Shayan Shafquat

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Education

MSc. Computational Neuroscience, Cognition and AI — Present | Nottingham, UK
University of Nottingham

Integrated MSc. Mathematics and Computing — Jun 2020 | Kharagpur, IN
Indian Institute of Technology, Kharagpur — CGPA: 7.2 / 10.0

Work Experience

Enkrypt AI, Inc | AI Research Consultant (Part-Time, Remote) — Boston, US | Jun 2023 – Sep 2023

- Developed a **malicious file scanner** for Python scripts and Jupyter notebooks, including reproducible threat analysis
- Conducted **survey** on ML and LLM Security, focusing on **prompt-injection attacks**, defences, and evaluation metrics
- Created an one-stop seamless solution for **securing**, monetizing, and maximizing the potential of **LLM applications**

ANI Technologies Private Limited (OLA) | Data Scientist — Bangalore, IN | Sep 2020 – Jan 2022

- **Pay after ride user identification**: Impact: Increased cashless ride by **5%** with no change in default rate i.e. **2.5%**
  - Labelled the trusted base of **0.5M** users based on the last ride reconciliation status or pending days
  - Improved and used feature store API to get user behaviour of **15M+** users prior to their last ride
  - Trained an **ensemble learning** (Balanced Bagging Classifier) on the trusted users with the AUC score of **0.91**
  - Predicted default probabilities for the non-trusted base and automated the pipeline by scheduling a weekly job, whitelisting **8.7M** users in the first iteration by limiting the overall predicted default rate
- **Improvements in peak pricing module**: Impact: Drop in the conversion prediction error from real by **2.2%**
  - Identified **hotspots** in cities to change peak accordingly in the region and its neighbouring geohashes
  - Learned distance based **paramters** to include intrip cabs in supply improving the allocation of cabs
  - Build a fallback model using **heuristic analysis** for peak-pricing to reduce the impact of outages
  - Used **regression** on the spatio-temporal data for cabs to **forecast** peak price for bike category
- **User level pricing**: Impact: **+1.5**% GMV/Bookings and improvements in net completion in the covid days
  - Learned the factor for each user based on their conversion hence improving the demand signal
  - Validated a hypothesis that of abrupt fare in the churn of a regular user using **control-test** group
- **Traffic lights optimisation**: Minimised wait-time for cars in road-network to mitigate congestion
  - Simulated the traffic scenario using **SUMO** framework and in-house cab-pings data (Baseline established)
  - Devised algorithms to optimise congestion locally and globally with fixed and dynamic traffic lights
  - Developed a **Deep Q learning** based **RL agent** on the environment with policies decreasing wait-time by **18.3**%
- **Others:** In-house utility-package (pyutilsds), Baseline model for next basket **recommendation** (Ola-Foods)

ANI Technologies Private Limited (OLA) | Research Engineer- Intern — Bangalore, IN | May 2019 - Jul 2019

- **Incentive optimisation for partners**:
  - **Feature engineered** each partner's behaviour utilising historical ride-related data of cities Pune and Kochi
  - Implemented **decision tree** on partner's data and incentives predicting their login hours to make **cohorts**
  - **Minimized** burn by **optimizing** the incentive for each of the cohorts with **constraints** on login hours

Technical Skills

Experience with: Python, C++, R, Git, Unity, AWS, Kubeflow, SQL, Linux, Bash, Hive, Spark, LaTeX, NEURON, OpenSourceBrain
Python Packges: Tensorflow, LangChain, LlamaIndex, Numpy, Pandas, Scipy, Sklearn, Scikit-learn, Seaborn, PyTorch, PyNeuroML, NLTK
Modelling: DQN, Dyna-Q, FineTuning, Transformers, RNN/LSTM/GRU, VAE, GANs, CNN, Gradient Boosting, Linear Regression, SVM

Projects

Machine Learning in Science | Coursework — University of Nottingham | Oct 2023 - Present

