R. Suresh

+91-7904210795 | sureshraghu0706@gmail.com | linkedin.com/in/suresh-raghu | github.com/R-Suresh07

EDUCATION

Indian Institute of Technology, Madras   Tamil Nadu, India
B.Sc. in Programming & Data Science   *Oct. 2020 – Present*
  − *Note: Pursued concurrently with B.Tech degree.*

Vellore Institute of Technology, Bhopal   Madhya Pradesh, India
B.Tech in Computer Science and Engineering; CGPA: 3.36/4.0   *Oct. 2020 – Jun 2024*

SKILLS

Primary Areas: Explainable AI (XAI), Uncertainty Quantification (UQ), Vision-Language Models (VLMs).
Research Focus: Hallucination Mitigation in RAG, Epistemic Uncertainty in Agentic Systems, Robust Document Understanding.
Languages: Python, Django, Django Rest Framework (DRF), C, C++, SQL
Frameworks: PyTorch, TensorFlow, scikit-learn, OpenCV, Pandas, NumPy, FastAPI, Flask, vLLM, LlamaIndex, LangChain, Transformers, Hugging Face, Matplotlib, Pillow, Crew AI, Ollama

PUBLICATIONS & PRE-PRINTS

Repair of Thought: Advancing Automated Program Repair through a Dual-Model Reasoning Framework.
*S. Pandey, **R. Suresh**, et al.*   *(Submitted for Review)*

  − Proposed "Repair of Thought," a function-level APR framework achieving an **83.1% plausible repair rate** on Defects4J. Decoupled reasoning from synthesis, validating repairs via a novel pipeline integrating **control-flow symbolic analysis** and **semantic verification** to ensure patch correctness beyond simple test-suite passing.

RESEARCH & ENGINEERING EXPERIENCE

VFS Global   New Delhi, India
Lead AI Research Engineer   *May 2024 – Present*
  − **Agentic Routing & Orchestration:** Investigated dynamic execution paths for multi-agent frameworks. Designed a **complexity-based routing mechanism** that differentiates between deterministic tasks (handled by parsers) and ambiguous instances (routed to reasoning-capable VLMs), optimizing the trade-off between inference cost and reasoning accuracy.
  − **Epistemic Uncertainty Quantification:** Implemented a dual-model validation system utilizing **LLM-as-a-Judge** for epistemic validation. The hierarchical approach targets low-confidence predictions for re-evaluation by reasoning models, reducing hallucination rates in information extraction tasks.
  − **Semantic Entropy Pipeline:** Integrated a **cascaded uncertainty pipeline** where token-level logit probabilities trigger rigorous **Semantic Entropy** calculations. Applied Monte Carlo self-consistency to distinguish between linguistic variance and epistemic model failure.
  − **Decoupled Verification Logic:** Designed a multi-stage verification system separating low-level **signal quality assessment** (Laplacian variance) from high-level **semantic attribute verification** (fine-tuned VLMs), improving robustness against occlusion and pose variations.

Adani Digital Labs   Gurugram, India
Machine Learning Researcher   *June 2023 – April 2024*
  − **Self-Supervised Representation Learning:** Explored latent space projections using Meta's **DINOv2** vision transformer for few-shot clustering. Replaced manual tagging with SVM classifiers operating on generated semantic embeddings, achieving **93% precision** in low-data regimes.
  − **Multimodal Retrieval:** Developed a CLIP-based retrieval system coupled with GPT-4 Vision to align textual queries with proprietary visual product data, addressing the semantic gap in retail inventory search.
  − **Long-Context Consistency:** Engineered a prompt-chaining pipeline to mitigate factual drift in long-context generation tasks, utilizing iterative refinement to maintain coherence across extended outputs.

SELECTED PROJECTS

Computational Aesthetics & Latent Space Alignment *(PyTorch, CLIP)*   Oct 2023 – Nov 2023
  − Formulated a context-aware aesthetic scoring function via **vector alignment** of CLIP embeddings. Precomputed positive/negative aesthetic centroids to map input images against specific aesthetic distributions.
  − Investigated domain adaptation techniques to align pre-trained visual encoders with the specific distribution of hotel interior photography.