Shreekanya Kodate

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Education

- **Department of Electrical Engineering, IIT Bombay** Mumbai, MH, India
  M.Tech. in Communication Engineering: ***9.44/10.0 CPI*** *2018 - 2021*
  Advisor: Prof. Amit Sethi
- **Department of E&Tc Engineering, Pune University** Pune, MH, India
  B.E. in Electronics and Telecommunication Engineering, ***80.22***% *2013 - 2017*

Research Interests

Signal Processing; Computer Vision; Safe and Fair AI; Biomedical AI; LLMs and Natural Language Processing; Semi-Supervised Learning; Assistive Technologies; Data Mining. I am particularly drawn to the intersection of deep learning, signal processing, and human-centered applications, aiming to contribute to the development of robust, interpretable, and socially responsible AI systems.

Publications

Robust Classification of Histology Images Exploiting Adversarial Auto Encoders. In 2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), pp.2871-2874.IEEE, 2021.

Employment Summary

Data Scientist, Xtelify Limited (Airtel Digital), Bengaluru, KA
Python, PySpark, pandas, sklearn, Airflow *May 2025 - Present*

- Spearheading the development of a real-time ML/DL-based product recommendation and ranking framework for financial products, leveraging behavioral and transactional data to improve personalization that will help the growth team in driving business by reducing the target audience size by 30%.
- Leading the revamp and automation of legacy propensity models to enhance runtime efficiency by 50%, and increasing predictive accuracy by 40%.
- Mentoring an intern by structuring learning goals, supervising EDA and ML algorithms implementation for the recommendation project, and instilling best practices in experimentation, documentation and model evaluation.

Research Engineer, Siemens Industry Software (India) Pvt. Ltd., Pune, MH
Hugging Face, transformers, Python, PyTorch, AWS, sklearn, seaborn, R *Jul 2021 - May 2025*

- Pioneered the exploration of open-source LLMs (LLaMA 2/3) aiming to implement cost-effective solutions.; applied these insights to agentic AI systems and voice conversational AI prototypes aiming to integrate multiple ML data models results into a unified intelligent decision-support framework.
- Assisted the Plant Simulation team for the research on AI copilot for Siemens' proprietary SimTalk language; evaluated Weaviate vs. Pinecone for retrieval performance, and analyzed chunking, embedding, and re-ranking strategies and optimized the RAG pipeline by 20% and made it delivery ready to the customer.
- Executed a cross-sell prediction framework, conducting literature review on Markov Chains, DNNs, and pattern mining techniques (SPADE, Apriori and FP-Growth); identified SPADE as the optimal algorithm and implemented it for next-product prediction. This increased the reliability on the recommendations and assisted in making faster and informed business decisions.
- Built a simplified dashboard visualizing next-best product recommendations via Sankey charts and reference-based explainability, enhancing interpretability and adoption across teams.
- Revamped and re-engineered existing opportunity prediction models, performing extensive EDA, feature engineering, and introducing new customer-level features through clustering (k-means, k-medoids, k-prototypes, UMAP) to enhance predictive accuracy and stability.
- Developed new end to end ML pipeline with emphasis on interpretability and robustness, deploying an XGBoost-based model with modular, maintainable code and new testing strategy, improving model accuracy and marketing efficiency over six months.
- Designed and implemented an R Shiny dashboard for model performance monitoring and reporting, enabling efficient decision making and reducing EDA efforts.

- Researched and implemented time-series forecasting models and finalized SARIMAX for sales forecasting, improving revenue prediction reliability.

Research Assistant, Wadhwani Electronics Lab, IIT Bombay, MH
Advisor: *Prof. Shalabh Gupta and Prof. Siddharth Tallur* *Jul 2018 - Jun 2021*

- Built a foundation in image processing through FPGA-based implementation of the Sobel edge detection algorithm, gaining hands-on experience in pixel-level computation, feature extraction, and data visualization.
- Applied this understanding to design a low-cost portable radio transmitter integrating GNU Radio, MAX V CPLD, DAC, AFE, and IQ modulator, with custom Python and CPLD modules for real-time digital waveform transmission.

