(+91)-8588038790
Gurugram, India
satya29m3@gmail.com

Satyadwyoom Kumar

Satyadwyoom.com
github/satyadwyoom
linkedin/satyadwyoom

Education

University of Delhi (NSIT) **2018 - 2022**
B.E., Electronics and Communication Engineering
CVPSK Scholar (Awarded to top 10 students)
Thesis: Introducing temporally consistent weather conditions in aerial-videos using LSTM & Cycle-GAN.
Coursework: Computer Programming, Data Structures and Algorithms, Operating Systems, Pattern Recognition, Image Processing.

Professional Experience

OYO Rooms **2022 - Pres.**
Sr. Data Scientist
- Reduced operation costs by $28k/month, by developing a statistical model for dynamic pricing.
- Developed approach uses historically accepted and rejected prices by patrons to predict an acceptable price.
- Enhanced OTA (Agoda, B.com etc) booking realization from 15% to 35% using the same technique.
- Saved $12k spent on manual intervention by developing an automated checkin-denial RCA framework from customer escalations.
- Identified factors contributing to checkin-denials for each property, by segmenting properties basis price drops, discount stacking, overbooking, owner alignment (correlation with owner wallet balance), and payout settlement.
- Highlighted anomalous properties operating in premium category for improved customer experience through PCA and K-Means Clustering on C-Ex and Revenue metrics.

Dell **2022 - 2022**
Data Scientist
- Reduced TAT to check the competitiveness of Dell products w.r.t competitors from an avg. of 4-hrs to under 10-mins by engineering a Natural Language Processing technique.
- Engineered solution, employs Bag of Words (BoW) representation and cosine similarity to eliminate redundant terms from web-scraped data, thereby optimizing data for downstream tasks.
- Developed python based web crawlers for extracting product data from e-commerce platforms (Amazon, Walmart, Costco etc.).
- Optimized and debugged the data pipeline to fetch and transform data points available at an OLAP-Cube, used to train a multivariate regression model for solving a unit vs margin zero sum game.

Research Experience

University of British Columbia, Canada **2020 - 2023**
Dr. Apurva Narayan (Dept. Computer Science)
- Developed a GAN-based adversary that produces adversarial perturbations by maximizing the distance between probability distributions while maintaining diversity in the generated perturbations.
- Developed a certified defence framework with a novel gaussian noise addition procedure for defending black-box CNNs.
- Developed an iterative-algorithm which optimizes a latent vector utilizing GAN-Inversion principles providing vendors with item level visual modifications for improved user preference.
- Works published at **ICPR-2022, IEEE-IJCNN-2022**.

University of Delhi-(NSIT) **2021 - 2022**
Dr. Amit Singhal, (Dept. Electronics and Communication Engineering)
- Developed a Generative-AI approach to produce translations of different weather for a given aerial video.
- Heuristically modified CycleGAN (Deep-ResNet) architecture and introduced another discriminator (real/fake prediction) to compensate lack of images with varied weather conditions from aerial perspective.
- Incorporated LSTMs to solve for a more complex problem of generating temporally consistent videos of varied weather conditions.

National University Singapore **2021 - 2021**
Prof. Hongliang Ren, (Dept. Biomedical Engineering)
- Developed a lightweight multi-task learning model for robotic arm based surgical workflow recognition.
- Proposed method utilizes a pretrained ResNet18 with LSTMs to analyze robotic arm interactions over time.
- Our method gave individual attention to the physical parameters of both left and right arms of the robot.
- Work published at **Journal of Computer Methods and Programs in Biomedicine**.

IIIT-Delhi **2020 - 2021**
Dr. Arun Balaji Buduru, (Dept. Computer Science)
- Developed a blackbox optimized physical adversarial patch, capable of fooling driver state detection systems.
- Analyzed the effect of adversarial patches by performing a real-time vision based adversarial patch attack (security application).
- Implemented a Driver-State detection system utlizing multiple features such as driver facial expressions (using VGGNet) and hand orientation (using segmentation maps generated from Mask R-CNN).

