Rajan Kumar Soni |

Indian Institute of Technology Madras

LinkedIn-Rajan LeetCode-Profile Mob No.: 9839828806, 8318722672
GitHub-Rajan Kaggle-Rajan Email-Id: rajansoni424@gmail.com

Education

Program	Institution	% /CGPA	Year of Completion
M.S. By Research (CSE)	IIT Madras	8.00/10	2021
B. Tech (CSE)	MMMUT, UP	7.71/10	2018
XII Std (CBSE)	DLW Inter College	85.2%	2013
X Std (CBSE)	DLW Inter College	9.6/10	2011

Research Highlights and Objectives

- We propose two task-agnostic learnt embeddings for HMMs based onAutoencoders and Graph variational autoencoders in an attempt to effectively encode both the structure and behavior of HMMs in the embeddings learnt.
- We apply the learnt embeddings in the context of a representative computationally cheap and a compute-heavy clustering algorithm to showcase their validity.
- We have also analyzed the efficacy of the embeddings learnt in the context of a classification task.
- We also proposed and evaluated a supervised class-label aware embeddingfor HMMs by leveraging a Diffpooling based graph neural network in the event of a small amount of labelled data being available.

Research Publications

1. Rajan Kumar Soni, Karthick Seshadri, Balaraman Ravindran, *MetricLearning for comparison of HMMs using Graph Neural Networks* , **Submitted to ACML 2021.**
2. Rajan Kumar Soni, Karthick Seshadri, Balaraman Ravindran, *Exploring graph neural nets for representation learning: A case study in ergodic HMMs*, **Submitted to Graph Embedding and Mining workshop, ECML-PKDD 2021.**

Projects

Machine Learning

- **Data contest for predicting movie rating:** Task was to predict movie rating, given a dataset, we had to try different collaborative filtering like- Nearest Neighbour model**.** Got best with the Modified latent factor model. With **73% accuracy,** we achieved **11th rank** on **Kaggle**.

Deep learning

- **Text Transliteration using LSTM based Encoder-Decoder:** Performed English to Hindi Transliteration using Recurrent neural network..
- **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.

Reinforcement Learning

- **Bandits:** Implemented and did the comparative analysis for the following bandit algorithms- Epsilon-greedy, soft-max, UCB1.
- **Four rooms and the cart-pole:**
  Implemented SMDP-Q learning and Intra-option learning on a 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.
- Developed Web app “Lets meet”. *Sep’18 – Oct’18*

Course Work

Core Courses: Reinforcement Learning, Deep Learning, Pattern Recognition and Machine Learning, Probabilistic Graphical Model, Concepts in statistical learning theory. Operating system, Database management system
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. *Jan' 19 - Jun'21*
- Was a Software **Engineer** Trainee HummingWave Technologies, Bangalore. worked on AWS(lambda services) and ios app development. Jul' 18 - Dec' 18
  Developed the 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, Pattern recognition and machine learning and Introduction to C.

Technical skills

Languages: *Proficient* - Python *familiar* - C, C++, Java, Html, CSS, JavaScript, Sql
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. *Jan' 20 - Jun'21*
- Was Executive member at The Editorial Board, MMMUT, Gorakhpur. *Jan' 15 - May'18*
- Was Mess secretary at MMMUT, Gorakhpur. *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). *Sep 2016*

Scholastic Achievements

- Ranked among top 1.5% of the candidates who appeared for the GATE 2018.
- Successfully solved Google Foo Bar Challenge up to Level-3.
- Attended **CoDS-COMAD 2020** at Indian School of Business, Gachibowli, Hyderabad. *5th Jan'-7th Jan'*
- Successfully cleared HackerRank Python(Basic), Problem Solving(Basic) assessment.
- Presented research poster in Tenth RBCDSAI Workshop on Recent Progress in Data Science & AI, Annual Research Showcase. 29th May, 2021

Extra-Curricular Activities

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

Skills & Hobbies

Painting, Poetry, Dancing