- Planning in autonomous drone navigation
  - Developed a 2D drone flight controller utilizing heuristic approaches and **RL framework** from scratch
  - **Parameter-tuned** heuristic approaches (rapid movement, stable landing) leading to **discretised** action space
  - Trained **DQN**, **Q-learning** and evaluated them on average steps taken, fuel consumption and average thrust
- Programming autonomous driving car
  - Developing models based on **transfer learning**, **neural attention** and **RL** predicting real-time speed and angle
  - **Deploying** the pre-trained model on the car to live test across **three tracks** and **12 driving scenarios**

Conversion of large-scale cortical models - INCF — Google summer of Code 2022

Mentor: Prof. Padraig Gleeson, Ankur Sinha | UCL London

- Verified and improved the original reduced multi-compartmental L5 pyramidal cell developed in **NEURON**
- Converted the multi-compartmental cell including channels, morphological and biophysical properties to **NeuroML**
- Validated, visualized, simulated the expected behaviour of the cell model and shared them on **Open Source Brain**

Computational Neuroscience - Neuromatch Academy — January 2022

- Implemented **epsilon-greedy** decision algorithm and a rule to model the **decision-making 2AFC** task in mice
- Explored agents based on **Q-learning**, Dyna-Q to solve the **cliff walking** problem and Quentin's world respectively

iFair - AI and Ethics — February 2020

- Learned a **generalized data representation** preserving **fairness-aware similarity** between individual records
- Developed the combined objective function involving **utility** and **fairness loss** and minimized that using L-BFGS
- Applied the method on two classification tasks of **Census** and **German credit** dataset with **gender**, **age** as protected group resulting in a gain of **3%**, **9%** in **consistency** (fairness) and a drop of **7%** and **1%** in accuracy respectively

Portfolio Optimization involving System of Linear Interval Equations — January 2020

Guide: Prof. Geetanjali Panda | Department of Mathematics | IIT Kharagpur

- Designed a problem of **portfolio optimization** involving equations of return, risk and utility with interval parameters
- Investigated and programmed the concepts of **regularity** in interval matrices as a necessary assumption condition
- Used **least squares** to obtain cost function for the problem and minimised that using iterative **gradient descent**

NLP research projects | Self-motivated — IIT Kharagpur | Dec 2018 - May 2019

- **Rumour detection in tweets**: Guide: Prof. Pawan Goyal | Department of Computer Science
  - Transformed tweets and comments using **one-hot encoding** on each character to feed as input for the **CNN**
  - Trained a CNN with label as named entities using **entity tagger tool**, finally obtaining the pre-final learned layer
  - Classified tweets by sequentially parsing the pre-final layer of the tweet and comments onto the **GRU** model
- **Hyperpartisan News Detection** | Competition: SemEval 2019
  - Implemented **Hierarchical Convolutional Attention Networks** for classifying articles on 5 classes of biasness
  - Implemented **Empath** model which analyzes articles on **lexical categories** using them for feature engineering

Relevant Coursework

- **Offline:**
  - Regression and Time series model
  - Data Structure and Algorithm
  - Neural Computation
  - Practical Biomedical Modelling
  - Computational Cognitive Psychology
  - Stochastic Process
- **Online:**
  - Linear Algebra by Prof. Gilbert Strang
  - Statistics for Applications by Prof. Philippe Rigollet

Achievements

- Eligible to receive the **INSPIRE** scholarship by the Ministry of Science and Technology for the undergraduate study
- Among the top 3 teams in the **EXL-EQ** case study competition, Top 40 teams selected worldwide in **SemEval** 2019
- Achieved **99.5** percentile score among 0.2M students who appeared in the **JEE** Advance examination
- Completed an **IEEE**-certified workshop implementing **Image Processing** techniques and algorithms
- Part of the Gold winning **Football** team in the Inter Hall Sports Championship for the year 2017 and 2019