Kinjawl Bhattacharyya

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Education

Indian Institute of Technology, Kharagpur **Nov. 2020 – April 2024**
Bachelor of Technology in Electrical Engineering *CGPA 9.22/10.00*

Birla High School, Kolkata **2020**
Higher Secondary *98.0%*
Secondary *93.4%*

Relevant Coursework

MOOCs: Deep Learning Specialization, Neural Networks and Deep Learning, Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization, Structuring Machine Learning Projects, Sequence Models, Convolutional Neural Networks
University: Deep Learning: Foundations and Applications(AI61002), Artificial Intelligence: Foundations and Applications(AI61005), Stochastic Processes and Applications(MA20208), Probability and Statistics(MA20205), Programming and Data Structures(CS10003), Digital Electronic Circuits(EC21202), Analog Electronic Circuits(EC21207), Signals and Systems(EE21201), Advanced Calculus(MA11003), Linear Algebra, Numerical and Complex Analysis(MA11004).

Preprints / Under Review

- *Piyush Tiwary,* ***Kinjawl Bhattacharyya****, Prathosh AP,* ***"Boundary Preserving Twin Energy-Based-Models for Image to Image Translation,"*** **[Under Review]** **[PDF]**

Experience

Representation Learning Lab, IISc Bangalore **Apr. 2022 – Present**
Undergraduate Research Intern *Advisor: Dr. Prathosh AP*

- Conducted a comprehensive literature survey on the current state-of-the-art methods for unsupervised domain adaptation in medical images and few-shot unconditional image generation using GAN-based and energy-based models.
- Implemented and trained a Wasserstein GAN, utilising gradient penalty to enforce Lipschitz constraint, on a dataset of latent codes corresponding to images of baby faces on the latent space of a StyleGAN2 pre-trained on the FFHQ dataset. The WGAN training significantly reduced image generation times in the few-shot setting, previously done by inference-time optimisation of a mixer network, and maintained a decent FID score of 63.68 with the baby faces dataset.
- Implemented, trained and investigated the efficacy of CycleGAN in performing translations of the embeddings, corresponding to images from the ETIS-Larib dataset to those from the CVC dataset, in the latent space of StyleGAN2 pre-trained on the CVC colonoscopy dataset.
- Performed extensive experimentation with latent search on the latent space of a StyleGAN2 trained on source domain of REFUGE fundus dataset to generate images retaining the content of target domain by utilising various combinations of losses like SSIM, L2 and VGG perceptual loss and retaining the style of source domain by utilising combinations of losses like gram-matrix style loss and adversarial loss.
- Investigated the efficacy of image-to-image translation methods based on latent energy transport for performing domain adaptation utilising twin EBM architecture
- Compared and beat baselines for unsupervised domain adaptation on several medical imaging datasets obtaining Dice Scores of 74.44% on ETIS test set, 87.49% and 95.85% for Optical Cup and Optical Disc segmentation respectively on REFUGE test set and 74.90% on CT test set of MM-WHS dataset.

Projects

Conditional Affordance Learning | *Advisor: Dr. Sourangshu Bhattacharya* **Oct. 2021 - Jan. 2022**

- Performed the data collection task on the CARLA simulator by running a custom benchmark consisting of 262 pairs of poses with 2 different weather ids resulting in the collection of approximately 200,000 frames and associated vehicle and environment measurements.
- Performed the task of data preprocessing on the collected data using the Numpy and Pandas Python packages to yield 2 sets of annotation CSV files containing the frame locations and associated affordances.
- Trained a Conditional Affordance Learning(CAL) driving model on the above-preprocessed data. The model learns high-level features from each image using the VGG-19 network, which predicts 6 affordances utilising separate task blocks consisting of LSTMs, GRUs and TCNs.

Hand Gesture Controlled Bot | *Python, OpenCV, Mediapipe* **June 2021**

- Implemented a Machine Learning based hand recognition module using the mediapipe library, which returns a list of 21 detected landmarks from the image of a hand.
- Utilised the landmarks obtained from the above hand recognition module to design a set of recognisable gestures to control the movements of the bot.

Technical Skills

Programming Languages: C, C++, Python, Matlab
Specialized Libraries: PyTorch, Tensorflow, OpenCV, Keras, Scikit-Learn, Pandas, Matplotlib, Seaborn, Numpy
Developer Tools/Technologies: VSCode, Google Colab, Jupyter Notebook
Simulator Software: Simulink, Tina TI, LTSpice, FreeCAD, CARLA

Academic Achievements

- Offered Branch Change to Electrical Engineering at IIT Kharagpur after securing 9.7 GPA in theory subjects in first year.
- Secured an AIR of 1730 out of 150k candidates appearing in Joint Entrance Examination Advanced, 2020.
- Secured an AIR of 1640 out of 929k candidates appearing in Joint Entrance Examination Main, 2020.
- Ranked among the top bracket of students in the National Standard Examination in Chemistry.
- Achieved the second highest aggregate score(98%) in higher secondary examinations from my school.