PRANJAL GUPTA

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OBJECTIVE

I am looking for full-time jobs as a Software developer preferably in research prototyping, systems design and prototyping, Database Systems, Graph-based systems and big-data management. I have an excellent breadth across domains of Computer Science and depth in Database and data-management systems.

EDUCATION

M. Math (thesis-tracked) in Computer Science, University of Waterloo, Canada *(September 2019 - Present)*

Advisor Prof. Semih Salihoglu

- CGPA: 89.25/100
- Courses: Graph Databases, Adv. Operating Systems, Adv. Distributed Systems, Machine learning for Data Cleaning.

B.E. (Honours) in Computer Science, BITS Pilani, India *(August 2013 - May 2018)*

Dual degree in Mathematics. Bachelor-thesis advisor Prof. Poonam Goyal

- CGPA: 9.06/10 (Passed with distinction)
- Relevant Courses: Graph Theory, Database Systems, Information Retrieval, Data Mining, Artificial Intelligence, Operating Systems, Algorithms, Analysis of Algorithms, Object-Oriented Programming and Computer Networks.

EXPERIENCES

Data Systems Group, Cheriton School of Computer Science, University of Waterloo, Canada *(September 2019 - Present)*

Graduate Research Assistant

- Working on Graphflow, a single-node in-memory property graph database system.
- I look at scaling graphflow on single-node environment by minimizing it's memory requirements without degrading performance. My research is on property storage data models, compression techniques for data and indices.

Advanced Data Analytics and Parallel Technologies Lab, BITS Pilani, India *(January 2018 - July 2018)*

Undergraduate Research Assistant

- Implemented a system detecting temporal events from a stream of tweets and creating a multi-level hierarchy of events.
- Implemented an abstractive summarization attention-based LSTM neural network model for generating synopsis and story out of the hierarchy of events.
- The work is submitted for review in IEEE Transactions on Computational Social Systems.

Mitacs Globalink Research Internship at the University of Manitoba, Winnipeg, Canada *(May 2017 - July 2017)*

Worked under the supervision of Prof. Carson Kai-Sang Leung in the Database and Data Mining Lab

- Developed an algorithm, SWITCH, that switched between classical algorithms for vertical frequent pattern-mining ECLAT, VIPER and DECLAT, with an objective to minimize the overall memory footprint of the process.
- Created relevant data structures and adopted ECLAT and VIPER algorithms for mining uncertain datasets, viz. uECLAT and uVIPER. Extended the SWITCH algorithm on the uncertain dataset.

Zomato Media Pvt. Ltd, Gurgaon, India *(May 2016 - July 2016)*

Intern in the Data Analytics team.

- Implemented Computational A/B Experimental framework and other statistical tools for evaluating metrics on the web and mobile applications for Zomato.
- Used probabilistic approaches for predicting network models on Zomato's user search data to discover overlapped communities of popular locations for food in prime Indian cities.

Homi Bhabha Centre for Science Education, TIFR, Mumbai, India *(May 2015 - July 2015)*

Worked under the guidance of Dr. G. Nagarjuna in the Gnowledge Lab

- Implemented Analytics, Data-visualization tools and RSS update feeds on MetaStudio, a studio-based learning platform, built on top of the Gnowsys kernel. [🔗]

ACADEMIC PROJECTS

Experimental evaluation of functions and MapReduce on serverless computing environment [🔗] *(February 2019 - April 2019)*

- Benchmarked performance metrics for functions running on serverless infrastructure using open-faas, Kubernetes and Docker containers. We studied system latency, I/O overhead and throughput, compute overhead and scalability.
- Implemented a simple MapReduce task on serverless infrastructure by designing an execution pipeline of triggers, coordinator functions, mappers and reducers. Studied variations by tweaking the parameters.

Discovering SHACL constraints on RDF Datasets[🔗] *(February 2019 - May 2019)*
Worked with Prof. Ihab Ilyas

- Worked on a running project on discovering constraints in RDF dataset using **SHA**pe **C**onstraint **L**anguage.
- My contributions include enhancing node feature discovery, optimizing search algorithm by pruning the constraint space, ranking discovered constraints by estimating their relevance and doing the empirical evaluations on the algorithm.

Constructing Image captions from contextual information and features using Neural Nets *(January 2017 - December 2017)*
Worked as a Research Assistant under the supervision of Prof. Poonam Goyal in the WISoC Lab.

- Designed a Recurrent neural network model based on the statistical probability for predicting the most appropriate caption for an image, using auxiliary contextual information; inspired by `encoder-decoder` machine translation models.

Basic Compiler for a toy language [🔗] *(February 2017 - April 2017)*

- Developed a compiler for a C-like imperative toy language.
- Incorporated and integrated modules for lexical analysis, top-down parsing of LL(1) grammar, Abstract Syntax Tree construction, Symbol tree generation, Type checking, Semantic analysis, and NASM code generation.

Multiplayer CLI-based game of Hearts over a TCP network [🔗] *(March 2017 - April 2017)*

- Developed a game of cards on the server-client paradigm that follows a round-robin flow of control over TCP protocol.
- Implemented a server module to listen for incoming connections and spawning a game-room per 4 client connections. Also, implemented the client module as a DFA, driven by commands from the game room. The client module interfaced to the user for I/O.

Wikie: the retrieval system [🔗] *(October 2016 - November 2016)*

- Developed a search engine to retrieve & rank Wikipedia pages, based on the vector-space model of information retrieval.
- The ranking mechanism employed PageRank scoring (for measuring the intrinsic importance of a page) and Elo Ratings (for measuring the extent of user popularity), to calculate relevance and importance of a webpage.

Modelling of Natural Language sentences using SPN Graphs [🔗] *(November 2016)*

- Developed a scheme for parsing natural language sentences and represented them in a graph structure, called SPN Graphs, thereby forming an overall connected graph for a particular set of sentences. The scheme parsed sentences based on their construct comprising an agent, action and patient.
- Developed a question-answering system based on the above-described model of information representation.

AWARDS, ACHIEVEMENTS and SCHOLARSHIPS

- **2018:** Received International Masters Student Award and UWaterloo's Graduate Scholarship.
- **2018:** Received MITACS Graduate Research Fellowship for pursuing research in Master's at the University of Waterloo.
- **2018:** Ranked 1st in the batch of 2013 of M.Sc.(Hons) Mathematics at BITS Pilani.
- **2017:** Received the award for `Best Student` in the batch of 2013 of M.Sc. (Hons) Mathematics.
- **2015:** Received 2nd prize at the technical festival of BITS Pilani in 'Software Development - Adaptive Technology' category.
- **2013:** Recipient of MCN Merit Scholarship at BITS Pilani for being in the top 4% of the merit list for all terms.

TEACHING ASSISTANTSHIPS

- **Fall 2019, Summer 2019, Winter 2019:** CS 338 (Computer Application in Business: Databases) at UWaterloo.
- **Fall 2018:** CS 136 (Elementary Algorithm Design and Data Abstraction) at UWaterloo.
- **Fall 2017:** CS F415 (Data Mining) at BITS Pilani.
- **Fall 2016:** CS F213 (Object-oriented programming) at BITS Pilani.

TECHNICAL SKILLS

Java (junit, mockito, grpc), Python (TensorFlow, sci-kit learn, numpy and pandas), C/C++, Prolog, Scala, Bash scripting, Linux, HTML5/CSS3, JavaScript, PHP, SQL, Git Versioning System.