Rajan Kumar Soni | cs18s038

Indian Institute of Technology Madras
Placement Registration Number :
LinkedIn-Rajan
GitHub-Rajan Kaggle-Rajan

Education

Program	Institution	% /CGPA	Year of Completion
MS (Computer Science)	IIT Madras	7.53/10	2021
B. Tech (CSE)	MMMUT, UP	7.71/10	2018 Proof
XII Std (CBSE)	DLW Inter College	85.2%	2013 Proof
X Std (CBSE)	DLW Inter College	9.6/10	2011 Proof

Research Highlights and Objectives

Thesis work: HMMs are extensively used in many areas in machine learning, but we have **only predefined metric to compare two HMMs**. I proposed **a supervised metric**, where I used the graph neural network to come up with an algorithm which uses graphical characteristics of Hmms being compared. On FSDD dataset all existing algorithm reaches at max **35% accuracy**(predefined) whereas our metric gives ***85% accuracy.***

Projects

Course projects -

Machine Learning(Prof.Arun, IITM)

- **Implemented and analysed many ML algorithms:** Multiclass Bayes classifier | Bias variance, underfitting, overfitting analysis in regression | Logistic regression with RBF kernel | SVM for different kernel types | Decision Tree and Random Forest with hyperparameter tunning | K-nearest neighbour | PCA, KPCA | EM algorithm for Gaussian Mixture Model.
- **Data contest for predicting movie rating:** Task was to predict movie rating, given dataset we had to try different collaborative filtering like- Nearest Neihjbour model**.** Got best with Modified latent factor model. With **73% accuracy,** we achieved **11th rank** on Kaggle.

Deep learning(Prof. Mithesh Khapra, IITM)

- **Compressed Representation of Data using Restricted Boltzmann Machine (RBM):** Trained RBM using Contrastive Divergence (CD) algorithm to learn an n-dimensional hidden representation of 784-dimensional binary Fashion MNIST image dataset.
- **Text Transliteration using LSTM based Encoder-Decoder:** Performed English to Hindi Transliteration by training a bidirectional LSTM Encoder and 2-layered Decoder with attention mechanism with 52% accuracy.
- **Image Classification using Convolutional Neural Network (CNN):** Built a CNN using TensorFlow and trained it on a subset of ImageNet dataset for the classification of the images.

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Reinforcement Learning(Prof. Balaraman Ravindran, IITM)

- **Bandits:** Implemented and did the comparative analysis for the following bandit algorithms- Epsilon-greedy, soft-max, UCB1, Median.
- **RL algorithms comparative analysis:**

Implemented SARSA, Q-Learning, Sarsa Lambda which learns Q-values over states. and implemented policy gradient which directly learns policy over states and did the comparative analysis.

- **Four rooms and the cart-pole:**

Implemented SMDP-Q learning and Intra-option learning on Four room environment and found that Intra-option learning is sample efficient. Tried DQN for cart pole and successfully completed the task of an average 195 reward over 100 episodes in less than **200 episodes.**

Other Projects -

- Developed Website of Literary Club (The Editorial Board) of MMMUT. Proof Proof
- Developed Web app Lets meet. *Sep' 2018 – Oct' 2018* Proof

Course Work

Core Courses: Reinforcement Learning, Deep Learning, Pattern Recognition, Machine Learning, Probabilistic Graphical Model, Linear Algebra, Concepts in statistical learning theory
Elective: Linear Algebra and Random Process
Miscellaneous: Discovering Creativity

Professional Experience

- Research Scholar at Robert Bosch Centre for Data Science and Artificial Intelligence **(RBCDSAI)** IIT Madras. Proof *Jan' 19 - Present*
- Was **Software Engineer** Trainee HummingWave Technologies, Bangalore. worked on AWS(lambda services) and ios app development. Proof Jul' 18 – Dec' 18
  Developed backend of the project named **Annual Wellness Program** from scratch using AWS lambda functions and API Gateway to render the endpoints for frontend clients. Designed and architectured the data model and rest APIs for the same. Implemented the concept of **State Machine** by constructing the event matrix to handle the flow of data for different events and states in the project.
- Teaching assistant at IIT Madras for the Probabilistic graphical model course. Proof *Jan' 20 -Present*

Technical skills

Languages: Python, C, C++, Java, Html, CSS, JavaScript
Tools/FrameWork: Pytorch, Numpy, Pandas, Torch, scikit-learn, LATEX, Tensorflow, Pycharm Git, AWS, OpenAi

Positions of Responsibility

- Training and placement cell Coordinator at IIT Madras. Proof *Jan' 20 - Present*
- Executive member at The Editorial Board, MMMUT, Gorakhpur. Proof Proof *Jan' 15-May'18.*
- Mess secretary at MMMUT, Gorakhpur. Proof *Jul' 17-sep'17*

Online Courses / Training

- **Android Development:** HP Course *Mar'17- Apr'17*
- **Web Development**: Introduction to web development, NPTEL IIT Madras (Online). Proof *Sep 2016*

Scholastic Achievements

- Ranked among top 1.5% of the candidates who appeared for the GATE 2018. Proof
- Successfully solved Google Foo Bar Challenge up to Level-3. Proof
- Attended **CoDS-COMAD 2020** at Indian School of Business, Gachibowli, Hyderabad. *5th Jan' -7th Jan'* Proof

Extra-Curricular Activities

- Participated in E-yantra, a robotics competition organized by IIT Bombay. Proof
- NCC Cadet in 1 UP EME COY NCC. Proof
- Participated in Kavi Sammelan on the foundation day of MMMUT. Proof

Skills & Hobbies

Painting, Swimming, Singing, Dancing, Poetry, Sports