Poornima Ramesh

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Data scientist with Masters in Physics and PhD in Machine Learning, with expertise in deep learning, Bayesian statistics and statistical modelling. Currently working as senior data scientist at IDinsight, helping build solutions for governmental and non-governmental organisations to inform policy and decision making.

WORK EXPERIENCE

Data Scientist IV   **Mar 2023 - Current**
At IDinsight, Nairobi Regional Office

- Developing and leading machine learning and data science projects including
  * leading model development and improvements for determining informal sector contributions for the Kenyan government's Social Health Insurance Fund (SHIF) initiative
  * leading development of Ask-a-Metric: an LLM-based tool for text-to-SQL generation deployed over messaging services
  * leading work on MOSAIKS, a tool for making satellite imagery easy to use for problems in the development sector
  * guiding and implementing an automated tool using geospatial data for creating sampling frames for surveys
  * working on Bayesian methods for impact and process evaluations, to help stakeholders make maximum use of collected data to gain insights
- Building machine learning and data science expertise internally by
  * helping create bootcamp materials on data science work
  * mentoring other team members
- Advocating for IDinsight's work externally, and the data science team internally
  * writing multiple technical and non-technical blogs
  * representing IDinsight at committee for determining Kenya's national AI strategy

PhD Researcher in Machine Learning   **Aug 2018 - Dec 2022**
At Technical University of Munich and University of Tübingen, Germany

- Used statistical modelling, data analysis, data visualisation and numerical optimisation for improving retinal prosthetics (Sekhar et al., 2018; Corna et al., 2021)
- Employed deep learning methods from computer vision, explainable ML and statistical modelling for applications in sensory neuroscience (Ramesh et al., 2019; Ramesh et al., 2022)
- Developed Bayesian statistical inference methods using deep learning for applications in neuroscience and climate science (Ramesh et al., 2022)
- Taught masters level courses in machine learning, data science, mathematics and scientific programming
- Supervised and mentored masters and internship students in research projects
- Led collaborative research projects across different labs and team members

– Helped set up compute infrastructure for collaborative programming and research within the lab

Data Science Intern **Aug - Oct 2021**

At IDinsight, Delhi Regional Office
Using machine learning and statistical models to predict out-of-school girls from census data in rural India

– Used statistical and deep learning models including generalised linear models and random forests for predicting the number of out-of-school girls in rural India based on census data
– Learned extensive data pre-processing methods for cleaning census and survey data, as well as data visualisation and scientific writing for technical and non-technical audiences

Assistant Graduate Researcher **Aug 2013- Jun 2018**

Concurrently during BS-MS studies

– Internship and masters thesis project using statistical models, data analysis, data visualisation and numerical optimisation for improving retinal prosthetics; involved collaboration with experimental neuroscience labs and retinal prosthetic manufacturers; at *Forschungszentrum caesar, Germany, May 2016 - Apr 2018*
– Used theoretical concepts in evolutionary dynamics, game theory, stochastic dynamics as well as probabilistic numerics, convex optimisation and numerical solvers for applications in population biology at *IISER Kolkata, India, Jan - Dec 2017*
– Studied and employed experimental biophysics approaches PCR amplification and confocal microscopy to explore the role of proteins associated with cell death in Alzheimer's disease, dementia, etc. at *Saha Institute of Nuclear Physics, India, May 2015 - Aug 2015*
– Learned and applied experimental biophysics techniques including isothermal titration calorimetry, fluorescence spectroscopy and performed data analysis to study protein denaturation in cancerous cells at *Saha Institute of Nuclear Physics, India, May 2014 - Aug 2014*

EDUCATION

- PhD in Machine Learning 2018–2022
  Technical University of Munich and University of Tübingen, Germany
- BS-MS Dual Degree in Physics, GPA: 9.16 2013–2018
  Indian Institute of Science Education and Research (IISER) Kolkata, India
- Indian School Certificate, 94.40% 2013
  Cathedral and John Connon School, Mumbai, India

SKILLS

- **Programming:** Python: numpy, scikit-learn, PyTorch for deep learning; MATLAB; C++; LaTeX; AWS, Docker, FastAPI
- **Languages:** English, Tamil, Hindi, Bengali, German, Kiswahili
- **Mathematics:** Machine learning, deep learning, statistical modelling, Bayesian statistics, signal processing, linear algebra, dynamical systems
- **Teaching:** Probabilistic machine learning, data science, linear algebra and numerical methods; supervising Masters and intern students

Professional activities

- Reviewer for International Conference on Machine Learning (ICML),
  Neural Information Processing Systems (NeurIPS),
  International Conference on Learning Representations (ICLR)   2020-Current
- Volunteer with Soforthilfe-Corona Bayern, Munich, Germany   2020
- Volunteer translator and data analyst for Crowdfight COVID-19   2020
- Freelance transcriber for CastingWords   2017
- Junior reporter for Daily News and Analysis (DNA) India   2010-2011