Publications

1. **Kumar, Satyadwyoom** and Apurva Narayan. Introducing diversity in feature scatter adversarial training via synthesis. In *26th International Conference on Pattern Recognition (ICPR)*, pages 3069–3075. IEEE, 2022
2. **Kumar, Satyadwyoom** and Apurva Narayan. Towards robust certified defense via improved randomized smoothing. In *International Joint Conference on Neural Networks (IJCNN)*, pages 1–8. IEEE, 2022
3. Arnaud Huaulmé, Kanako Harada, Quang-Minh Nguyen, Bogyu Park, Seungbum Hong, Min-Kook Choi, Michael Peven, Yunshuang Li, Yonghao Long, Qi Dou, **Kumar, Satyadwyoom**, Hongliang Ren, et al. Peg transfer workflow recognition challenge report: Do multimodal data improve recognition? *Computer Methods and Programs in Biomedicine*, 236:107561, 2023

Projects

ChatGPT - Personal WhatsApp Message Responder
- Utilised Selenium to automatically open WhatsApp recent chats and fetch specific messages from chat.
- Further developed the ability to open specific chats or fetch messages from a particular person in a Group chat.
- Extracted messages are then used to generate a response using GPT-3.5. Generated responses sent to chat using Selenium.

Deep Reinforcement Learning For Control Problems
- Created self-working agents by utilizing Deep Reinforcement Learning.
- Developed agents could play soccer and tennis (Deep-Q-learning) by themselves or land a lunar lander (Cross-Entropy method).

Self Driving Car Simulation in Gaming Environment
- Collected 2+ hrs video data along with steering controls by driving a car in GTA San-Andreas.
- Initially trained a ResNet-18 model to predict movement controls to drive a car.
- Further utilized Deep-Q learning to improve the accuracy of predicted controls in the simulated car.

Reddit Flair Detector
- Developed and deployed a machine learning-based Reddit post flair (eg: politics/business etc.) detection web app on Heroku.
- Fetched 1500+ unique Reddit posts for a variety of flairs appearing when r/india is searched using praw Reddit Api.
- Employed preprocessing techniques: Stemming/Lemmatization to bring word tokens to their root form.
- Tested a variety of ML Models: Naive Bayes (f1: 65% Acc: 65%), Random Forest (f1: 67% Acc: 68%), Support Vector Classifier (f1: 68% Acc: 68%). Further improved the performance using BERT (f1: 75% Acc: 76%)

Mini-NLP Tasks - using Transformers
- Fine-tuned BERT leading to an improvement of 7% on sentiment analysis task for Airline-tweets.
- Transfer learnt GPT-2 to classify whether one text entails the other.

Crowd Counter & Self Driving RC Car
- Used an ESP8266 module in promiscuous mode to collect WiFi packets released by mobile phones to determine MAC-Addresses.
- Based upon the number of MAC-Addresses and a purge mechanism, crowd count is estimated.
- Employed ultrasonic sensors for obstacle avoidance and steering in a forward moving RC car.

Skills

Languages	Python, C++, R, LaTeX, SQL
Tools	Git, Matlab, Hive, Spark, Scrapy, Pandas, Numpy, Selenium, Matplotlib
ML/DL Frameworks	Pytorch, Tensorflow, scikit-learn, NLTK, HuggingFace
Hardware	Arduino, Raspberry-Pi
Interests	Adversarial ML, Explainability, Computer Vision, Recommendation Systems

Certifications

- **Applied Text Mining using Python.** — University of Michigan
- **Applied Machine Learning using Python.** — University of Michigan
- **Introduction to Data Science in Python.** — University of Michigan
- **Convolutional Neural Networks in TensorFlow.** — Coursera
- **Natural Language Processing in TensorFlow.** — Coursera
- **Improving Deep Neural Networks: Hyperparameter Tuning, Regularization & Optimization.** — Coursera
- **Introduction to Tensorflow for Artificial Intelligence, Machine Learning & Deep Learning.** — Coursera
- **Neural Networks and Deep Learning** — Coursera