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New Delhi, India

Diksha Shrivastava

AI Research Engineer — Continual Learning in Complex World Models

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Experience

- **School of CSET, Bennett University** — India · Remote
  Research Intern on Post-Training & Decision-Making — *Jan '22 - Present*
  - **Paper:** Grounding Inferred Relationships in Complex World Models with Continual Reasoning. Diksha Shrivastava, Mann Acharya, Dr. Tapas Badal *(In Progress).*
  - **Paper:** Bridging Latent Space Reasoning to External World Model Representation for Language Models with Iterative Hypothesis Cycles. Diksha Shrivastava, Mann Acharya, Dr. Tapas Badal *(In Progress).*
  - **Paper:** Agents are Decision-Makers First: Leveraging Graph of Decisions for Intermediate Reward Modeling. Diksha Shrivastava, Mann Acharya, Dr. Tapas Badal *(In Progress).*
  - **Paper:** Beyond Correctness: Generating New Problems from Divergent Solutions for Reasoning with Rearrangement Sampling. Diksha Shrivastava, Mann Acharya, Dr. Tapas Badal *(In Progress).*
  - **Paper:** Closing the Loop: Execution-Guided Continuous Generation for Adaptive Model Reasoning. Diksha Shrivastava, Mann Acharya, Dr. Tapas Badal *(In Progress).*
  - Developed a tool to automate end-to-end ML pipelines with continous code generation and execution using a dynamic graph of decisions.

- **Digital Product School by UnternehmerTUM** — Munich, Germany
  AI Engineer for German Federal Ministry, BMZ · (Full-Time) — *Jun '24 - Sept '24*
  - **Technical Blog -** The Problem of Reasoning in Holistic Systems
  - Pilot-launched a Decision-Making System for the Policy Officers of 60 countries to aid in country policy decisions and negotiations.
  - Designed a Decision-Making System from scratch on a complex, 5-level hierarchy of government initiatives and a multi-subsystem world model.
  - Executed 54 iterations of reasoning and analysis pipelines which could gather data from 200-2000 nodes at once from unstructured reports of multiple levels of subsystems throughout the years.
  - Implemented 7 AI features like performance growth analysis, risk assessments and actionable next steps based on situational similarity and relative importance across the subsystems using LLMs.
  - Evaluated multiple approaches for post-training and inference like agentic workflows in a complex world model, multi-hop reasoning, long context reorder and few-shot planning.
  - Benchmarked several data representation approaches to track hidden entity relationships across subsystems throughout years like hybrid vector-graph methods graph-rag, agentic parsing and standardization.
  - Forwarded roadmaps for training SLMs on planning and reasoning data for each sub-task and LLM-driven Monte Carlo Tree Search to improve agentic execution in a complex world model.

- **Digital Product School by UnternehmerTUM** — Munich, Germany
  AI Engineer for FSM Department, SAP · (Full-Time) — *Feb '24 - May '24*
  - **Onsite Pitch Video -** ai-SAP: Helps you complete tasks ASAP
  - Prototyped ai-SAP to be used by 100,000+ SAP employees & customers, with one-point search and chat functionality to data scattered across internal documentation, GitHub and Slack.
  - Launched a system with 15+ readers and 13+ calls to privately deployed LLM, including semantic chunking, metadata filters, recursive retrieval, intent classification, feedback loop, reflection-generation cycle, response synthesis with explainability.
  - Integrated a CI/CD pipeline using Google Cloud Build and Google Cloud Run. Reduced search and debug time from 14+ hours of manual search to 5 seconds.
  - Modified LlamaIndex to implement custom chunking, extraction and retrieval strategies to improve recall and MRR. Integrated Mlx server into LlamaIndex for rapid prototyping.
  - Designed a generative feedback loop which changes answerable questions metadata based on user feedback, to strongly align the knowledge base to user needs.
  - Delivered product presentations to Angel Investors and VCs at Meta, IBM, UnternehmerTUM, MTZ, AWS, United Internet Media GmBH. Received an invitation to the exclusive Summer BBQ with UVC Partners to meet VCs, angel investors, and start-ups.

