

Dr. Pritam Deka

AI Engineer | LLMs | Agentic AI | Multimodal AI | Document Intelligence

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🐙 GitHub | 🔗 LinkedIn | 🤖 Hugging Face | 📁 Portfolio

Profile

AI Engineer / Applied AI specialist with a PhD in Computer Science and 5+ years of experience designing, building and evaluating practical AI systems across LLMs, RAG, agentic AI, multimodal AI, document intelligence and workflow automation. Current AI Research Fellow within the £40m PwC Advanced Research Centre (ARC), developing applied AI prototypes for commercial workflow, process automation and complex corporate-structure understanding use cases. Strong record of turning research ideas into working systems, demos and reusable pipelines, while communicating technical trade-offs to both technical and non-technical stakeholders.

Technical Expertise

AI Engineering	LLM applications, RAG, agentic workflows, multimodal/VLM systems, document AI, information extraction, model evaluation, human-in-the-loop systems
Models	GPT-4o/GPT APIs, Gemini, Qwen, Gemma, Mistral, LLaMA-family, BERT/BioBERT/PubMedBERT, transformer-based NLP and vision-language models
Frameworks	Python, PyTorch, TensorFlow, Keras, scikit-learn, Hugging Face, CrewAI, Pandas, NumPy
Delivery	FastAPI, Flask, Gradio, REST APIs, structured JSON/XML pipelines, prompt/context engineering, LoRA/PEFT, reproducible evaluation pipelines
Deployment	Git/GitHub, Vercel, Netlify, Hugging Face Spaces, API-backed web demos, environment-based API-key management, local-to-hosted workflows
Business Skills	Requirements gathering, stakeholder demos, technical-to-business translation, commercial use-case framing, risk-aware solution design, applied prototyping

Professional Experience

AI Research Fellow - Applied AI Engineering

May 2024 – Present

Queen's University Belfast | InvestNI - PwC funded Advanced Research Centre (ARC)

Belfast, UK

- AI Research Fellow within the £40m PwC Advanced Research Centre, developing agentic AI, multimodal AI and process automation prototypes for commercial applications across PwC business workflow contexts.
- Led applied AI work on complex corporate structures, process understanding and workflow automation, focusing on extracting information from BPMN diagrams, flowcharts and organisational hierarchy charts for downstream reconstruction, editing and analysis.
- Designed and delivered AI pipelines that convert unstructured visual process artefacts into structured outputs such as Mermaid code and BPMN XML, enabling workflow documentation and process-model rebuilding.
- Built and showcased the Flowchart-to-Mermaid application to PwC ARC stakeholders, demonstrating image upload, Mermaid generation, diagram preview, export and AI-assisted refinement for editable process representations.
- Developed reusable prompt and context-engineering structures for flowchart and BPMN extraction; detailed prompts remained restricted in publications due to confidentiality around ARC/PwC-facing work.
- Received QUB/ARC dissemination support for peer-reviewed outputs from the PwC ARC postdoctoral work, including approximately £3,200 support for IEEE Access publication costs and funded travel/accommodation to present ACM SAC 2026 work in Greece.
- Developed a BPMN fullstack prototype with a FastAPI backend for image-to-BPMN XML conversion using GPT-4.1 and a frontend editor for image upload, live BPMN rendering and inspection of generated process models.
- Fine-tuned and evaluated open-source VLMs including Qwen2.5-VL, Qwen3-VL and Gemma, and integrated frontier LLM APIs for structured JSON/XML generation and human-in-the-loop refinement.
- Presented AI findings, prototype demos and emerging technology capabilities to PwC ARC stakeholders and QUB technical teams, translating complex implementation considerations into accessible business insights.
- Built an agentic synthetic dataset generation pipeline for business process modelling tasks using CrewAI, supporting scalable experimentation where real-world labelled data is limited.
- Deployed and shared applied AI applications through GitHub, Vercel and Hugging Face Spaces, packaging prototypes as accessible web demos rather than only scripts or notebooks.

Co-Founder and AI Product Lead

Jan 2026 – Present

Khyontek AI

Guwahati / Remote

- Lead product strategy and hands-on AI engineering for SME-focused AI products, translating business problems into feasible solution concepts, prototypes and implementation plans.
- Built a structured AI internship programme and mentor students on practical AI workflows including problem scoping, dataset preparation, model experimentation and reproducible delivery.
- Lead fundraising preparation, product positioning and go-to-market planning, balancing technical ambition with customer value, implementation cost and commercial viability.

Senior Research Assistant - AI and Cyber Security

University of Southampton

Jul 2023 – Jan 2024

Southampton, UK

- › Developed large-scale labelled datasets and ML pipelines for predictive cyber-attack attribution, entity extraction and automated classification.
- › Fine-tuned transformer-based models for cyber-attack attribution and named entity recognition, improving repeatability and reducing manual analysis effort.
- › Automated preprocessing, evaluation and reporting pipelines to make experiments reproducible and easier to hand over to technical collaborators.
- › Built and publicly released a labelled cyber-attack attribution dataset for NER and classification, including preprocessing and evaluation workflows; the dataset supported a peer-reviewed conference publication. Dataset link.

