

# ASHESH

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**Publication** 360-Degree Gaze Estimation in the Wild Using Multiple Zoom Scales  
[2020] <https://arxiv.org/abs/2009.06924>

**Experience** **Mar 2020 - Present**  
**Research Assistant (Computer Vision)**  
**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.
  - Achieved **state of the art performance** on two datasets: Gaze360 and RT-GENE (<https://arxiv.org/abs/2009.06924>).
- (Ongoing) Extreme precipitation prediction for Taiwan region using Radar data. Image-to-image translation network with GRU being used currently.

**Feb 2019 - Oct 2019**

**Data Science**

**Self Employed**

- Participated in 4 kaggle competitions (1-1.5 month each). Was in the **top 2-3 percent** in the last 2. Details in Projects section.
- Did 5 coursera certifiable courses involving Deep learning. Details below.

**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, 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** (Python).
  - 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.

**Education** **B.Tech & M.Tech in Computer Science**

**Indian Institute of Technology Delhi**

**Delhi, India**

**July 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

**Projects** **(M.Tech Project) Subcellular Regulatory Network Learning using MLN**

**Jul 2014-May 2015**

- A model which 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 initial state.
- With synthetic data, was able to show the limitations of our approach in terms of available data size and 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% solutions**.

**(Kaggle Competition) Predicting next month 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%**.

### On Uniqueness of Amino Acid (AA) composition In Proteins

Jan 2014-May 2014

- Hypothesis was that average AA composition completely determines the average protein length of that class and that AA composition is unique.
- Formulated a function for predicting protein length from AA composition. Eventually ***proved*** the hypothesis otherwise.

### 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](#).

### Certifiable Online courses (Coursera)

- **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

- Areas: Deep Learning, Machine Learning, Computer Vision, Reinforcement Learning, numpy, pandas, keras.
- Languages: Python, C++, Bash, C, Matlab, ruby
- Queues: Rabbitmq, Kafka.
- Task management: Celery, Luigi, Airflow, Sidekiq, Resque.
- Database: Mysql, Neo4j, Alembic.
- Others: AWS, Elasticsearch