Ashesh Ashesh

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Kaggle: https://www.kaggle.com/silence2

Publications

(1) Ashesh, Florian; denoiSplit: a method for joint microscopy image splitting and unsupervised denoising. ECCV 24. https://ashesh-0.github.io/denoiSplit/
(2) Ashesh et al.; MicroSSIM: Improved Structural Similarity for Comparing Microscopy Data. BIC workshop, ECCV 24. https://ashesh-0.github.io/MicroSSIM/
(3) Ashesh et al.; µSplit: efficient image decomposition for microscopy data. ICCV 23. https://ashesh-0.github.io/uSplit/
(4) Ashesh et al.; 360-Degree Gaze Estimation in the Wild Using Multiple Zoom Scales. BMVC 21. https://www.bmvc2021-virtualconference.com/conference/papers/paper_0643.html
(5) Ashesh et al., Accurate and Clear Precipitation Nowcasting with Consecutive Attention and Rain-map Discrimination. AIES 2022, 1-41. https://journals.ametsoc.org/view/journals/aies/aop/AIES-D-21-0005.1/AIES-D-21-0005.1.xml

Education

PhD in Computer Science
Human Technopole, Milan, Italy
Affiliated to TU Dresden, Germany
2022 June - Currently
Research: Solving image decomposition task for microscopy data. The aim is to extract individual constituent channels (C1, C2) from the superimposed image X, where X = C1 + C2 + noise (Publications 1 & 3). Integrated Aleatoric and Epistemic uncertainty quantification. Also developed a variant of SSIM suitable for Microscopy data (Publication 2).

Code: Contributed to (a) MMCore, a C++ based open source code for interacting with microscopes and to pymmcore-plus, a SWIG enabled python binding to MMCore, (b) microsim, a light microscopy simulator, and (c) created a Python package predtiler for stitching tiled predictions.

B.Tech & M.Tech in Computer Science
Indian Institute of Technology Delhi
Delhi, India, 2010 - 2015
CGPA: 8
ML-related courses: Artificial Intelligence, Machine Learning, Special Topics in AI: Probabilistic Graphical Models, Computer Vision, Digital Image Analysis, Graph Theory.
Bio-related courses: Molecular cell biology, Modern biology for engineers, Biometry, Systems Biology, High Dimensional Biology, Intr. to Prac. Modern Biology.

Work Experience

Jul 2021 - Mar 2022

Pre-PhD, Jug Group, Human Technopole, Milan (Due to Covid induced VISA delay)

Structural noise removal from image using contrastive learning. Segregate noise from image content in the latent space. Used this latent space segregation to enable structural noise removal. Worked with notMNIST, CIFAR-10, and Places dataset. https://ashesh-0.github.io/structural_noise_removal/

Mar 2020 - Apr 2021

Research Assistant (Computer Vision) at CLLab, NTU, Taipei, Taiwan

3D Gaze estimation in unconstrained environments using both image and video frames as input. Full 360° variation in yaw handled using sine-cosine based target space transformation. Improved prediction on frontal gazes using a weighted predictive scheme. Robustness with respect to varying head sizes in images and extraction of features present at multiple magnification levels were handled jointly using multi-scale feature aggregation (Publication 4).

Extreme precipitation prediction for Taiwan region using Radar data. An Image-to-image translation network setup with GRU as recurrent units. Used adversarial learning to generate realistic rainmaps. (Publication 5)

Feb 2019 - Oct 2019

Data Science, Self Employed

Participated in 4 Kaggle competitions. Was in the **top 2-3 percent** in the last 2. Did 5 Coursera certifiable courses involving Deep learning.

Dec 2015 – Dec 2018

Data Scientist, Qplum Software Labs + Two Roads Technological Solutions, India

ML model for *portfolio*: Development of autoencoder-based market neutral strategy. Generated synthetic data to aid in training. It managed **5% of the portfolio** (Python).

ML model for *execution*: Development and analysis of multiple intraday execution algorithms and meta algorithms. Used regularized LR and traditional trading techniques like mean reversion, and momentum. **Daily $50K** was traded using my algorithms saving 1-2 bps (Python, C++).

ML data pipeline: Extraction and distributed processing of data from raw tick data files and web APIs. Used airflow and celery for distributed processing (Python).

Non data science projects involved

Conversion of sequential simulation engine to vectorized simulation engine. Achieved **5x speedup.**

Creation of Execution pipeline, Order routing server, and Reconciliation pipeline for multiple brokers (Python, C++).

May 2015 – Oct 2015

Software Developer, Readersdoor Pvt. Ltd, Delhi, India

Recommendation module for rooms and books. Scraping news content.

Projects

(M.Tech Project) Subcellular Regulatory Network Learning using MLN
Jul 2014-May 2015

A model that jointly learns the biclusters and links (activating and inhibiting) in the gene regulatory network using Markov Logic Networks on Halobacterium dataset of Inferelator. Used canopy clustering results as the initial state. With synthetic data, were able to show the limitations of our approach in terms of available data size and the complexity of the network.

(Kaggle Competition) Prediction of magnetic interactions between atoms in a molecule. Jul 2019-Aug 2019 Github link.

Ensemble of MPNN(message passing neural networks) and GBDT. Extensive feature engineering for GBDT was done. Reached in **top 3% of solutions**.

(Kaggle Competition) Predicting next month's sales of products in shops.
May 2019-Jun 2019 Github link.

Primarily feature engineering was done. Used PCA on top of TF-IDF on item names and shop names to get important features. Mean encodings, lagged features, city features, and several other features were created. Nearest neighbors was also used to create features. GBDT was used as a model. At submission time, the solution was in the **top 2%.**

Projects done in online courses

Guided projects done as part of Coursera courses.

- Computer Vision: Facial recognition, Face detection, Face generation using GANs, Image captioning, Car detection with YOLO algorithm, Art generation with style transfer.
- Bayesian Methods: Variational Autoencoder on MNIST dataset.
- Reinforcement learning: Approximate Q-learning on Cartpole, DQN on Atari, Advantage actor critic on atari.

- Done in 2019: deep learning in computer vision, practical reinforcement learning, Bayesian methods for machine learning, how to win a data science competition, introduction to deep learning.
- Done in 2017-2018: neural networks and deep learning, improving deep neural networks: hyperparameter tuning, regularization, and optimization, structuring machine learning projects, convolutional neural networks, sequence models.

Skills

Keywords: Computer Vision, Microscopy data, H-VAEs, Diffusion models.
Languages: Python, C++, Bash, SWIG.
Python Packages: pytorch, numpy, pandas.