Mainak Pal

Final Year Undergraduate · Jadavpur University

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Education

Jadavpur University — *West Bengal, India*

Bachelor of Engineering in Electronics and Telecommunication — *July. 2017 - PRESENT*

- CGPA : 8.6 (till 3rd year - 2nd Sem)

Mahesh Sri Ramkrishna Ashram Vidyalaya(H.S) — *West Bengal, India*

Higher Secondary Education — *2015 - 2017*

- Percentage Score – 89.4

Mahesh Sri Ramkrishna Ashram Vidyalaya(H.S) — *West Bengal, India*

Secondary Education — *2006 - 2015*

- Percentage Score – 92.6

Publications

A Generative Model Based Approach for Zero-shot Breast Cancer Segmentation Explaining Pixels' Contribution to the Model's Prediction

Interpretable Artificial Intelligence - A Perspective of Granular Computing, Springer-Verlag; PP 401-426 [PAPER] — *Apr. 2020*

- Preeti Mukherjee*, **Mainak Pal***, Lidia Ghosh, Amit Konar

Generative Model-driven Structure Aligning Discriminative Embeddings for Transductive Zero-shot Learning

[Expected Publication] Under review at Journal of Visual Communication and Image Representation, ELSEVIER [PREPRINT] — *Aug. 2019*

- Omkar Gune, **Mainak Pal***, Preeti Mukherjee*, Biplab Banerjee, Subhasis Chaudhuri

Multi-resolution Hierarchical Clustering by Vector Quantization — *Goa, India*

Accepted at International Conference on Cybernetics, Cognition and Machine Learning Applications(ICCCMLA 2019), Advances in Cybernetics, Cognition, and Machine Learning for Communication Technologies pp 243-249 [PAPER] — *Aug. 2019*

- **Mainak Pal***, Preeti Mukherjee*, Amit Konar

JU_ETCE_17_21 at SemEval-2019 Task 6: Efficient Machine Learning and Neural Network Approaches for Identifying and Categorizing Offensive Language in Tweets — *Minneapolis, Minnesota, USA*

Proceedings of the 13th International Workshop on Semantic Evaluation (SemEval-2019), pages 662–667 [PAPER] — *Jun. 2019*

- Preeti Mukherjee*, **Mainak Pal***, Somnath Banerjee, Sudip Kumar Naskar

* indicates equal contribution of the authors

Experience

Serre Lab, Brown University — *RI, USA*

Summer Research Intern Under Dr. Thomas Serre — *May 2020 - PRESENT*

- Computational Neuroscience

Xu Lab, Carnegie Mellon University

Remote Research Intern Under Dr. Min Xu — *Jan 2020 - Dec 2020*

- Computational Biology, Computer Vision

Vision and Image Processing Lab, IIT Bombay — *Mumbai, India*

Summer Research Intern Under Dr. Biplab Banerjee — *May 2019 - July 2019*

- Transductive Zero-shot Learning, Computer Vision

Artificial Intelligence Laboratory, ETCE Department, Jadavpur University — *West Bengal, India*

Undergraduate Research Assistant Under Dr. Amit Konar — *Apr 2019 - PRESENT*

- Machine Learning, Pattern Recognition, Cognitive Science

NLP Lab, CSE Department, Jadavpur University — *West Bengal, India*

Undergraduate Research Assistant Under Dr. Sudip Kumar Naskar — *Aug 2018 - Jun 2019*

- Natural Language Processing, Machine Translation

Projects

Data augmentation using GAN to improve Generalizability and Robustness of Finger-Induced Motor Imagery Classification — *Feb. 2021 - PRESENT*

Bachelor's thesis supervised by Dr. Amit Konar,JU ETCE

- Designed a generative network to generate synthetic fNIRS data that are very similar to original data.
- Designed an end-to-end paradigm to perform classification based on the image biomarkers for finger tapping tasks.

Automatic behavioral analysis of C.Elegans locomotion — *May. 2020 - PRESENT*

Summer Internship Under Dr. Thomas Serre, Serre Lab, Brown University

- Implemented autoregressive HMM and other statistical models to quantify and analyze worm locomotion.
- Working on various recurrent neural models to automate behavioral analysis of C.Elegans locomotion.

Computational Vision in Cryo-electron Tomography — *Jan. 2020 - Dec. 2020*

Remote Internship Under Dr.Min Xu, Xu Lab, Carnegie Mellon University

- Incorporated a wasserstein distance based metric and a domain critic to leverage adversarial domain adaptaion in Cryo-ET data of different SNR levels.
- Exploring various methods to extract information from tomographic data

Generative adversarial approach for unsupervised domain adaptation — *Nov. 2019 - Dec. 2020*

Remotely working Under Dr. Biplab Banerjee, VIP Lab, IIT Bombay

- Extending our previous work on ZSL in unsupervised domain adaptation. Working on various generative models to achieve better latent layer representation of multimodal visual feature space.

Zero-shot breast cancer segmentation — *Nov. 2019 - Mar. 2020*

Undergraduate Research Project Under Dr. Amit Konar,JU ETCE

- Trained the BiGan model on healthy data so that the trained model can construct nearest healthy samples from unhealthy data.
- Based on RISE model, we proposed a novel architecture for automatic segmentation of the tumor region from our previous understandings.
- Our approach is capable of segmenting tumors without using any unhealthy samples while training.

Transductive Zero-shot Learning — *May. 2019 - Jul. 2019*

Summer Internship Under Dr. Biplab Banerjee, VIP Lab, IIT Bombay

- Worked on the Transductive extension of Structure Aligning Discriminative Latent Embedding for Zero-Shot Learning.
- Exploring zero-shot application on various domains.
- Exploring implementation of various autoencoders on latent space and semantic space.

