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SCHOLASTIC ACHIEVEMENTS

- **JEE Advanced:** Achieved a rank of **807** in JEE Advanced | **264** in JEE Mains Examination. *(2020)*
- **KVPY : Cleared level-1** of the Kishore Vaigyanik Protsahan Yojana (KVPY) Examinatoin. *(2020)*

PROJECTS

Fine Tuning a LLM on a Curated Dataset | GPT2 *(March 2023)*

- **Fine-Tuned GPT2** pretrained on **28,000** paragraphs from **Paul Graham's** Essays using **Hugging Face** API.
- Achieved a **Perplexity** of **2.47,** Generated **text infused** with Paul Graham's **wisdom** and writing style.
- **Scraped** the data, **Tokenized** and **Trained** the model. Built a **Gradio App** to interact with the model.

Reinforcement Learning *(Autumn 2023)*

- Agent to play **Pool** using **UCT Tree Search**. Learnt Policy Gradient, Q-learning, works behind AlphaGo.
- Coded **Howard's policy iteration** to solve a 3-player 4x4 **football** game with **encoder, planner, decoder**`GitHub`
- Gained a deep understanding in the taxonomy of **model-based/free; On/Off-line** algos in **DeepRL.**

Formal Methods for Robustness Verification and Adversarial Analysis in DNNs *(Autumn 2023)*

- Proficient in methods like **DeepPoly,** α**-CROWN,** β**-CROWN, and Reluplex,** which are used to rigorously assess the robustness of DNNs. Used **Eran to implement** these techniques **on MNIST dataset.**
- Explored logical abduction techniques **generating** explanations,**counterexamples** &**adversarial** examples to understand the vulnerabilities of NNs. **Reading Research papers** to understand these concepts.

Computer Vision | CS231n *(Nov-Jan 2022)*

- Implemented **Image Captioning**(CNN + RNN/ Transformers/ LSTM) and improved the test, validation **accuracy by 15% using Dropout**, **LayerNorm** and tuning hyper parameters on **COCO dataset**; `GitHub`
- Individually **Coded BatchNorm**, Entropy, **Softmax with Numpy,** grasping **Intuition in Back-Prop.**
- Studied **Ian J. Goodfellow** research paper: **GANS** and coded **Generator**, **Discriminator** update functions.

Natural Language Processing (NLP) and Transformer Architecture *(Jan 2023)*

- Implemented a **Transformer** on Shakespeare's writings, **generated Shakespeare like dialogue** & scene.
- Developed **`Micrograd`** package for Transformers, Wrote **Multi-Head Attention**, Position Embedding, **query, key, value** vectors from **scratch using Numpy,** gained **intuition for attention mechanism** `Github`.

Amphibious Drone for Payload Deployment Underwater *(Autumn 2023)*

- Wrote lot of **Python code** implementing Blade Element Hover, **Forward Flight** theory, and **optimization of interdependent** variables in a **modular** fashion, **saving** much **time** and being easy to replicate `Github`.
- **Designed Hub** and **Tail** Rotors for **100 kmph Forward, 5mps Hover** in **Air** & 5mps forward, hover in **Water**. **Using plots** with Thrust, Roll/Pitch **Moments** vs.cyclic pitch, tinkered the inputs to **reach Trim**.

Website Development | Udemy Course by Angela Yu ***Certification.*** *(May 2022)*

- Built full-stack website using **React, Node.js, MongoDB & RESTful API**. Email list using **MailChimp**.
- **Coded and Deployed** a *website* built using **Astro** a SSG to document my work, thoughts, & interests.

RESEARCH

- Implemented techniques that **Generalize GNNs better than state-of-the-art. Authored a paper** *arXiv*
- Introduced **Residual Connections** into **GNNs** to foster scalability, **higher test accuracy**. Incorporated **learnable weights** within **message passing**, enhancing the **information propagation within GNN.**

TECHNICAL SKILLS

- **Programming Languages**: **C++,** Bash, Git, **Python,** PHP, LaTeX, css, **JavaScript**, mojo, Markdown.
- **Framework & Libraries**: **PyTorch**, Numpy, Pandas, **Hugging Face**, **LangChain**, **Matplot**, React.

RELEVANT COURSES

- **Mathematics:** Linear Algebra, Calculus I & II, Differential Equations, Intro to Numerical Analysis.
- **Computer Science:** CS747 Foundations of **Intelligent and Learning Agents**, CS781 **Formal Methods in Machine Learning**, CS101 Computer Programming&Utilization, AE102 Data Analysis&Interpretation.

HOBBIES & EXTRA-CURRICULAR ACTIVITY

- Reading **Books, Research Papers**, Practicing Guitar Riffs, **Writing, Listening to Podcasts**, Dancing.
- Participated in AIDS'23(**Annual Insync Dance Show**) and Aero Department **Volleyball** Competition.