Pranav Agarwal

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Interests

Deep Learning, Reinforcement Learning, Robotics, Generative Adversarial Networks, TinyML

Education

Indian Institute of Information Technology Guwahati **G.P.A: 9.40/10**
Bachelors in Electronics and Communication Engineering *2015–2019*

Experience

INRIA RITS **Paris**
Supervised by: ***Dr. Raoul de Charette*** *Aug 2019–Mar 2021*

- Worked on Reinforcement Learning (RL) Algorithms (DDPG, TD3 and PPO) for Autonomous Driving.
- Implemented an OpenAI Gym like wrapper for CARLA Simulator to train and test different RL algorithms.
- Proposed a novel curriculum driven multi policy RL agent to learn to drive using only sparse rewards.

INRIA Flowers **Paris**
Supervised by: ***Dr. Natalia Díaz-Rodríguez*** *May 2019–Apr 2020*

- Worked on Image Captioning (IC) Algorithms (YOLO, NOC and DNOC) to caption Egoshots dataset.
- Proposed a new IC metric, Semantic Fidelity to evaluate diversity in image captioning models.

Singapore University of Technology and Design **Singapore**
Supervised by: ***Dr. Gemma Roig*** *May 2018–July 2018*

- Worked on Eccentricity Convolution Neural Network (ECNN).
- Compared the performance of ECNN on ImageNet and FaceScrub to the existing models like AlexNet.

Publication

Sparse Curriculum Reinforcement Learning for End-to-End Driving
- Proposed a sparse reward dependent end to end driving on navigation maps using curriculum learning.
- Our method discovers driving behaviour using simple binary rewards, generalizing to unseen tracks.
- Submitted to **IROS**, 2021

An ego-vision dataset and semantic fidelity metric to evaluate image captioning models
- Proposed a semantic fidelity metric to evaluate the diversity in image captioning models without labels.
- Relative to other metrics, our proposed evaluate the predicted captions without human annotated labels.
- Presented at **Machine Learning in Real Life Workshop ICLR**, 2020

Learning to Synthesize Faces using Audio clips for Cross Modal Bio-Metric matching
- Using generative networks, proposed cross-modal biometric matching, synthesizing faces using voice.
- Similar to neurological experiments, our work demonstrates dependence of voice and face attributes.
- Presented at **TENSYMP**, 2019

Fall Detection and Posture Recognition
- Proposed an end to end framework for Posture recognition and fall detection using machine learning.
- Deployed and tested the complete frameowrk in real life using Arduino and IMU sensors.
- Presented at **ICSTEM**, 2019. Awarded the **Best Technology Award** by Govt. of India.

Research Projects

Learning to play Connect 4 using Monte Carlo Tree Search
- Using different search based algorithms to play connect 4 on kaggle environment.
- Final approach proposed using Monte Carlo Tree Search achieved score in the top 30%.

Video Based Automatic Commentary System in Cricket and Soccer
- Real-time automatic commentary system (3 classes) using deep learning architectures.
- Scrapped and annotated data from Youtube videos
- Compared the performance of 3D CNN and CNN+LSTM models for action recognition on videos.

Combinatorial Optimization Using Conditional GANs
- Bin Packing and Knap Sack Problems has a wide range of applications.
- Proposed a novel approach using conditional GANs for solving 2D rectangular bin packing.

Awards

- Awarded the **President's Gold Medal** for graduating with highest GPA.
- Received the best **Technology award** by Government of India at Vibrant Gujrat-2019 (ICSTEM-2019).
- **Silver Medalist** at YUVAAN cricket - An Intra Collge sport's fest of IIIT Guwahati.
- **Winner** of ElectroWarFare - An Intra College Techno Fest event of IIIT Guwahati.
- **Merit certificate** for being in top 0.1 % (securing full marks) across India in standard XII exams.

Technical Skills

- **Programming Languages:**- Python, C, C++, Matlab, ROS
- **Software and tools:**- OpenCV in Python, Numpy, Scipy, Matplotlib, Carla, Git, Linux
- **Machine Learning Packages:**- Pytorch, Tensorflow, Keras.

Relevant Courses

Mathematics : Linear Algebra, Multivariate Calculus, Probability and Statistics
Computer Science : C Programming, Data Structures, Operating System, Computer Architecture
Robotics and AI : Image Processing, Machine learning and Pattern recognition, Advance Control System
Online Courses : Python Programming, Deep Learning, AI for Medical Diagnosis, Algorithms

References

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