Chimata Anudeep

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Education

Birla Institute of Technology and Science, Pilani — Goa, India
Bachelor of Engineering in Computer Science — *Aug 2021 – Present*
Master of Science (Hons.) in Economics
Minor in Data Science
Cumulative GPA : 8.89/10.00

Rashtriya Indian Military College — Dehradun, India
Class 8 - Class 12 — *July 2016 - May 2021*

Experience

Machine Learning Research Assistant — May 2023 – July 2023
under Senior Scientist Dr. Kaushal Kishore — *CSIR CEERI,Pilani, India*

- Implement and adapt the CACLA algorithm for drone navigation within indoor environments.
- Fine-tune algorithm parameters and configurations to optimize navigation performance.
- Gather sensor data from the drone's onboard LIDAR and preprocess it for input to the algorithm.
- Define the state space, action space, and rewards system for the CACLA algorithm in the context of drone navigation.
- Develop a reward function that encourages safe and efficient navigation while avoiding collisions.
- Conduct systematic testing to evaluate the algorithm's performance in different indoor scenarios and against various challenges.

First Degree Teaching Assistant — Jan 2023 – May 2023
Security Analysis and Portfolio Management — *BITS Pilani K. K. Birla Goa Campus, India*

- Assist in organizing and coordinating logistics for exams, presentations, and group projects.
- Help maintain course-related records, attendance, and other administrative duties as needed.
- Assist students in using any relevant software tools or financial analysis platforms used in the course.

Projects

Seq2Seq Transformer from Scratch | *Python, PyTorch* — April 2023

- Gain a deep understanding of the Seq2Seq architecture and how it's used for tasks like machine translation, text generation, and more.
- Study the Transformer architecture, including self-attention mechanisms and encoder-decoder structures.
- Implement the core components of the Transformer model: the multi-head self-attention mechanism, feedforward neural networks, and positional encodings.
- Experiment with hyperparameters like the number of layers, hidden dimensions, attention heads, and batch sizes to optimize performance.

Semantic Segmentation using Mask-RCNN | *Python, PyTorch* — October 2023

- Developed expertise in semantic segmentation using Mask R-CNN for tasks such as image segmentation and object detection.
- Studied the Mask R-CNN architecture, understanding its components and how it integrates region-based convolutional neural networks for precise instance segmentation.
- Implemented key components of Mask R-CNN, including the backbone network, region proposal network (RPN), and segmentation masks generation.
- Explored and tuned hyperparameters such as anchor scales, aspect ratios, and ROI pooling to enhance the model's segmentation accuracy.
- Collaborated on real-world applications, adapting Mask R-CNN for specific use cases and optimizing its performance.

Image Segmentation using CLIP | *Python, PyTorch, Git* — April 2023

- Understand how CLIP is pre-trained on a large dataset to associate images and their textual descriptions.
- Determine how to adapt CLIP for image segmentation tasks.

- Define the loss function for segmentation and backpropagate the gradients through the model.
- Choose appropriate evaluation metrics for image segmentation, such as Intersection over Union (IoU) or pixel accuracy.

YOLOForge: Crafting Real-Time Object Detection from Scratch | *Python, PyTorch* October 2023

- Developed a comprehensive understanding of the YOLO architecture, known for its real-time object detection capabilities.
- Studied the components of YOLO, including its unique grid-based approach, anchor boxes, and how it handles object detection as a regression problem.
- Implemented the YOLO model, including the backbone network, detection head, and loss functions, from scratch using a deep learning framework such as TensorFlow or PyTorch.
- Experimented with different anchor box configurations, grid sizes, and model architectures to optimize object detection accuracy and speed.
- Contributed to enhancing YOLO's capabilities by exploring and implementing improvements such as YOLOv2 or YOLOv3.

Object Detection (SSD/Retina Net) | *Python, PyTorch* October 2023

- Implemented the SSD/RetinaNet architecture to perform efficient multi-class object detection.
- Preprocessed and augmented image data to create a diverse and representative training dataset.
- Fine-tuned the model on a selected dataset, optimizing hyperparameters and learning rates.
- Developed post-processing techniques to visualize bounding boxes and class labels on detected objects.

WolverineUnveiled: 3D Modeling with Neural Radiance Fields | *Python, PyTorch* October 2023

- Mastered the fundamentals of Neural Radiance Fields (NeRF) and their application in 3D scene representation and rendering.
- Delved into the mathematics behind NeRF, understanding concepts like volume rendering, ray marching, and how neural networks can model complex 3D scenes.
- Implemented NeRF from scratch, creating the neural network architecture to capture the volumetric representation of scenes using a deep learning framework like TensorFlow or PyTorch.
- Collaborated on the training process, fine-tuning NeRF to capture the intricate details of a 3D Wolverine model, considering factors like lighting, pose, and surface appearance.
- Optimized the rendering process, experimenting with parameters such as network depth, positional encoding, and view-dependent effects to achieve high-quality 3D reconstructions.

Technical Skills

Languages: Python, C/C++, SQL (Postgres), JavaScript, HTML/CSS, Java, Bash, MATLAB
Frameworks: PyTorch, TensorFlow, Django, Selenium
Developer Tools: Git, VS Code, Visual Studio, PyCharm, IntelliJ, Eclipse
Libraries: Pandas, NumPy, Matplotlib, NLTK, Seaborn