ASHU GUPTA

CONTACT INFORMATION

Graduate Student
Department Of Computer Science
University of Illinois Urbana-Champaign
Urbana, IL 61801-2302 USA

Mobile: +1-217-419-9032
E-mail: agupta80@illinois.edu
http://web.engr.illinois.edu/ agupta80

RESEARCH INTERESTS

Data Mining, Machine Learning, Parallel Programming, Database Systems, Big Data, Distributed Systems, Crowd-sourced Systems

EDUCATION

University Of Illinois Urbana-Champaign, Urbana, IL, USA

Pursuing M.S. in Computer Science, August 2014 to May 2016

- GPA: *4.0/4.0*
- Advisor: Dr Aditya Parameswaran

IIT Kanpur, Kanpur, Uttar Pradesh, India

B.Tech in Computer Science and Engineering, July 2010-May 2014

- GPA: *9.5/10.0*
- Advisor: Professor Raghunath Tewari
- Bachelor Thesis: Study of Isolation of cycles in $K_{3,3}$ minor-free Graphs
- Awards: *Academic Excellence Award*

EMPLOYMENT

Teaching Assistant, CS 101 : Introduction to Computing - Fall 2014, UIUC

SUMMER INTERNSHIPS

IBM Research, New Delhi, India

Distributed Iceberg Cubing over Continuous Columns
Dr Rajeev Gupta, Dr Prasad M Deshpande *May 2014 to July 2014*

- Developed a novel MapReduce algorithm for materializing icerberg cube satisfying a certain support and confidence on distributed systems.
- Dynamically found ranges within continuous attributes to maximize confidence using a linear time dynamic programming algorithm at reducer.
- Reduced map output and network cost by a hybrid batching scheme, making efficient use of combiner and both bottom-up and top down cubing algorithms.
- Developed Code in Java and tested our algorithm on a 16 node cluster running Hadoop 1.0.3 with "NYC 311 Requests 2004" Dataset and obtained 2x Speedup with present MR Cubing algorithms.

Microsoft Research, Redmond, WA, USA

Big Data Processing on GPGPU
Dr Jin Li, Dr Sudipta Sengupta *May 2013 to July 2013*

- Designed and implemented an efficient and optimized parallel algorithm for K-means clustering algorithm for very large high dimensional data and large k on GPU.
- Exploited the intrinsic parallelism in GPU hardware and SIMT architecture and explored the viability of using GPU in big data processing.
- Developed code using NVidia CUDA to target on GPU optimizing memory access patterns , cache memory , global memory usage , register spilling , loop unrolling , instruction overlay , branch divergence , thread synchronization.
- Obtained 500x speedup of K-means algorithm on NVidia GTX TITAN as compared to a single thread version on Intel Xeon processor (2.10 GHz)

ACADEMIC ACHIEVEMENTS

- Received Academic Excellence Award for the term 2010-2014 at IIT Kanpur.
- Secured All India Rank -127 in IIT JEE 2010 among 400,000 applicants.
- Secured All India Rank -38 in AIEEE 2010 among 1,000,000 applicants.
- Awarded CBSE Merit Scholarship Scheme for the term 2010-2014
- SAT subject Test (Physics, Chemistry, Mathematics-II) score 2400/2400

KEY ACADEMIC PROJECTS

Study of Isolation of cycles in $K_{3,3}$ minor-free Graphs
Professor Raghunath Tewari, Department of CSE, IIT Kanpur *Aug 2013 to ongoing*

- Trying to find a log space polynomial bound skew symmetric weight function to isolate cycles in K3,3-free graphs such that all cycles have non zero weight.
- Used Plak5 tree decomposition to decompose K3,3-free graphs in alternate K5 and planar components and solved sub cases like bounded degree, bounded depth, uniform tree and some special cases.
- Finding such a weight function would prove that the DecisionâĹŠBPM and UniqueâĹŠBPM problems for K3,3- free graphs are in SPL
- Working on possible extension to K5-free graphs

Stereo Image Matching for Spaceborne Imagery in Parallel
Professor Phalguni Gupta, Department of CSE, IIT Kanpur *Jan 2014 to May 2014*

- Implementing an efficient method for stereo image matching of CARTOSAT-1 images on GPU.
- Using aspect-based correlation to find match points and estimate the slope of the terrain.
- Image matching implemented in a hierarchical manner using wavelets to reduce the computational cost.
- Developed code using NVidia CUDA to target on Multi GPU architecture.