AI Intern - Conversational AI

Moment One

Mar 2022 – Sep 2022

Remote / UK

- › Contributed to dialogue design, model integration and prototype deployment for a mental-health-focused conversational chatbot using Rasa and Hugging Face transformer models.
- › Balanced user sensitivity, technical feasibility and responsible AI considerations while developing supportive conversational interactions.

Government of India Sponsored PhD Scholar - NLP and Evidence-Based AI

Queen's University Belfast | QUB–Tezpur University Collaborative PhD Programme

Oct 2019 – Dec 2024

Belfast, UK

- › Awarded a Government of India sponsored scholarship under the Queen's University Belfast–Tezpur University Collaborative Research Degree Programme, a competitive funding package worth over £100,000 across tuition, accommodation, UK subsistence and conference support, plus preparatory and return-airfare allowances.
- › Designed NLP and information-retrieval systems for evidence-based verification of online health information, combining query generation, document retrieval, biomedical language models and weak supervision.
- › Built reusable pipelines for claim analysis, evidence extraction, biomedical fact verification and explanation generation, later extended into applied demos and open-source tools.
- › Developed the Biomedical Fact-Checker application from PhD work, demonstrating evidence retrieval, claim classification, evidence extraction and transparent explanation generation for health information.
- › Published three peer-reviewed conference papers during the PhD, with QUB-supported conference registration and virtual presentation during COVID-era restrictions.

Lecturer / Assistant Professor - Computer Science

Royal Global University and SITM Guwahati

Mar 2017 – Sep 2019

Guwahati, India

- › Delivered programming, data structures, algorithms, Python and object-oriented programming modules to undergraduate and master's cohorts, including classes of 60+ students.
- › Supervised student projects and translated complex technical concepts into practical learning activities, strengthening communication skills relevant to technical and non-technical audiences.

Selected AI Applications and Prototypes

- › **Flowchart-to-Mermaid Converter — PwC ARC / Complex Corporate Structures:** Built and deployed a Vercel-hosted AI application for converting uploaded flowchart images into editable Mermaid code, supporting process digitisation, structured diagram extraction and workflow standardisation. Demonstrated to PwC ARC stakeholders and used to explore how visual corporate/process structures could be transformed into editable representations. [Live app]
- › **BPMN Fullstack App — PwC ARC Internal Prototype:** Developed a fullstack image-to-BPMN XML prototype using a FastAPI backend, OpenAI GPT-4o and a frontend BPMN editor with image upload and live BPMN rendering. Designed for Vercel/Netlify-style frontend hosting with a separately deployed API backend and API-key management through environment variables; not publicly deployed.
- › **BelfastBuild AI — Independent Applied AI Application:** Built and deployed a Vercel-hosted RAG-based planning compliance pre-screener for Northern Ireland planning proposals. The application cross-references indexed planning policy sources, validates NI postcodes, flags likely policy conflicts, produces remediation guidance and provides source citations. [Live app]
- › **Biomedical Fact-Checker — PhD-Derived Application:** Built and deployed a Hugging Face Spaces demo based on doctoral work for verifying health-related claims against biomedical evidence using retrieval, evidence extraction, claim classification and explanation generation. [Demo]
- › **Open-Source AI Assets:** Published 50+ models and 20+ datasets on Hugging Face across document intelligence, retrieval, classification, biomedical NLP and multimodal reasoning. [Hugging Face]

Stakeholder Communication and Delivery

- › Demonstrated applied AI prototypes to PwC ARC stakeholders and technical teams, using working systems to explore commercial feasibility and implementation considerations.
- › Regularly translate complex AI concepts, model limitations and implementation trade-offs into practical recommendations for mixed technical and non-technical audiences.

- › Speaker at AICON 2024 (Titanic Belfast), Vision and Language Symposium 2025, and Queen’s University Belfast guest lectures on AI and Deep Learning.

Education

PhD, Computer Science - Queen’s University Belfast, UK	2019–2024
<i>Government of India sponsored QUB–Tezpur University Collaborative Research Degree Programme scholar; funding package worth over £100,000 including tuition, accommodation, UK subsistence and conference support</i>	
<i>Thesis: Evidence-Based Approach to Verification of Online Health-Related Content</i>	
MTech, Information Technology - Tezpur University, India	2014–2016
BE, Computer Science and Engineering - Gauhati University, India	2009–2013

Selected Publications and Recognition

- › 10+ peer-reviewed publications in NLP, information extraction, health AI, fact verification and multimodal/document AI. Full list: Google Scholar.
- › Selected work: evidence extraction for medical claim validation; unsupervised evidence-based fact checking for online health news; cyber-attack attribution using named entity recognition datasets; multimodal process-diagram understanding.
- › Best Paper Award, iiWAS 2021.

Languages and Certifications

English (fluent), Assamese (native), Hindi. Certifications include Mathematics for Machine Learning: Linear Algebra and Natural Language Processing with Classification and Vector Spaces.

References

Available upon request.