Govind Sharma

Languages *English*, *Hindi*, *Telugu*, *Kannada*

I am a computer science engineer-researcher with experience and interests in *machine learning*, *natural language processing*, *network science*, *recommendation systems*, and *computer vision*, with a strong inclination towards *explainability* and *interpretability*. Of late, I have developed a keen interest in *causality* – both theoretical and applied – and aspire to be a leader therein.

Professional Career Progression

Permanent/Full-time

Since Jan '22 **Senior Data Scientist**,   *Reed.co.uk, London, UK.*
- Designing and deploying customised search/recommender evaluation pipelines, learning to match/rank, and structural data parsing algorithms.
- Playing a key role in bridging gaps between machine learning and business.

2021–22 **Research Fellow in ML for Medical Imaging** *(postdoc)*,   *University of Surrey, Guildford, UK.*
- Built and deployed an end-to-end dental disease detection system with crowdsourcing capabilities.
- Mentored PhD, masters, and bachelors students achieve their goals.

2020–21 **Data Scientist**,   *Factors.Ai, Bangalore, India.*
- Designed and developed products for automated marketing analytics.
- Extracted intelligent marketing insights from large datasets via multivariate data mining.

2012–20 **PhD Researcher**,   *Indian Institute of Science (IISc), Bangalore, India.*
- Developed strong mathematical foundations in machine learning and computer science.
- Consistently strived towards making research breakthroughs in network science, hypergraphs, and social networks.
- Communicated existing and researched topics by publishing, presenting, and educating peers.
- Mentored, collaborated with, and motivated fellow researchers to achieve their own goals.

2018–19 **Senior Data Scientist**,   *MiQ Digital India, Bangalore, India.*
- Design and production of ad-tech based products and solutions, both internal and external
- Process/analyze ad-tech data build quick-PoCs; data ingestion and processing.
- Training/Helping the team with cutting-edge ML/DS tools and techniques.

Contractual/Part-time & Internships

2020 **R&D Consultant & Developer**,   *114 AI Innovation, Bangalore, India.*
- Space-tech based startup; I designed and developed mathematical models for path prediction.
- Satellite-manoeuvre detection and intent extraction thereof with geometric models on TLE data.

2014–20 **ML Consultant & Trainer**,   *Softwaves Consultancy Pvt. Ltd., Bangalore, India.*
- Handled end-to-end corporate training pipelines involving deep/machine learning (D/ML)
- Trained moderate- to large-sized teams (40–60 personnel each) on tools and techniques in Computer Science

2016–17 Automating IT Service Management Systems,   *Wipro Technologies, Bangalore, India.*

2010 Topic Detection and Clustering of Text Documents,   *CAIR, Defence R&D Org. (DRDO), Bangalore, India.*

Education

2012–20 **Doctor of Philosophy (PhD)**,   *Computer Science and Automation (CSA), IISc, Bangalore, India.*
Thesis title: **Hypergraph Network Models: Learning, Prediction, & Representation in the Presence of Higher-Order Relations**
Solved problems involving *higher-order relations* in network science through *hypergraphs*. Studied effects of hypergraphs on link prediction in networks, and further exploited this effect. Designed new algorithms to tackle extreme class imbalance in hyperedge prediction in networks. Tested novel hypergraph evolution and information-flow hypotheses and utilized them for prediction. Developed novel deep hypergraph models based on attention mechanisms for node and hyperedge embeddings.

2010–12 **Master of Science – Engineering**, *Computer Science*,   *CSA, IISc, Bangalore, India.*
Thesis title: **Sentiment-driven Topic Analysis of Song Lyrics**
Built *topic models* to automatically assign sentiment-based topics to songs based on their lyrics. Mined textual data, crawled & merged multiple corpora, handled synonymous/polysemous words, used Variational LDA and SentiWordNet

2006–10 **Bachelor of Engineering**, *Electrical & Electronics*,   *Manipal Institute of Technology, Manipal, India.*

Technical and Academic Skills

Languages C ○ C++ ○ Python ○ SQL ○ GoLang ○ MATLAB ○ R ○ Java ○ MATLAB Coder ○ Unix

Cloud Tools GCP: KubeFlow ○ BigQuery ○ Vector AI ○ Document.AI ○ AWS: EMR ○ EC2 ○ S3 ○ Sagemaker ○ Textract

Libraries Pandas ○ NumPy ○ SkLearn ○ NLTK ○ Tensorflow ○ Keras ○ PyTorch ○ (Py)Spark ○ OpenCV ○ NetworkX

CI/CD, IDEs Git ○ Azure DevOps ○ Visual Studio Code ○ Jupyter ○ PyCharm, vi

Mathematical proficiency Linear Algebra ○ Optimization ○ Probability, Statistics, & Causality ○ Graphs & Hypergraphs ○ Real Analysis ○ Discrete Mathematics & Number Theory ○ Calculus ○ Mathematical Logic

