

KSHITIJ TAYAL

CONTACT INFORMATION	425 13th Avenue SE, Apt 1102 Minneapolis, Minnesota 55414	651-219-9173 tayal007@umn.edu
EDUCATION	University of Minnesota , Minneapolis, United States <i>PhD in Computer Science</i> <ul style="list-style-type: none"> • Advisor: Dr. Vipin Kumar • CGPA: 3.67 / 4.0 • Relevant Courses: Machine Learning, Advance Algorithms and Data Structures, Non-Linear Optimization, High Performance Computing, Data Mining, Matrix Theory, Probability and Statistics. 	Sep 2017 - Present
	University of Hyderabad , Hyderabad, India <i>Masters in Information Technology (Gold Medalist)</i> <ul style="list-style-type: none"> • Thesis: Evolutionary Computing-based Class and Fuzzy Association Rule Mining as an Application to Banking • Advisor: Dr. Vadlamani Ravi • CGPA: 9 / 10 	July 2013 - July 2015
	Gautam Buddha University , Uttar Pradesh, India <i>Bachelor of Engineering (Hons.) Computer Science</i> <ul style="list-style-type: none"> • CGPA: 7.6/ 10 	Sep 2009 - June 2013
BRIEF PROFILE	I am a second year PhD Student in Computer Science at University of Minnesota looking for summer internship for 2019. I have two years of industry experience as R&D Researcher at Tata Innovation Labs, Hyderabad. My research interests are in the area of Algorithms, Machine learning and High Performance Computing.	
WORK EXPERIENCE	Data Mining Group, UMN, Twin Cities Project: <i>Advancing Deep Learning to Monitor global change</i> Mentors: <i>Dr. Vipin Kumar</i> <ul style="list-style-type: none"> • My research involves working on a range of neural network architectures to learn feature representation and extract discriminate features over space and time using large volumes of multi-scale, spatio-temporal data. • Currently I am working on satellite image segmentation for automatic extraction of buildings, roads and farm lands using U-net architecture. 	May 2018 - Present
	Teaching Assistant, UMN, Twin Cities Mentors: <i>Dr. James Parker, Dr. Daniel Challou</i> <ul style="list-style-type: none"> • Taught Algorithms and Data Structure class in Fall 2018 • Took lab for Introduction to C++ class in Spring 2018 	Sep 2017 - April 2018
	Tata Innovation Labs, Hyderabad, India Project: <i>Human Genome Analysis</i> Mentors: <i>Dr. Naveen Sivadasan, Dr. Rajgopal Srinivasan</i> <ul style="list-style-type: none"> • Today, the most crucial biological research bottlenecks are increasingly computational. Massive size of underlying sequence data and graph data poses challenges in designing algorithms. My research involves working on big data problem as applied to Genomics. 	Aug 2015 - July 2017

- I developed method and software tools in C++ for storage, indexing, graph traversal, similarity search (Minhashing), graph alignment etc., that are efficient, allowing us to analyze data-sets quickly and effectively.
- Used data distribution and task parallelism techniques for exploiting multicore architectures. Implemented using Pthreads and OpenMP libraries in C++
- We gave a fast and accurate greedy approximation algorithm for reconstructing haplotype pair consistent with input genotype which has linear time and space complexity. Also, we provided a novel alignment algorithm that aligns the input sequence directly on the input graph while avoiding expensive DAGification (Loop Unrolling) steps
- The work resulted in a number of publications. (See below)

Center for Unified Biometrics, University at Buffalo

Mar 2015 - Jun 2015

Project: *Writer Identification*

Mentor: *Dr. Venu Govindaraju*

- In this project we highlighted written language usage as a novel soft-biometric trait that can be used as an alternative for sensor based biometric authentication.
- I designed and implemented large number of scalable experiments in Python/Matlab which involved use of large-scale real world blog dataset having millions of entries, consisting of thousands of authors. We used various classification algorithms, like SVM, Decision Trees, Random Forest, Logistic Regression and showcased efficacy of Random Forest and Logistic regression on our data-set.
- The work resulted in a IEEE Transactions publication (See below)

Institute for R&D in Banking Technology, India

Jun 2014 - Feb 2015

Project: *Evolutionary Computation*

Mentor: *Dr. Vadlamani Ravi*

- Association and classification are two important tasks in data mining. We proposed Binary particle swarm optimization (BPSO) algorithm based novel miner for extracting class association rule mining and fuzzy association rule mining
- We formulated our problem as combinatorial global optimization problem which led us to find top class association rules without having to specify minimal support and confidence unlike other conventional associative classifiers.
- We investigated phishing problem from two perspectives i.e. phishing email and phishing URL and applied in banking domain due to its severe consequences in banking industry transactions. We demonstrated superior results as compared to traditional associative classifiers.
- The work resulted in a number of publications. (See below)

PUBLICATIONS

1. **Tayal, K.**, & Ravi, V. (2015, December). Fuzzy association rule mining using binary particle swarm optimization: Application to cyber fraud analytics. In Computational Intelligence and Computing Research (ICCIC), 2015 IEEE International Conference on (pp. 1-5). IEEE.
2. **Tayal, K.**, & Ravi, V. (2016, August). Particle swarm optimization trained class association rule mining: Application to phishing detection. In Proceedings of the International Conference on Informatics and Analytics (p. 13). ACM.
3. Pokhriyal, N., **Tayal, K.**, Nwogu, I., & Govindaraju, V. (2017). Cognitive-Biometric Recognition From Language Usage: A Feasibility Study. IEEE Transactions on Information Forensics and Security, 12(1), 134-143.
4. **Tayal, K.**, Sivadasan, N., & Srinivasan, R. (2016). GPhase: Greedy Approach for Accurate Haplotype Inferencing. bioRxiv, 073379.

5. Kavya, V.N.S., **Tayal, K.**, Srinivasan, R. and Sivadasan, N., 2018. Sequence Alignment on Directed Graphs. Journal of Computational Biology.

ACHIEVEMENTS

- **Best Poster Award - 2017** — Received Best Poster Award out of 100 core posters at the 21st Annual International Conference on *Research in Computational Molecular Biology*
- **Gold Medalist - 2015** — Received University Gold Medal for outstanding academic excellence during *M.tech Information Technology*
- **GATE - 2013** — Secured 2355 All India Rank in *Graduate Aptitude Test in Engineering for Computer Science* (99.08 percentile)

SOFTWARE SKILLS

- **Programming:** C, Java, Python, OpenMPI, OpenMP, MySQL, Matlab
- **Web Technologies:** HTML, CSS, JavaScript, Flask, Django
- **Cloud platforms:** Amazon web services

REFERENCES

- Dr. Vipin Kumar
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- Dr. Venu Govindaraju
Department of Computer Science, University at Buffalo
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- Dr. Rajgopal Srinivasan
Chief Scientist, Tata Innovation Labs
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