Kalyan Roy

Personal Information

kalyan.r1226@gmail.com +880-1749888998
Google Scholar https://roy-kalyan.github.io

Education

BS in *Computer Science and Engineering* at **North South University**, Dhaka, Bangladesh
August, 2014 - December, 2019

Notable Courses : Data Structure and Algorithm, Design and Analysis of Algorithms, Artificial Intelligence, Neural Networks, Discrete Mathematics, Introduction to Linear Algebra, Probability and Statistics

Work Experience

- Research Assistant (RA) at **North South University**, Dhaka, Bangladesh
  November, 2019 - June, 2024
  Supervisor : *Dr. Ahsanur Rahman*
  Research Area : Algorithms, Graph Theory, Data Mining
  Responsibilities : Implementing an exact algorithm to enumerate dense-subgraphs of a graph. Implementing an approximation algorithm to find minimal vertex cover. Implementing and optimizing the aforementioned tasks in C/C++. Testing the algorithms with real and synthetic data.

- Teaching Assistant (TA) at **North South University**, Dhaka, Bangladesh
  January, 2019 - September, 2019
  Courses : Design and Analysis of Algorithms
  Data Structure and Algorithm
  Computing Concepts (C Programming)
  Responsibilities : Holding regular office hours, tutoring sessions, scoring answer scripts and assignments.

Research Interests

Algorithms, Graph Theory, Cryptography

Research Papers

Journals

- **A Step towards Information Extraction : Named Entity Recognition in Bangla using Deep Learning**
  Redwanul Karim, M.A. Muhaiminul Islam, Sazid Rahman, Saif Ahmed Chowdhury, Kalyan Roy, Adnan Al Neon, Md. Sajid Hasan, Adnan Firoze, Rashedur M. Rahman LINK
  Publisher : IOS Press **DOI :** 10.3233/JIFS-179349

Conference Papers

- **Crime Prediction Using Multiple-ANFIS Architecture and Spatiotemporal Data**
  Mashnoon Islam, Redwanul Karim, Kalyan Roy, Sadat Hossain, Saif Mahmood, Rashedur M. Rahman LINK
  Publisher : IEEE Intelligent Systems IS'18 **DOI :** 10.1109/IS.2018.8710564

Current Research Projects

- **A Fast Exact Algorithm to Enumerate Maximal Pseudo-cliques in Large Sparse Graphs (Accepted KDD '24)**
  Description : *This research falls under the area of graph theory. We developed an exact algorithm, called FPCE (stands for Fast Pseudo-Clique Enumerator) to enumerate dense portions (a.k.a., dense subgraphs or pseudo-cliques) of a network (a.k.a., graphs). FPCE is a reverse search algorithm along with effective pruning techniques employed from graph theory. Because of these pruning techniques, our algorithm runs significantly faster than our competitors as well as takes less or comparable amount of memory.*
  Tools and Frameworks : *C, C++, Python, Bash, NetworKit, NetworkX, Valgrind, GNU parallel*
  October, 2018 - June, 2024 LINK

- **An Approximation Algorithm For Vertex-cover Problem**
  Description : *The goal is to design and implement an approximation algorithm to find the minimal or near minimal vertex-cover of a network (a.k.a., graphs). We are employing known theorems from graph theory as well as deriving new theorems for the research purpose.*
  Tools and Frameworks : *C, C++, Python, Bash, NetworkX*
  June, 2020 - Present LINK

Notable Projects

- **Bangla Automatic License Plate Recognition (ALPR) System**
  Description : *In collaboration with a company named Headblocks, we developed a system for recognizing multiple license plates simultaneously. This system boasts high accuracy even with challenging video footage, including skewed angles, faded or blurry plates, and nighttime or low-light conditions.*
  Tools and Frameworks : *Python, PyTorch, OpenCV*
  January, 2019 - September, 2019

- **A Unified Platform for Face Recognition - Deep Learning and Conventional Approach**
  Description : *In this project, we built a unified platform for face recognition, in which deep learning and conventional models were integrated i.e., YOLOv2, Haar feature-based cascade classifier. Using this platform we can compare the performance of different face recognition models.*
  Tools and Frameworks : *Python, TensorFlow, OpenCV*
  January, 2018 - April, 2018

Skills

Programming Languages	: C, C++, Python, R, Java, Bash
Version Control	: GIT
Database Tools	: SQL, MySQL
Open Source Tools	: Vim, Tmux, Valgrind, GNU profiler (gprof), GNU parallel

Special Accomplishments

Participated in ICPC Dhaka Regional Site 2019 *LINK*
Participated in ICPC Dhaka Regional Site 2018 *LINK*
Participated in Bangladesh Mathematical Olympiad National Site 2012