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in *linkedin.com/in/govindjsk*   ○ *govindjsk*   *govindsharmajsk*   *govindjsk.github.io*

Areas of Expertise and Interest

Primary   Machine/Deep Learning Theory/Applications ○ Network Science ○ Higher-order Relations ○ Hypergraph Networks ○ Network Embedding ○ Causality ○ Natural Language Processing ○ Computer Vision ○ XAI

Secondary   Online Advertising ○ Recommendation Systems ○ Information Retrieval ○ Statistical Learning Theory ○ Reinforcement Learning ○ Stochastic Algorithms ○ Machine Learning in Life Sciences ○ Computational Neuroscience

List of Publications

Peer-reviewed   1. *G. Sharma*, P. Patil, and M. N. Murty, *C3MM: Clique-Closure based Hyperlink Prediction*, Int. Joint Conf. on Artificial Intelligence, 2020, Japan.

"   2. P. Patil, *G. Sharma*, and M. N. Murty, *Negative Sampling for Hyperlink Prediction in Networks*, Pacific-Asia Conf. on Knowledge Discovery and Data Mining, 2020, Singapore.

"   3. *G. Sharma* and M. N. Murty, *Mining Sentiments from Songs using Latent Dirichlet Allocation*, Intelligent Data Analysis, 2011, Portugal.

"   4. D. Deodhare, *G. Sharma*, A. Srivastava, A. Sharma., *Semantically Driven Soft-clustering of Documents using Lexical Chains*, Int. Conf. on Natural Language Processing, 2010, India.

Preprints   5. *G. Sharma*, P. Gupta, and M. N. Murty, *Love tHy Neighbor: Remeasuring Local Structural Node Similarity in Hypergraph-derived Networks*, arXiv 2021.

"   6. *G. Sharma*, A. Challa, P. Gupta, and M. N. Murty, *Higher Order Relations Skew Link Prediction in Graphs*, arXiv 2021.

"   7. *G. Sharma*, S. Singh, V. S. Devi, and M. N. Murty, *The CAT SET on the MAT: Cross Attention for Set Matching in Bipartite Hypergraphs*, arXiv 2021.

"   8. *G. Sharma*, P. Patil, and M. N. Murty, *SHONeNs: Sub-higher-order Neural Networks for Hyperedges*, (PDF available on demand).

Self-published articles   9. *Intuition can only take us so far: Fun with Factors*, Factors.Ai Blog, 2021.

10. *Measuring Marketing With Change Science*, Factors.Ai Blog, 2022.

Awards, Achievements, and Scholarships

2019	Employee of the Month,	*MiQ, Bangalore, India.*
2018	Best Newcomer Award,	" .
2018	Lightning Talk Award,	EECS Research Symposium, *IISc, Bangalore, India.*
2012–18	Full Scholarship for PhD Research,	*Dept. of Higher Ed., Ministry of HR & Dev. (MHRD), Govt. of India.*
2010–12	Full Scholarship for Masters,	" " " .

Teaching/Training Experience

Teaching Assistance   Linear Algebra (2017),   *NPTEL, Ministry of HRD, Govt. of India.*
Discrete Structures (2014),   *CSA, IISc, Bangalore, India.*

Teaching   Design and Analysis of Algorithms (2013),   *Wipro Bangalore & VIT Vellore, India.*

Industrial Training   *Machine/Deep Learning in Software* (2020), *Deep Learning for Web* (2019), *Machine Learning for Communication Networks* (2019), *Advanced Algorithms & Programming* (2017), *Data Structures & Algorithms* (2016), *Data Clustering Techniques* (2018), *Mathematics in Data Science* (2019), *Foundations of Deep Learning* (2019), *Statistical Data Analysis* (2014)   *Softwaves Consultancy Bangalore Pvt. Ltd., Bangalore, India.*

Miscellaneous

Initiatives   *Fun with Mathematics*, Biweekly sessions, 2020,   *Factors.AI, Bangalore, India.*
Initiatives   *Learn Deep Learn*, Reading Group, 2019,   *MiQ, Bangalore, India.*
    Mathematics Discussion Club, Discussion Group, 2011–12,   *IISc, Bangalore, India.*
Volunteer   *CSA Summer School & Web Team*, 2013–14,   " .
    CSA Dept. Curriculum Committee (Student Member), 2011–12,   " .
Talks   *Matrix Factorization Techniques*, 2015,   *CSA Summer School,*   " .
    Careers after Engineering, 2014,   *Manipal Institute of Technology, Manipal, India.*
    Mathematics for Computer Science, 2013,   *CSA, IISc, Bangalore, India.*
Hobbies   *Programming, Movies, Documentaries, Poetry, Mentoring, STEM Reading* .