

# Aadhithyan Velan M

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## EDUCATION

**Birla Institute of Technology and Science (BITS), Pilani**

*Bachelor of Engineering in Computer Science*

**CGPA:** 8.20/10.0

Hyderabad, India

*Aug. 2023 – May 2027*

## EXPERIENCE

**Undergraduate Student Researcher (Adversarial Deep Learning)**

Aug. 2025 – Dec. 2025

*BITS Pilani (Advisor: Prof. Aneesh Chivukula)*

*Hyderabad, India*

- Reproduced and evaluated **latent-space adversarial attacks** on CNNs using **VAEs**, framing the interaction as a **Stackelberg game** to generate perceptually constrained perturbations.
- Benchmarked attack performance on standard vision datasets (MNIST, GTSRB), including safety-critical traffic sign recognition tasks.
- Explored extensions and alternative optimization strategies, including Quantum-behaved Particle Swarm Optimization (QPSO), to study attack effectiveness and stability.

## PROJECTS

**Knightmare Protocol: Chess Agent** | *Python, PyTorch*

Jul. 2025 – Present

- Used chess as a testbed to study **reinforcement learning** in large discrete action spaces, implementing **NFQ**, **DQN**, **DDQN**, and **Dueling DDQN** from scratch.
- Trained a supervised policy on **8M+ expert positions** from the Lichess Elite Database and deployed the resulting agent (~1500 Elo) live on Lichess.
- Designed **canonical board representations** to remove player-perspective asymmetry, improving data efficiency and training stability.
- Conducted systematic experiments transitioning from **offline supervised learning to online RL**, observing **policy collapse and catastrophic forgetting** driven by objective mismatch and **Q-value inflation**.
- Authored a technical blog documenting architectural decisions, experimental results, and failures.

**E-Commerce Attribute Extraction** | *Python, Hugging Face*

Aug. 2025 – Dec. 2025

- Built an end-to-end **Attribute-Value Extraction (AVE)** system for unstructured e-commerce product titles, framing the task as **sequence labeling**.
- Implemented a **BERT-CRF architecture** to leverage contextual token representations while enforcing **label consistency and valid attribute-value spans**.

## TECHNICAL SKILLS

**Machine Learning:** PyTorch, NumPy, scikit-learn, OpenAI Gym

**Research Areas:** Reinforcement Learning (value-based methods, offline-to-online learning), Imitation Learning

**Languages:** Python, C++, Java, GDScript

**Tools:** Git, Linux/Bash

## HONORS & ACHIEVEMENTS

**National Talent Search Exam (NTSE) Scholar:** Awarded by Govt. of India to top 2,000 students nationwide.

## INTERESTS

**Creative Writing:** Authored a **50,000+ word** high-fantasy novel draft; designed comprehensive world-building bible.

**Game Development:** Prototyping a 3D Open-World RPG in **Godot**; focusing on narrative system design.