

DIKSHA SHRIVASTAVA

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RESEARCH INTERESTS

AI for Scientific Discovery · Continual Learning in Complex World Models · Decision-making in Language Models · Latent Space Reasoning

EDUCATION

2021-2025 BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE

Bennett University
(The Times Group),
India

GPA: 9.04/10.00 (ongoing) · Specialization in Artificial Intelligence
Awarded for extraordinary performance in industry, academia and hackathons. Investigated mathematical frameworks for continual reasoning in world models. Researched failure modes of language models in discovering implicit causal structures.
[THESIS](#) | [CODE](#)

PUBLICATIONS

Continual
Learning in
Complex Systems

2025 · Grounding Inferred Relationships in Complex World Models with Continual Reasoning. [DIKSHA SHRIVASTAVA](#), MANN ACHARYA, DR. TAPAS BADAL. *In progress.*
2025 · 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.*

Reinforcement
Learning

2025 · Agents are Decision-Makers First: Leveraging Graph of Decisions for Intermediate Reward Modeling. [DIKSHA SHRIVASTAVA](#), MANN ACHARYA, DR. TAPAS BADAL. *In progress.*
2025 · Beyond Correctness: Generating New Problems from Divergent Solutions for Reasoning with Rearrangement Sampling. [DIKSHA SHRIVASTAVA](#), MANN ACHARYA, DR. TAPAS BADAL. *In progress.*
2025 · Closing the Loop: Execution-Guided Continuous Generation for Adaptive Model Reasoning. [DIKSHA SHRIVASTAVA](#), MANN ACHARYA, DR. TAPAS BADAL. *In progress.*

Cognitive Sciences

2022 · Analysis of Neural Correlates of Different Music Genres using Machine Learning. [DIKSHA SHRIVASTAVA](#), DR. ANUJ BHARTI. *Accepted to Fechner Day 2022, by International Society for Psychophysics.*

APPLIED AI & PRODUCT DEVELOPMENT

Digital Product
School, Munich
with
German Federal
Ministry, BMZ

Jun–Sept,
2024 AI ENGINEER, FOUNDING TEAM

Can AI reason across multi-subsystem policy decisions spanning decades?
Product: Designed and piloted an AI-driven Decision-Making System for policy officers in 60+ countries, modeling hierarchical government initiatives as a 5-level structured world model to support strategic policy decisions.
Pipeline: Developed multi-layered agentic reasoning pipelines (54+ iterations over 200–2000 entities from unstructured reports) to track causal shifts in policy evolution.
Tools: Built 7+ AI tools—situational similarity models, graph-based retrieval, and AI-driven action plans—to surface risk factors and rank interventions by structural importance.
Inference: Explored and benchmarked reasoning methods (agentic workflows, multi-hop reasoning, few-shot planning, Monte Carlo Tree Search, graphrag, etc.) to capture implicit relationships over time.
Handover: Delivered the system to BMZ’s DataLab with AI-driven recommendations, strategic planning insights, and roadmaps for SLM training on structured decision-making tasks.
[TECHNICAL BLOG](#)

Digital Product
School with SAP,
Munich

Feb–May,
2024

AI ENGINEER, FOUNDING TEAM

How can a LLM-based system continuously learn from feedback to refine technical knowledge retrieval and reasoning?

System Development: Prototyped ai-SAP, an LLM-powered search and retrieval system for 100,000 SAP employees, unifying access to internal documentation, GitHub, and Slack.

Retrieval & Reasoning: Designed a multi-step retrieval pipeline with 15+ data readers and 13+ LLM calls, integrating filtering, recursion, and intent classification.

Optimization & Efficiency: Integrated a CI/CD pipeline on Google Cloud and enhanced LlamaIndex with custom chunking and extraction strategies, improving recall, MRR, and reducing debugging time from 14+ hours to 5 seconds.

Continuous Learning: Designed a generative feedback loop that dynamically updates answerable question metadata based on user feedback, aligning the knowledge base with evolving user needs.

Investor Presentations: Presented the product to investors at Meta, IBM, UnternehmerTUM, MTZ, AWS, and United Internet Media GmbH, demonstrating the system's capabilities.

[ONSITE PITCH VIDEO](#)

RESEARCH EXPERIENCE

Jan–Present,
2025

RESEARCH INTERN, AI REASONING & CAUSAL DISCOVERY

How can language models iteratively refine reasoning to discover unseen dependencies in structured world representations?

Latent Space Bridging: Designed methods to align latent representations with structured external world models, improving hypothesis formation.

Continual Reasoning: Developed a memory-integrated framework for iterative self-correction in complex inference tasks.

Intermediate Reward Modeling: Introduced Graph of Decisions for Intermediate Reward Modeling (GoD-IRM) to dynamically assign rewards in structured decision-making.

