Mohd Ayyoob

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WORK EXPERIENCE

Tata Consultancy Services
May 2021 to August 2022

Assistant System Engineer

Automated CI/CD pipeline development

- Created and managed automated deployments across various technologies such as Ant and Maven.
- Managed the branching and merging of code for a variety of technologies (Jenkins, Maven)

EDUCATION

Indian Institute of Science, Bengaluru
2022 to Present

Master of Technology (Computer Science) 7.0 GPA

Mahatma Jyotiba Phule Rohilkhand University, UP
2017 to 2021

Bachelor of Engineering (Computer Science) 8.61 GPA

PROJECTS

Generating Infinite Text: Shakespeare LLM

-Implemented **Generative Pre-Trained Transformer (GPT)** that takes text data as input and generates similar text as output.
-trained a GPT to be a **character-level language model** from scratch. Implemented a custom **Byte Pair Encoder (BPE)** tokenizer.
-Further trained a GPT to add numbers (inspired by GPT-3 paper)

Why Will My Question Be Closed? – Stack Overflow (SO)

Prof. Shirish K. Shevade (Deep Learning for Natural Language Processing Course)

-A tool to **pre-evaluate** the questions to be posted on SO, **classifying** whether a question gets closed after submission.
-Added functionality to provide the exact reason for the closure of question. Used **LSTM** and **BERT** Embedding to vectorize questions.
-Further applied **KNN** and **Random forests**. Achieved a **5% increase in accuracy** of binary classification (Open/Closed questions).

Neural Collaborative Filtering for Recommendation Systems

-Model to recommend a set of apparel products to a user using his past preference.
-Performed fusion of Generalized Matrix Factorization (GMF) and Multi-Layer Perceptron to perform collaborative filtering.
-Experimented with **VGG-16 ConvNet, Inception-based ConvNet,** and **IDF-Word2Vec** for image and text featuring.
-Achieved 0.66 **Hit Ratio (HR)** for MovieLens dataset

Auto Review Analyser (Sentiment Analysis)

Prof. Shirish K. Shevade (Deep Learning for Natural Language Processing Course)

-Developed a Deep Learning Model to automatically classify reviews based on their sentiments.
-Used various architectures to improve accuracy**.** Experimented with **GRU, biGRU, DAN, GRU+Attn.**
-Achieved final accuracy of 92.3% using **Word2Vec** word embeddings on the test set.

Human Activity Recognition (Kaggle Dataset)

Prof. Shirish K. Shevade (Applied Linear Algebra and Optimization Course)

-Model to identify a person's activity (6 activities) based on a trace of their movement using smartphone sensors (**Time series data**)
-Visualized activity groups using Principal Component Analysis **(PCA)**
-Employed different classification models like **Naïve Bayes**, **K-NN**, Support Vector Classifier (**SVC**), **Random Forest**, and **XGBoost.**
-Improved **accuracy from 0.90** to **0.95** using **Voting ensemble.**

RESEARCH WORK

Improving Reinforcement Learning Algorithms Using Physics Informed Neural Nets (PINN)
IISc Bangalore

M.Tech Research Project (ongoing) – Prof. Shalabh Bhatnagar
Jun 2023- Present

While Convolutional Neural Networks (CNNs) are powerful tools for encoding image observations in visual **Reinforcement Learning** (RL), successful algorithms often consider the encoders to be black boxes. We study the representation learning capabilities of the **CNN-based** encoders in the imitation learning framework and find the learned representations to be **sub-optimal**. Consequently, **we present a Fourier Neural Operator (FNO) based Encoder** to learn better representations from images by modeling the underlying partial differential equations (PDEs) governing the dynamics of the environment. Subsequently, we apply the **FNO-based encoders** to the online reinforcement learning setting. FNO encoder with the **Rainbow** algorithm **outperforms** several model-free and model-based algorithms in **the Atari100k benchmark** by obtaining **26.1% median Human Normalized Score (HNS),** a 10 points improvement in the absolute scale when compared to the **16.1% HNS of the Efficient Rainbow algorithm**. Additionally, upon using our FNO encoder with the PPO algorithm, we achieve SOTA results in the **autonomous driving task** in CARLA from just image observations.

SKILLS

Technical skills: Python, Keras, PyTorch, C++, Machine learning, Deep Learning, Algorithm Design, Latex, Gi

Soft Skills: Presentation, Event Organization, Public Speaking, Leadership, Teamwork.

ACHIEVEMENTS AND POSITIONS

Placement Coordinator, IISc 2022-Present
National level Awardee (TDCS, IEEE) *May 2019*