Research Intern, Indian Institute of Science (IISc), Bengaluru, KA
Advisor: *Prof. T. V. Sreenivas, ECE, IISc Bengaluru* *Jun 2016*

- Selected in a national merit-based research internship.
- Conducted independent research and self-learned digital image processing and implemented core image enhancement and transformation algorithms in MATLAB.
- Developed an image text extraction algorithm using Otsu's thresholding and histogram equalization, achieving efficient segmentation and accurate recognition of text regions from natural images.

Research & Technical Projects

Robust Training Procedures in Deep Learning Models for Histopathology Image Analysis
Advisor: *Prof. Amit Sethi, Electrical Engineering, IIT Bombay* *M.Tech. Thesis, May 2020 - Jun 2021*

- Designed novel training strategies to improve robustness of deep learning models against label noise, out-of-distribution (OOD) samples and addressing weak supervision challenges through sample re-weighting and loss optimization.
- Conducted an extensive literature review on curriculum learning, hard example mining, semi-supervised learning, and noise modeling to design a hybrid robust training framework.
- Experimented with an Adversarial Autoencoder (AAE)-based model utilizing latent-space feature likelihoods for dynamic sample weighting (Binary, Normalized, and Hybrid weighting) schemes across BreakHis and BACH datasets under controlled noise conditions and proved that our algorithm is robust than the regular CNN. Hence we enhanced the generalization and stability of histopathology classifiers.
- Extended the model to four-class cancer classification on the BACH dataset, analyzing multivariate Gaussian priors for generalization, and found that selecting proper priors is important part of the design.
- Achieved 12.5% and 6.18% accuracy gains on BreakHis(2-classes) and Endometrium datasets(4-classes) and AUC stability under 20% noise, validating a semi-supervised MixMatch with energy shaping, prototype clustering (k-medoids) and contrastive loss (used SimCLR pretrained model) to exploit unlabeled data effectively. Designed a framework for robust computational pathology hence enabling efficient and accurate classification of breast cancer subtypes under limited labeled data conditions.

A Budding Artist — Generative Adversarial Network *Self, Online project, 2020*

- Designed DCGAN models for art generation; achieved BRISQUE score of 32%, indicating high perceptual quality and published a blog post (Medium article).

Human Protein Classification (Kaggle Competition) *Self, Online project, 2020*

- Studied and developed ResNet-based multi-label classifiers for protein localization; achieved 75.7% accuracy and top 15% rank among 894 teams.

Relevant Coursework

Fundamentals of Machine Learning—Statistical Signal Analysis—Information Theory—Digital Signal Processing—Digital Image Processing—Applied Linear Algebra

Technical Skills

- **Languages:** Python, C++, R, C, SQL
- **Deep Learning Libraries:** PyTorch, Tensorflow, HuggingFace, Langchain, llama-index, NLTK, PySpark
- **Tools:** AWS, VS Code, MATLAB, GNU Radio, LaTeX, Eagle

Miscellaneous

Awards—Secured 5th rank among 300 students in the department (2017) and 2nd rank in Savitribai Phule Pune University among 1,50,000 students (2016)

Professional Contributions—Recognition at Siemens Learning Day for RAG research presentation (2023); Siemens Hackathon for cross-sell app (2023); Siemens Scholarship selection process (2022); Supervised undergraduate projects and assisted in laboratory instruction and experimental design for 30+ students in Communications lab and Electronics Design lab in WEL at IIT Bombay (2018-2021).

Co-curricular Contributions—Published ML blogs on Medium (2020); Instructor, Bridge Course Team, IIT Bombay — taught GNU Radio basics (2019); Class Representative, Communication Engineering batch, IIT Bombay (2018–2021)