Rearrangement Sampling: Proposed a sampling technique that converts divergent solutions into new problem formulations, enhancing generalization across reasoning tasks.

Execution-Guided Generation: Implemented a feedback-driven decoding pipeline where execution traces refine model-generated hypotheses, reducing error propagation.

Automated ML Pipelines: Developed a system that dynamically generates and executes end-to-end ML pipelines from high-level problem specifications using a decision graph.

[ABSTRACTS](#) | [CODE](#)

Sept–Dec,
2024

INDEPENDENT RESEARCHER

Can language models formulate ML problems from deep, interacting subsystems?

Developing BMZ's Decision-Making System exposed a fundamental failure in AI reasoning—LLMs recognize surface correlations but fail to uncover deep causal structures in complex, evolving world models.

Beyond Static Models: Studied Transduction & Induction Methods for Reasoning, Symbolic Regression, Automated Theorem Proving, exploring frameworks for self-improving inference, continual reasoning, and structured adaptation.

Continual Learning with Dynamic Database: Designed a self-updating framework for hypothesis-driven link prediction and structured learning in evolving datasets.

Reasoning in Holistic World Models: Designed experiments to test agent learning, adaptation, and generalization in dynamically interwoven systems represented by hybrid vector-graphs system.

This realization became the foundation of my research, leading to structured investigations into continual learning in complex world models with deep causal structures—establishing the groundwork for AI-driven scientific discovery.

[TECHNICAL BLOG](#)

School of CSET,
Bennett University

Independent
Research, Remote

Nvidia-Bennett
Centre for AI,
Bennett University

May–Aug,
2022

STUDENT RESEARCHER

How do cognitive disorders affect neural music perception? Investigated the neural correlates of music to understand how different genres activate distinct cognitive patterns.

Neural Pattern Analysis: Applied SPM12 and PRoNTO V3.0 in MATLAB to analyze fMRI data, isolating superior temporal gyrus (STG) activity for genre-based classification.

Machine Learning for Cognition: Designed an SVM-based classifier to distinguish neural responses to music genres, leveraging voxel-based feature extraction.

Conference Acceptance: Selected to present at Fechner Day 2022, Sweden, showcasing ML-driven insights into music cognition and mental health applications. (*Withdrawn for Grant Reasons*)

[ABSTRACT](#) | [WEBSITE](#)

FELLOWSHIPS & OPEN-SOURCE

Unify.ai (YC
W23), London

Jul–Oct, 2023 CORE CONTRIBUTOR - ML

Contributed to unifying backend APIs across TensorFlow, PyTorch, JAX, MindSpore, and PaddlePaddle to ensure cross-framework compatibility. Designed universal loss functions, neural network ops, and convolution layers while extending backends, working with model garden, debugging test pipelines, and contributing to graph compiler optimization and CI/CD.

KaggleX
Fellowship

2022–2023 GOOGLE KAGGLEX FELLOW

How can AI understand and generate emotions in music through symbolic representation? Explored symbolic music understanding and generation using Music Transformers (arXiv:1809.04281), focusing on structural pattern recognition in music. Developed MIDI and audio generation models with Librosa, Music21, LSTM, and RNN, applying multi-class classification for symbolic music structure analysis.

TalentSprint ·
Google, India

2022–2024 GOOGLE WOMEN ENGINEER SCHOLAR

Completed a two-year training program focused on machine learning, data structures and algorithms, system design, and software development. Attended Google Immersion Week and a bootcamp at IIIT Hyderabad, showcasing ML projects to field experts while receiving mentorship in communication, strategic planning, and design thinking.

OTHER INFORMATION

Awards &
Recognition

2024 · **UVC Partners' Summer BBQ:** Personally invited to UVC Partners' highly exclusive, invite-only Summer BBQ to network with top VCs, angel investors, and startups.

2024 · **Investor Presentations:** Presented products to investors at Meta, IBM, MTZ, AWS, receiving funding offers for a white-label version.

2022 · **Google KaggleX Grantee:** Selected as one of the Top 152 globally among AI researchers and engineers, awarded a \$1,000 research grant and \$1,000 in GCP credits.

2022 · **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.

Community &
Outreach

2025 · **AI Makerspace by Digital Product School:** Collaborating with Exa.ai (YC S21) to expand DPS coaching agents beyond Europe, and mentor LLM product teams.

2023 · **Open Source Department at AI Society:** Facilitated the orchestration of Kaggle Competitions, steering a team of 60+ students in contributing to open-source ML repositories.

2022 · **Research Department at Computer Society of India Chapter:** Mentored students in ML, data science, and deep learning, fostering a culture of collaborative research and AI projects.

March 23, 2025