

Naman Saxena

Linkedin ID: naman-saxena-718b7b175

Skype ID: Skype:live:.cid.6d38acb186dfa956

Gmail : namanofficial9@gmail.com

IISc Email : namansaxena@iisc.ac.in

Mobile : +91-9821114997

EDUCATION

- **Indian Institute of Science** Bangalore, India
M.Tech (Research), Computer Science and Engineering; GPA: 7.3/10 (12 Credits) *Oct 2020 - Present*
- **Jaypee Institute of Information Technology** Noida, India
B.Tech, Computer Science and Engineering; GPA: 9.5/10 (195 Credits) *Aug 2016 - July 2020*

TECHNICAL SKILLS

- **Reinforcement Learning:** Actor-Critic, Hierarchical, Average reward algorithms
- **Languages/ Framework:** Python, PyTorch, TensorFlow, C, C++, Scikit-learn, OpenAI Gym
- **Deep Learning:** Convolutional Neural Network, Transformer, Image Segmentation
- **Coursework:** Machine Learning, Linear Algebra, Probability, Reinforcement Learning

ACHIEVEMENTS

- **Graduate Aptitude Test in Engineering (GATE) 2020:** Ranked 222 out of 97481 candidates (99.77 percentile) in the Computer Science and Information Technology paper.
- **Graduation Rank:** Ranked 4 out of 538 students in the Computer Science and Engineering department in B. Tech.
- **AISSCE 2016 Physics Paper:** Among the top 0.1 percent of 528269 candidates appeared in the CBSE All India Senior School Certificate Examination 2016 Physics paper.

PROJECT WORK

- **Reinforcement Learning Algorithms:**
 - Successful implementation of Q-learning, SARSA, Advantage Actor-Critic, Proximal Policy Optimization (PPO), Soft Actor-Critic (SAC), Deep Deterministic Policy Gradient (DDPG), Twin Delayed DDPG (TD3), and Trust Region Policy Optimization (TRPO) algorithm.
 - Successful implementation of average reward policy gradient algorithm.
- **Q-learning with Signal Temporal Logic:**
 - Maze environment used with start and goal locations.
 - Trained agent using Q-learning to achieve conflicting goals with a preference for goals.
- **Question Answering System:**
 - The project aims to address long context question answering.
 - MS MARCO dataset for question answering is used.
 - **Longformer** model with sparse attention is used for answer span retrieval.
 - **BART** model is subsequently used for paraphrasing answers.
- **Recommendation System:**
 - Collaborative filtering-based recommendation system is implemented using **Graph Convolution Network**.
- **Generative Adversarial Network:** Trained Generative Adversarial Network on MNIST dataset.

RESEARCH WORK

- **Off-Policy Average Reward Algorithm:**

- The work proposes on-policy and off-policy average reward deterministic policy gradient theorems.
- Implemented actor-critic algorithm with deterministic policy using replay buffer and target neural network.
- Finite sample analysis is performed to show non-asymptotic convergence. (**Work done as the first author, Accepted at ICML 2023**).

- **Reinforcement Learning for Signal Temporal Logic using Funnel-based method:**

- This work proposes the use of funnel function-based reward shaping for robust satisfaction of Signal temporal logic (STL) specification.
- Deep Q-Network is used with non-stationary policy.
- Approach is able to handle convex predicate in STL specification. (**Work done as the first author**).

- **A Framework for Provably Stable and Consistent Training of Deep Feedforward Networks:**

- The work proposed a gradient clipping method to stabilize the training of neural networks using gradient descent.
- It has been theoretically proven that the proposed method stabilizes the training as well as reduces the variance.
- We show experimentally that our method can be used to remove the target network in Deep Q-Learning. (**Under review in journal**).

- **COVID-19 Infection Segmentation:**

- The work aims to detect the trace of COVID-19 infection in the lungs using image segmentation on chest CT-scan data.
- Used U-Net architecture and replaced decoder part using Xception network.
- Obtained a classification accuracy of 95.3 % (**Work done as first author, Published in 2021 IEEE 18th India Council International Conference (INDICON)**).

- **Cost Optimization based Adaptive Clustering algorithm (COBAC):**

- The work proposes an adaptive clustering algorithm to find a solution to illegal transshipment activities in the ocean.
- Clustering algorithm uses a gradient descent-based module to optimize cost function and find a near-optimal number of clusters.
- The approach works with a non-commutative distance function for clustering.
- Proposed algorithm takes one-tenth run-time compared to brute force version (**Work done as the first author, Under review in Wireless Personal Communications (Springer)**).

- **Twitter User Credibility Score:**

- Proposes two formulas for assigning a score to users based on their credibility on Twitter.
- The first formula is based on the propagation pattern of tweets of the user.
- The second formula is based on the user profile features as the rate of posting tweets, rate of increase in follower count, etc. (**Work done as the first author, Accepted at Information Processing and Management journal (Impact Factor: 7.446)**)