

PRANAV SHINDE

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AI engineer and applied researcher working across confidential computing, multi-agent systems, and verifiable machine learning. Prior research at top academic institutions in India spanned blockchain-enabled digital twins for healthcare, anomaly detection, and cryptocurrency analysis. Proven expertise in building zero-trust infrastructure for multi-agent systems.

EDUCATION

MSc Blockchain & Financial Technologies, 1st | University of East London, UK | 2024 – 2025

BTech Information Technology, 1st | Shivaji University, India | 2019 – 2023

ACHIEVEMENTS

- Awarded by the Government authorities for implementing a blockchain-based agri-supply chain solution.
- Avishkar Research Convention Winner (Rank 1 - Pharmacy & Medicine)

EXPERIENCE

AI Engineer

June 2025 - Present

CoralOS | London, United Kingdom

- Designed and implemented network fault-detection multi-agent systems using Open Gateway APIs, enabling automated diagnosis and coordination across agents.
- Developed architecture diagrams and design documents for single-agent/multi-agent system use cases.
- Contributed to Confidential AI research, evaluating the maturity and adoption levels of Trusted Execution Environments (TEEs) and Zero-Knowledge Proofs (ZKPs) that can be applied to secure multi-agent systems.
- Assessed the scope of partnerships with confidential computing platforms, aligning their capabilities with Coral Protocol.

Project Intern

November 2023 - July 2024

Indian Institute of Technology(IIT), Dhanbad | Remote

- Designed a redactable blockchain for digital twins in the healthcare sector. Implemented data storage mechanisms, data sharing protocols, and IoT device authentication with Zero-Knowledge-Proofs.
- Developed a privacy-preserving anomaly detection system using KNN and HE with an accuracy of 95.35%.
- Co-authored high-impact publications and delivered technical presentations to interdisciplinary teams, demonstrating the scalability and efficiency of the framework.

Project Intern

April 2023 - July 2023

Indian Institute of Management(IIM), Bangalore | Remote

- Conducted quantitative analysis on cryptocurrency datasets, identifying wallet patterns, exchange platforms, and HEX address activities.
- Developed heuristic algorithms to cluster 75,000+ HEX wallets and decode 53,000 Bitcoin and Ethereum addresses using API calls, enabling affiliation predictions.
- Analyzed transaction volumes and correlations across centralized and decentralized exchanges, identifying high-volume nodes and potential anomalies.

PROJECTS

TEE-Attested Multi-Agent Pipeline for Privacy-Preserving Document analysis

Code:<https://github.com/Pranav-7/Phala-Network-MAS>

- Architected a 4-agent confidential pipeline (Interface, PDF, FireCrawl MCP, Verification) using Coral Protocol and Phala's TEE infrastructure for processing sensitive documents without exposing data to any single party.
- Implemented cryptographic attestation storage at each agent hop, binding LLM completions and tool outputs to hardware-level signatures.
- Achieved fully verifiable document analysis with sub-second attestation lookups, <3s end-to-end verification latency, and zero plaintext data leakage by isolating all processing within secure enclaves.
- Enabled a compliance-ready, trustless foundation for confidential AI workflows, supporting PDF ingestion, web-augmented research via MCP, and cryptographic proof chaining for enterprise-grade audit trails.

ztML: Zero-Knowledge & TEE-Enabled Framework for Verifiable ML Inference

Code: <https://github.com/Pranav-7/ZTCNN>

- Designed and implemented a hybrid Zero-Knowledge + TEE framework (ZTML) to generate cryptographically verifiable ML inference proofs inside a secure enclave.
- Developed this system to solve the trust and provenance problem in ML, where model outputs cannot be independently verified without exposing model IP.
- Achieved verifiable inference with compact 17–25 KB proofs, ~2.3 s verification time, and ~5% TEE overhead across 6 models (CNN, MLP, LSTM, SVM).
- Enabled a trustless, compliance-ready foundation for auditable AI deployments, binding every proof to hardware attestation to prevent tampering or replay.

SKILLS

- **Programming Languages:** JavaScript, Python
- **AI Development:** LangChain, LangGraph, RAG, Copilot Studio, Dataverse, Power Automate, Azure AI.
- **Blockchain Development:** Solidity, web3.js, Hardhat, Ganache, snarkjs
- **Web Development:** ReactJS, Node.js, Express.js, MongoDB, Bootstrap, HTML, CSS, SQL, Git

EXTRA-CURRICULAR

- Research contribution: Actively attend and participate in conferences, summits, hackathons, and bootcamps.
- Volunteer: Member of the UEL Cancer Society, UEL Sustainability volunteer

PUBLICATION

- ZTML: A Zero-Knowledge and TEE-Enabled Framework for Cryptographically Verifiable Machine Learning Inference. ([Link](#))
- Blockchain-Enhanced Healthcare Digital Twins: Secure EHR Management and Anomaly Detection Through Redactable Blockchain ([Link](#))
- Secure Digital Twin in Healthcare: A Cryptographic Framework with Redactable Blockchain Integration ([Link](#))
- Blockchain Revolutionizing E-commerce System: Enhanced ONDC Standards with Hyperledger Fabric ([Link](#))
- Blockchain Based Supply Chain System: A Case Study of Agriculture ([Link](#))

BLOGS

- zkSNARKs Explained: A First-Principles Walkthrough ([Link](#))
- Small Language Models: A better way to Agentic AI ([Link](#))
- ONDC: Blockchain and ZKPs for a Secure, Privacy-Preserving E-Commerce Future ([Link](#))
- Revolutionizing Electoral Bonds in India: Transparency, Privacy & Accountability with Blockchain and Zero-Knowledge-Proofs ([Link](#))