Yeasir Rayhan

Contact Information

Lecturer
Department of Computer Science and Engineering
East West University, Dhaka
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Research Interest

Spatial Database, Spatio-temporal Data Mining, Interpretable AI, Graph Representation Learning

Education

B. Sc. in Computer Science and Engineering July 2014 - October 2018
Department of Computer Science and Engineering (CSE)
Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh.
CGPA: 3.81/4.00

Publications

Efficient Scheduling of Generalized Group Trips in Road Networks
Yeasir Rayhan, Tanzima Hashem, Roksana Jahan, Muhammad Aamir Cheema
ACM Transactions on Spatial Algorithms and Systems (**TSAS**), 2019

Research Experience

Interpretable Spatio-temporal Model for Long-term Epidemic Prediction
Supervisor: Dr. Tanzima Hashem
Status: In Progress (Expected completion March 2021)

- We aim to forecast (1-4 week ahead) the infection rate of infectious diseases such as COVID-19 at county-level of USA based on different spatio-temporal aspects such as inter-county human mobility, intra-county human mobility, different POIs, connectivity of counties, demographics along with traditional historical COVID-19 cases and deaths in an interpretable manner

MinMax Indoor Facility Selection and Relocation Queries
Supervisor: Dr. Tanzima Hashem
Status: In progress (Expected completion: December 2020)

- We study minmax location selection query and its variant, minmax facility replacement query in discrete space (e.g. indoor venues like hospitals, shopping centers)
- We adapt the state-of-the-art solution in road networks to indoor spaces and propose two baseline solutions for both queries
- We propose two novel algorithms based on VIP-tree based nearest neighbor and shortest distance computation algorithms for both queries
- Extensive Experiments on Melbourne Central and Chadstone Shopping Center dataset suggests the superiority of VIP tree based solution over the baseline solution for facility selection problem. However, baseline solution outperforms the VIP tree based solution for facility relocation problem

AIST: An Interpretable Attention-based Deep learning Model for Crime Prediction
Supervisor: Dr. Tanzima Hashem
Status: Under Review

- We propose AIST, a novel interpretable spatio-temporal deep learning model

to capture diverse spatio-temporal correlations based on past crime occurrences, external features and recurring trends
- We propose hGAT, a novel GAT variant that allows AIST to learn more faithful node (region) embedding by incorporating hierarchical structure of regions
- We propose fGAT, another novel GAT variant to incorporate crime specific semantic information in a region's embedding to provide insights behind the predictions of AIST
- AIST shows a decrease of 8.3% on MAE and 20.98% on MSE over the state-of-the-art on Chicago crime dataset and provides useful insights behind its predictions

Efficient Scheduling of Generalized Group Trips in Road Networks (Undergraduate thesis)
Supervisor: Dr. Tanzima Hashem
Status: Published in ACM Transactions on Spatial Algorithms and Systems (**TSAS**), 2019
Awards: Regional Winner (Asia), The Global Undergraduate Awards, 2019

- We introduce generalized group trip scheduling (GGTS) queries that enable friends and families to perform activities at different points of interest (POIs)
- We propose an efficient algorithm to evaluate the exact answers for GGTS queries in road networks.
- Since finding the answer for a GGTS query is an NP-hard problem, we propose two heuristic solutions— trip-scheduling heuristic (TSH) and search region refinement heuristic (SRH) for processing GGTS queries
- Extensive experiments on California road dataset show that our optimal algorithm is preferable for small parameter settings, and the heuristic solutions reduce the processing overhead significantly in return for sacrificing the accuracy slightly.

Employment History

Lecturer — January 2019 - Present
Department of Computer Science and Engineering
East West University

Lecturer — October 2018 - December 2018
Department of Computer Science and Engineering
Eastern University

Selected Course-work

Artificial Intelligence, Simulation & Modeling, Computer Graphics, Computational Geometry

Courses Instructed

Structured Programming Language, Object-Oriented Programming Language, Discrete Mathematics, Structured Programming Language Sessional, Object-Oriented Programming Language Sessional

Scholarships, Awards, and Grants

- Regional Winner(Asia) in Computer Science
  The Global Undergraduate Awards, 2019 (World's largest academic awards program for undergraduates)
- Dean's Honor List, BUET
- University Merit Scholarship, BUET

Community Services

- Reviewer: NSysS (2020), APWEB-WAIM (2019 - 2020), ICASERT (2019)
- Organizing Committee Member (ICASERT 2019)