

Mayukh deb

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DOB: November 9th, 2000

Education

- Expected 2023 **Bachelor's of Technology**, *Electrical and Computer Engineering*, ASE, Amrita Vishwa Vidyapeetham, Kollam, India. GPA: 8.93/10.0.
- 2016 - 2018 **Higher Secondary**, Amrita Vidyalayam, Kolkata, India. Marks: 93%.
- 2016 **Secondary**, Amrita Vidyalayam, Kolkata, India. GPA 8.8/10.0.

Areas of Interest

Deep neural networks, Data science, GANs, Adversarial Attacks, Deep-Dreams, Computer vision, Image processing

Experience

- May 2020 - **Google Summer of Code with INCF**
- August 2020 Worked with OpenWorm and trained multiple deep learning models for:
- Segmenting microscopic images of embryos to extract individual cells and other features
 - Generating images of embryos with GANs
 - Estimating the population of various lineages of cells within the embryo from videos
 - Predicting the curvature/muscle activity of a worm's body with time using LSTMs
 - Determining cell lineages within the C. elegans embryo from its position, size and age
- September 2020 - **Creator of Torch-Dreams**
- Torch-Dreams is a python library that makes deep neural networks more interpretable for research and art. It reveals the patterns that emerge from within NNs by "optimizing" activations of layers, channels or even single units.
- August 2020 - **Creator of DevoLearn**
- DevoLearn is a python library which helps accelerate data driven research on embryos with Pre-Trained deep learning models used for feature extraction directly from microscopic videos and images.
- July 2019 - **Member and mentor at amFOSS**
- present amFOSS is India's leading computer science club with over 50 passionate students who actively contribute to open source software

Relevant Projects

- December 2019 - August 2020 **Mind the bend** Made a car drive and stay on the road by itself in a simulation using a custom ensemble model and some automation using PyAutoGUI. The model was trained on custom data which comprised of images from two perspectives of the road for better performance https://github.com/Mayukhdeb/mind_the_bend
- February 2020 **Deep chicken terminator** This was a computer vision project where I tracked various animals in real time in the from the live feed of the player's perspective in the game minecraft. At the heart of this project was a deep learning model trained to classify animals in minecraft. <https://github.com/Mayukhdeb/deep-chicken-terminator>

- March 2020 - **Deep chicken saviour** Used adversarial attacks on the trained model from deep-chicken-terminator to break the tracking algorithm using FGSM. Generated "Adversarial blocks" within the game which were misclassified as animals by the model.
<https://github.com/Mayukhdeb/deep-chicken-saviour>
- April 2020
- August 2020 **Gradient Games** Wrote simple neural networks on numpy from scratch along with their backpropagation algorithms and visualized the weights as they trained to classify images.
<https://github.com/Mayukhdeb/gradient-games>
- January 2020 - **Adventures with augmentation** Worked on a custom dataset generated from a time-lapse video of the life cycle of a c.elegans worm. Trained a deep learning model which detects and classifies the embryo of the worm into 4 of its embryonic stages with an accuracy of over 98%
<https://github.com/Mayukhdeb/adventures-with-augmentation>
- March 2020
- April 2020 **Worm embryo classifier** Flask web-app where the user can drag and drop a microscopic image of a roundworm's (C.elegans) embryo to determine it's embryonic stage using deep learning.
<https://github.com/Mayukhdeb/worm-embryo-classifier>
- January 2020 **ECG heartbeat categorization** Worked on an ECG dataset and trained a deep learning model which helps derive medical inferences from ECG data of patients with an accuracy of over 97%
<https://github.com/Mayukhdeb/ECG-heartbeat-categorization>

Technical Skills

Programming	Python, C
Libraries	PyTorch, NumPy, SciPy, Pandas, OpenCV, PIL
OS	GNU/Linux, Microsoft Windows
Tools	Jupyter Notebooks, Git, conda
Web	FrontEnd- HTML, CSS
Development	BackEnd- Flask

Volunteer work and extra-curricular activities

- 2010 - 2018 **Black belt in kyokushin karate:** I've been a part of the martial arts class in my school and participated in multiple tournaments in Kolkata, India under the mentorship of Sensei Bejoy Dhara, branch chief and country representative for IKO Matsushima.
- 2016 - 2018 **Co-ordinated charity events to support villages:** I was one of the co-ordinators who helped put together events where students donated basic medical supplies and other utilities which were to be given to the poor and needy children in villages near Kolkata, India. This programme was a part of Mata Amritanandamayi devi's (Popularly known as "Amma") efforts to help the poor and the needy throughout the world
- 2016 - 2018 **Helped co-ordinate clean up drives in Kolkata, India as a part of "Amala Bharatam":** Volunteered on clean-up drives in Kolkata as a part of the "Amala Bharatam" programme under Mata Amritanandamayi Math
- 2019 **Volunteered for the crowd management team during AmritaVarsham:** I was one of the volunteers who helped in crowd management during AmritaVarsham (Amma's birthday celebrations).

Languages

English, Hindi and Bengali