Ayush **Jain**

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Research Interests

My primary research interest lies in Computer Vision. I am also interested in the intersection of Computer Vision with NLP and reinforcement learning, which when combined could lead to several useful real-world applications.

Education

Year	Degree	Grade	Rank
2017-2021	B.E. (Hons.) in Computer Science, BITS Pilani, Pilani Campus	9.25 / 10.0	Department Top 10%
2015-2017	Senior Secondary, Modern International School	95.4%	State Top 3%

Academic and Industrial Research Experience

May 2019 – Present | **Carnegie Mellon University (CMU) | Research Associate, Pittsburgh, USA**

- Working on enabling an embodied agent to learn about objects without ground truth supervision in an unseen 3D environment just by moving around.
- Working towards my bachelor thesis as part of the present research work

August 2019 – May 2020 | **MultiCog Research Group | Computer Vision Research Assistant, Pilani, India**

Project Page Code Paper Preprint

- Implemented **retinanet** from scratch and developed an aerial object detection pipeline in Tensorflow.
- Achieved **about 10%** increase in mean average precision than baseline retinanet model
- Achieved **top performances in ECCV 2020** Aiskyeye Object Detection Challenge obtaining **14%** better performance than their baseline model. (Paper in submission)

May 2019 – August 2019 | **Indira Gandhi Center for Atomic Research | Research Assistant, Chennai, India**

Project Page Code Paper Preprint

- Preprocessed **7000 PDF** Nuclear research papers to build **first nuclear language dataset - NText**
- Built **NQuAD(Nuclear Question Answering Dataset)** consisting of 730 Q/A.
- Achieved F1 score of **93.87** and exact match score of **88.31** a 1.22 improvement on former and 5.21 revision on latter from Google's BERT model. (Paper in submission)

Publications and PrePrints

2020 **Jain, A.***, Sarch, G.*, Fang, Z.*, Harley, A., Fragkiadaki, K., 2020 "Seeing by Moving : Towards Self-Supervised Amodal Object Detection" (submitted to CVPR)

2020 **Jain, A.***, Ramaprasad, R.*, Narang, P., Mandal M., et al., 2020 "AI-Enabled Object Detection in Unmanned Aerial Vehicles for Edge Computing Applications." (submitted to IEEE comsoc)

2020 **Jain, A.**, Ramaprasad, R., Narang, P., Mandal M., et al., 2020 "VisDrone-DET2020 : The Vision Meets Drone Object Detection in Image Challenge Results. European Conference on Computer Vision (ECCV)" (Challenge Report, in Press)

2020 **Jain, A.***, Meenachi, N.M. and Venkatraman, B., 2020 "NukeBERT : A Pre-trained language model for Low Resource Nuclear Domain." arXiv preprint arXiv:2003.13821 (2020). https://arxiv.org/abs/2003.13821

Project

Towards Learning Spatial Common Sense Through Weak Supervision : A Comparitive Study 2019 - 2020

Report Presentation

Reviewed, compared and analysed three recent papers proposed in generalising to novel views through the use of view-prediction self-supervision tasks as part of a course project. The report received special mention from course supervisor.

Named Entity Recognition from scratch 2019-2020

Code Presentation

Built multilayer perceptron network for Named Entity Recognition on CONLL2003 dataset from scratch, implementing backpropagation and gradient checking. Implemented Synthetic Minority Oversampling Technique to mitigate class imbalance issues, achieving 6 point gain in F1 scores.

ABB Robot Simulation 2019-2020

Cursive Alphabet Block Alphabets Curved Design

Built simulation of various tasks like writing a cursive and block alphabets on a paper and building complex curved designs using AutoPath, which is finally executed on a real ABB Robot

Earthquake Prediction and Management 2018-2019

Code Video

Implemented Rundle et al.'s research paper for probabilistic prediction of earthquake based on nowcasting. Using the previous nowcast points, a CDF is formed, using which probability of next big earthquake is predicted. This project was made under the guidance of **Dr. Sumanta Pasari**. and received **award from Microsoft**

Teaching and Leadership Roles

2019-20	Teaching Assistant, Artificial Intelligence at BITS PILANI
2019-20	Teaching Assistant, Machine Learning at BITS PILANI
2019-20	Team Leader, Microsoft Student Partner, BITS Pilani
2018-20	Teaching Assistant, Computer Programming at BITS PILANI

Course Work

On Campus	AI[1], Machine Learning[1], Foundations of Data Science, Robotics, Selected topics in CS(CV and NLP)[1]
Online	Machine Learning(Stanford), Deeplearning Specialization, CNN for Visual Recognition(Stanford), NLP with Deep Learning(Stanford), Reinforcement Learning Specialisation, Multi View Geometry (Prof. Cremers)

Awards and Scholarships

2019-20	**Google AI Summer School** 1/50 students across India selected for Google AI summer school
2019-20	**York CVR – VISTA Vision Science Summer School** 1/50 students selected worldwide
2018-20	**Institute Merit Scholarship** Awarded to top 3% students for Exceptional Academic Performance
2018-19	**Flipkart Machine Learning Hackathon (Level 1)** 2nd position in university and 33rd position nationwide
2017-18	**Mcrosoft Codefundo++ Hackathon** Placed 3rd/150+ teams on campus
2016-17	**KVPY Scholar** A national level drive for adjudging high research potential
2016-17	**National Science Examination in Physics (NSEP) Fellow**

Technical Expertise

Programmation	**Python C**, **C++**, Java, HTML, CSS
Frameworks	**Pytorch**, **Tensorflow**, Django
Operating Systems	Linux, Mac OS, Wnidows 7/8/10

References

Dr. Katerina Fragkiadaki, Asst. Prof., Machine Learning Dept., Carnegie Mellon University; katef@cs.cmu.edu
Dr. Pratik Narang, Asst. Prof., Computer Science Dept., BITS Pilani; pratik.narang@pilani.bits-pilani.ac.in
Dr. N.M. Meenachi, Scientist, Indira Gandhi Center for Atomic Research; meenachi@igcar.gov.in

1. Course Topper