Vishweshwar Tyagi

Curriculum Vitae

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Education

2021–2022 **MS in Data Science**, *Columbia University*, USA 3.97/4

2019–2021 **MS in Mathematics**, *IIT Kanpur*, India 9.0/10

2016–2019 **BS in Mathematics**, *University of Delhi*, India 9.4/10

Research Interests

hierarchical Bayesian models, probabilistic programming, Monte Carlo methods
statistical machine learning, stochastic processes

Experience

Research Experience

2023–Present **Data Scientist**, *Department of Neurology, Columbia University*, New York, USA

- Developed hierarchical Bayesian models to estimate motor recruitment curves from sparse neurophysiological data of brain and spinal cord stimulation
- Implemented mixture models to detect and down-weight outlier observations, improving robustness of inference
- Applied Bayesian mixed effects models in intervention studies to detect change in motor threshold with fewer participants compared to frequentist tests
- Released open-source Python package hbMEP, which formed basis of funded NIH grant on real-time adaptive stimulation and supported preliminary analyses for $1.25M CDMRP grant optimizing stimulation parameters in human and rodent studies

Industry Experience

Summer 2022 **Data Science Intern**, *Quartet Health*, New York, NY

- Improved identification of high-risk patients for mental health conditions by fine-tuning large language model BERT on clinical notes using transfer learning in PyTorch, increased F2-score by 13% over XGBoost baseline
- Built end-to-end pipeline on Amazon Redshift using dbt and SQL to automate transformation of medical claims data and added unit tests to validate pipeline output
- Leveraged pipeline to evaluate insurance network quality, reduced claim denial rates by 7% through outlier detection, and identified network gaps, saving $20K in referral costs

Publications

2025 **Tyagi, V.**, Murray, L. M., Asan, A. S., Mandigo, C., Virk, M. S., Harel, N. Y., Carmel, J. B., McIntosh, J. R. (2025). *Hierarchical Bayesian estimation of motor-evoked potential recruitment curves yields accurate and robust estimates.* Brain Stimulation.

Under Review

2025 Pascual-Leone, A.*, **Tyagi, V.***, Asan, A.S.*, Rocha-Flores, P.E., Rodriguez-Lopez, O., Voit, W.E., McIntosh, J.R.†, Carmel, J.B.† (2025). *Electrode position, size, and orientation determine efficacy of cervical epidural stimulation to recruit forelimb muscles in rats.* bioRxiv.

Software

Maintainer hbMEP (hbmep.github.io/hbmep/)

Teaching

Teaching Assistant, Columbia University

Fall 2022 Applied Deep Learning (COMS W4995)

Spring 2022 Applied Machine Learning (COMS W4995)

Spring 2022 Analysis and Optimization (MATH V2500)

Fall 2021 Reinforcement Learning (ELEN E6885)

Fall 2021 Calculus I (MATH UN1101)

Conferences

2024 **Tyagi, V.**, Murray, L. M., Asan, A. S., Mandigo, C., Virk, M. S., Harel, N. Y., Carmel, J. B., McIntosh, J. R. (2024). *Hierarchical Bayesian estimation of motor-evoked potential recruitment curves yields accurate and robust estimates.* Society for Neuroscience (SfN) Nanosymposium on Analytical Computational Tools, October 2024, Chicago, Illinois.

Technical Skills

Programming Python, C++, R, SQL

Bayesian Pyro, NumPyro, Stan

ML scikit-learn, PyTorch, Hugging Face, XGBoost, OpenAI

Tools Git, Docker, Bash, Linux, SSH

Data dbt, PostgreSQL, BigQuery, Redshift, MySQL