Movie Rating Estimation And Recommendation
Professor Harish Karnik, Department of CSE, IIT Kanpur *Aug 2013 to Dec 2013*

- Implemented a Movie Rating Prediction system based on selected training sets provided by MovieLens.
- Several Machine Learning related algorithms - baseline predictor, KNN, Stochastic Gradient Descent, SVD, SVD++ and asymmetric SVD are used to predict the rating from particular users for unrated movies.
- RMSE (Root-Mean-Square-Error) is applied as the main criteria to evaluate their performance.

Grasping Known Objects with Humanoid Robot
Professor Amitabha Mukherjee, Department of CSE, IIT Kanpur *Jan 2012 to Apr 2012*

- Implemented object detection and grasping of known objects on a Humanoid Robot Aldebaran Nao , using sterio vision , image processing , supervised machine learning and inverse kinematics.
- Used stereo vision to model and train Aldebaran Nao to map image of ball to its coordinates in 3D space.
- Successfully picked up a known ball from an unknown table (dimensions not known to robot)
- Image Processing was done using OpenCV libraries and Aldebaran Nao was coded in PYTHON.

Digital and Database Watermarking
Professor Arnab Bhattacharya, Department of CSE, IIT Kanpur *May 2012 to Jul 2012*

- Devised a more Robust Algorithm for Watermarking of Relational Databases making use of Data-partitioning methods and implemented the algorithm on a database using MATLAB.
- Devised and implemented distortion free and non-distortion free algorithms which were robust under randomized , rounding and mix and match attacks.
- Improved and Implemented Various LSB and Spread Spectrum Algorithms for Relational Databases And digital media (audio, video, image) using MATLAB.

RELEVANT COURSES

Data Analytics & AI: Introduction to Data Mining, Machine Learning, Mathematics in Machine Learning, Artificial Intelligence, Database Systems
Theoretical Computer Science: Theory Of Computation, Computational Complexity
Systems: Computer Architecture, Compiler Design, Operating Systems, Parallel Programming, Computer Networks
Computer Science: Data Structure and Algorithms, Functional Programming, Discrete Mathematics, Game Theory, Computer Graphics
Mathematics Courses: Probability and Statistics, Linear Algebra, Real Analysis, Complex Analysis, Differential Equations, Mathematical Logic

TECHNICAL SKILLS

- **Languages:** C/C++, JAVA, PYTHON, MATLAB, CUDA, OPENGL, GLSL
- **Tools:** MATLAB, HADOOP, OPENGL, OPENCV, WEKA, LATEX, VISUAL STUDIO
- **Web:** HTML/CSS, PHP, JAVASCRIPT, SQL, AJAX, JSON, XML

POSITION OF RESPONSIBILITY

- Coordinator of event Rube-Goldberg in Techkriti'13 at IIT Kanpur.
- Student Mentor and a member of Counseling Service at IIT Kanpur.
- Election Council member for the Gymkhana Elections 2014 at IIT Kanpur.

EXTRA-CURRICULAR

- Bagged 2^{nd} position and Won cash prize of 400$ at Allstate Hackathon 2014 at UIUC
- Created Moodify a Web App which gave music recommendations based on mood of the user .Implemented using tags and genres of songs to map songs to different moods queried using YQL in the event Yahoo HackU in IIT Kanpur.
- Bagged 1st position in the event Rube Goldberg among many participants from all over India in Techkriti'11.