Fall 2016

Teaching Assistant at Lahore University of Management Sciences (LUMS)

- Big Data Analytics (CS-5312) Spring 2020, 2021
- Advanced Algorithms (CS-510) Fall 2017, 2018

SKILLS

Major Courses

- Big Data Analytics – Algorithms – Machine Learning – Data Mining – Natural Language Processing

Programming Languages / IDEs

- PYTHON (SPYDER, JUPYTER) – JAVA (NETBEANS) – C++ (MS VISUAL STUDIO) – MATLAB
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