- **Unify.ai (YC W23)** — London · Remote
  Core Contributor - ML — *Jul '23 - Oct '23*
  - Analyzed 5+ ML Frameworks' structure (TensorFlow, JAX, PyTorch, PaddlePaddle, MindSpore, NumPy) and added loss, conv, nn, ops functions and tests to the Frontend API wrapping Ivy.
  - Extended the Backend API for PyTorch and NumPy by incorporating functionalities from 5+ ML frameworks. Fixed tests for different ML frameworks, debugged Frontend APIs. Assisted with fixing MindSpore's testing pipeline. Gained experience working with CI/CD.
  - Assisted with open-source contributions, engaged in the model garden, developed understanding of graph compiler optimization and integrating Ivy into open-source repositories.

- **KaggleX Fellowship** — California · Remote
  Google KaggleX Fellow — *Dec '22 - Mar '23*
  - Achieved selection among the Top 152 mentees across 15+ countries and 20+ timezones among more experienced professionals. Received KaggleX BIPOC grant and credits to pursue higher ML education.
  - Early-career Kaggler mentored by Ms. Usha Rengaraju (ML Google Developer Expert), worked on modeling Music Transformers (arXiv:1809.04281), Symbolic Music Understanding and Generation. Attended multiple workshops and Kaggle Competitions.
  - Developed audio and MIDI generation models with Librosa, Music21, LSTM and RNN, applied multiclass classification to recognize music genres.

- **Bennett - NVIDIA Centre for Artificial Intelligence** — Greater Noida, India
  Student Researcher — *Apr '22 - Jul '22*
  - Researched "Analysis of Neural Correlates of Different Music Genres using Machine Learning" as first author, selected for Fechner Day '22 Conference at Sweden.
  - Conducted fMRI processing and utilized SPM and PRoNTO in MATLAB for classification. Investigated the effects of music on individuals with disorders.

- **TalentSprint · Google** — India · Remote
  Women Engineer Scholar — *Mar '22 - Apr '22*
  - Developed a ML Framework for Julia, received mentorship on Data Structures and Algorithms.
  - Chosen as one of the Top 250 from 30,000+ applicants, awarded a 100% Scholarship for 2-years training by Google and TalentSprint experts.

Education

- **Bennett University** — Greater Noida, India
  Bachelor of Technology - Computer Science and Engineering — *Sept '21 - Jun '25*

  Specialization: *Artificial Intelligence.* ***GPA:*** *9.03 (ongoing).*

  Key Courses: *Statistical Machine Learning, Artificial Intelligence and Machine Learning, Intelligent Model Design and Thinking, Natural Language Processing, Image and Video Processing, Special Topics in Artificial Intelligence, UG Research*

  Key Achievements: *Google KaggleX Fellow '22, Google WE Scholar '22, fMRI-ML Paper Selection for ISP Conference. Received awards for academic excellence and exceptional hackathon performances.*

Selected Projects

- **Swan AI**: Researched six hybrid graph-vector approaches to enhance data representation for reasoning in multi-system environments. Tested the ability of LLMs to recognize and predict hidden relationships within a fictional Arc World. (July '24)
- **Celestial Navigation with Deep Learning**: Designed a marine navigation system leveraging computer vision and deep learning. Applied a CNN with Haversine Loss to achieve sub-1 nautical mile positional accuracy. Technologies: Python, Skyfield, TensorFlow, CNN, Haversine Loss, Monte Carlo Dropout. (December '23)
- **Soundscapes - Analysis of Music on Individuals with Intellectual & Development Disorders**: Distinguished EEG patterns between individuals with IDD and Typically Developing Controls (TDC) to support early diagnosis. Achieved 96% accuracy using SVM and identified IDD patterns with LSTM. Researched emotional responses in EEG data to propose personalized music therapy interventions. (December '23)
- **Robotouille - Fine-tuned Culinary Robots**: Developed a user-friendly software framework to control cooking robots. Fine-tuned an LLM for generating recipes from diverse input descriptions. Presented the project at the 5th Symposium of Computational Gastronomy after winning the Fork-It Hackathon. (December '23)
- **ChessGAN**: Designed a generative adversarial network for chess, where one neural network generated human-like moves and another identified whether moves were human or machine-made. Ensured the machine lost 50% of games to reliably meet Turing Test criteria. Investigated the correlation between errors and victory in chess games.(October '23)