Vector Quantization Clustering

Mar. 2019 - Feb 2019

Undergraduate Research Project Under Dr. Amit Konar,JU ETCE

- In existing clustering algorithms, larger attributes have more contribution in the distance measure in comparison to the attributes of small values. Thus, attributes of smaller values even if differ by larger magnitude are not encountered in the clustering algorithms - causing false clustering.
- To overcome this problem, we have proposed an novel clustering algorithm based on quantization at each attribte level.
- Our approach performs better than state-of-arts and also computationally less expensive. We have worked on several gene-micro array datasets, breast cancer dataset. Proposed method is also helpful in time-series modeling.

Identifying and Categorizing Offensive Language in Social Media

Sep. 2018 - Feb. 2019

Undergraduate Research Project Under Dr. Sudip Kumar Naskar,JU CSE

- Sentiment analysis on a set of tweets .
- Explored multiprocessing.
- Explored different techniques of machine learning (like Logistic Regression , Linear SVC , LinearSVC with L1-based feature selection , Multinomial NB , Bernoulli NB etc.)
- Implemented several Deep Learning networks like CNN-word2vec , attention based Bi - RNN with LSTM

Other Projects

Independent Projects

- Perro Gato : An CNN based Image Classifier [CODE]
- Real-time 2D plot of Azimuth Plane using Ultrasonic Wave Sensor (HC SR04) [CODE] [DEMO]
- Approximate-Pi: Approximated the value of pi using Processing. [CODE] [DEMO]
- Cloud : A nodejs app deployed on Heroku aiming to help beginners finding Open Source projects. [CODE] [DEMO]
- [Py]Scanner : A real-time Document Scanner application using OpenCV written in python. [CODE]
- Mosom : A weather forecast app built in PyQt. [CODE]
- Shoot The Ball : A game developed using Processing and implemented the idea of processing.js. [CODE]

Skill-sets

Programming Languages , Python,C,C++,Matlab,Julia

Machine Learning and Deep Learning Techniques , Generalized Linear Models, Regularization Techniques, Decision Trees, Ensemble Models (Gradient Boosting, Random Forest, Voting Classifiers, etc), Convolution Neural Networks,Recurrent Neural Network, Clustering and Dimension Reduction

Data Science and Numerical Computation Libraries , Numpy, Scikit-Learn,Pandas, Matplotlib,Scypi,Gensim

Deep Learning Libraries , Pytorch, Keras, Tensorflow, Chainer

Operating Systems, Linux, Windows

Version Control, Git and Github

Typesetting Tools, Latex, Markdown

Languages, English (Professional Working Proficiency), Bengali (Native), Hindi (Professional Working Proficiency)

Responsibilities

IEEE Computer Society Student's Branch Chapter, Jadavpur University

Jadavpur University

Founder and Chairperson

Mar. 2019 - PRESENT

- The Computer Society of the JU, IEEE student branch aims to to be a leading provider of technical information, community services, and personalized services to the world's computer professionals. It is our goal to integrate our activities beyond the realms of competitive coding into the broader aspects of Computer Science.

IEEE Jadavpur University Student's Branch

Jadavpur University

Webmaster and Technical Lead

Feb. 2019 - PRESENT

- The Jadavpur University IEEE student branch, founded in 2010, belongs to the Kolkata section of Region 10 of the organization.
- Developed the homepage. [HOMEPAGE]
- Lead the technical team of 12 members. Technical team of the student branch is responsible for providing any kind of technical assistance during events.

Extracurricular Activity

IEEE TechX Congress: Eastern India Techno-Leadership Summit 2020 *Feb. 2020*

Technical co-lead

- Managed the technical team of 18 members.
- Developed the homepage for aforesaid event. [HOMEPAGE]

Think.AI : The IEEE Machine Learning Summit'19 *Apr. 2019*

Head Coordinator

- Two day workshop on Machine Learning organised by IEEE CS, Jadavpur University.
- Developed the homepage for aforesaid event. [HOMEPAGE]

Fantasy for Innovation (Srijan'19) *Feb. 2019*

Executive Committee Member

- Events organised by IEEE Student's Branch, JU at Srijan'19 (Techno Management Fest of Jadavpur University)

Electrophoria'18(Departmental Freshers') *Oct. 2018 - Nov. 2018*

Core Member of Web Development Team

- Developed the homepage for aforesaid event. [HOMEPAGE] [GITHUB]

Jadavpur University Code Club *Sep. 2017 - PRESENT*

Member

- A club aims to promote an atmosphere of competitive programming among fellow students of Jadavpur University.

Boeing National Aeromodeling Workshop IIT Kanpur, Kanpur *Nov. 2017*

Workshop participant

- Two day workshop on making an RC aeroplane.

Painting

5th year distinction holder in Applied Fine Arts at Academy of Fine Arts

- Extreamly interested in classical fine arts. Love to draw with pencil and charcoal.

References

Dr. Thomas Serre

thomas_serre@brown.edu

Associate Professor, Cognitive Linguistic & Psychological Sciences, Brown University

Dr. Biplab Banerjee

getbiplab@gmail.com

Assistant Professor, Centre of Studies in Resources Engineering (CSRE), IIT Bombay

Dr. Amit Konar

konaramit@yahoo.co.in

Professor, Electronics and Telecommunication Engineering, Jadavpur University

Dr. Sudip Kumar Naskar

sudip.naskar@gmail.com

Assistant Professor, Computer Science and Engineering, Jadavpur University