- **Muse - Symbolic Music Understanding & Generation**: Researched Symbolic Music Understanding and Generation in an immersive program. Developed audio and MIDI generation models using Music Transformers. Implemented multiclass classification for accurate music genre recognition with tools such as Librosa, Music21, LSTM, and RNN. (March '23)
- **Dark Matter Substructures**: Applied Equivariant Neural Networks to identify three distinct dark matter substructures with high precision. Technologies: Python, TensorFlow, JAX. (March '23)
- **Alzheimer Detection**: Directed a project utilizing FastAI and ResNet50 for predicting Alzheimer's risk from MRI scans. Integrated a tech stack comprising FastAI, OpenCV, and PyTorch to achieve reliable results. (November '22)
- **DeepFake Detection**: Built a video deepfake detection system combining LSTM and CNN architectures. Accurately identified manipulated content by analyzing eye blinking patterns within specified time intervals. Technologies: Python, TensorFlow, OpenCV.(October '22)
- **Face Mask Detection**: Developed a CNN-based model for detecting face masks, employing Python, MobileNet, OpenCV, TensorFlow, Keras, NumPy, and Matplotlib. (October '21)

Awards & Honours

- **Fork-It Hackathon**: Secured 2nd Prize, outperforming 50+ competing teams, by crafting an innovative software framework for controlling cooking robots. Fine-tuned a Large Language Model to generate recipes based on diverse formats of descriptions. (November '23)
- **KaggleX BIPOC Grant Receiver**: Selected as one of the Top 152 mentees across 15+ countries and 20+ time zones, among a diverse group of data scientists, ML engineers, researchers, and students. Received a 1000 USD grant and 1000 GCP credits. (November '22)
- **Project Shortlisted for Industry Showcase** : Alzheimer Detection project shortlisted for an industry showcase out of 700+ students. (November '22)
- **Google TalentSprint WE Scholar**: Chosen as one of the Top 250 from 30,000+ applicants, awarded a 100% Scholarship for training by Google and TalentSprint experts. (March '22)
- **Hackacinno Hackathon Winner**: Secured 1st prize while working on 'Prediction and Prevention of Self-Harm with Mental Well-Being Analysis' among 40+ teams. (May '22)
- **Research (Bennett University)**: Selected for Fechner Day 2022 at Lund University, Sweden, by the International Society for Psychophysics. (July '22)
- **Academic Excellence (Bennett University)**: Topped the Computational Thinking and Programming Course (with Python) among 500+ students. Recognized for extraordinary performance in the Hackathon. (May '22)

Volunteer Experience

- **AI Engineer & Mentor** — Munich, Germany
  AI Makerspace by Digital Product School — *June '24 - Present*
  - Mentoring product teams developing LLM-based solutions.
  - Developing examples for the wider AI community. Holding workshops on LLM-based product development.
  - Contributing to the development of Agentic AI Coaches.
- **Head, Open Source Department at AI Society** — Greater Noida, India
  Bennett University — *Dec '23 - Jul '24*
  - Facilitated the orchestration of Kaggle Competitions, steering a team of 60+ students in contributing to open-source ML repositories.
- **Co-Head, Research Department at Computer Society of India Chapter** — Greater Noida, India
  Bennett University — *Aug '22 - Jul '23*
  - Guided a dedicated team of 6 students in crafting their own research papers, offering mentorship in machine learning, data science, and deep learning. Pioneered a culture of collaborative research and technical projects, providing mentorship on Artificial Intelligence and Data Science aspects.
- **Member, BURS Research Community** — Greater Noida, India
  Bennett University — *Sept '21 - Jul '22*
  - Conducted in-depth research on diverse topics including the Recognition of Cues of Distress in Animals, the Study of History and Development in Theory of Mind AI, and the development of Iksha - a Neurological Tool integrated with AI and Virtual Reality.
- **Member, HarmonyOS Club** — Greater Noida, India
  Bennett University — *Sept '21 - Dec '21*
  - Received expert guidance from Huawei professionals, honing Android development skills. Actively participated in multiple lectures and workshops, contributing to a rich learning experience.