

Sarthak Ahuja

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EDUCATION

CARNEGIE MELLON UNIVERSITY
SCHOOL OF COMPUTER SCIENCE
MASTERS IN ROBOTICS
Exp July 2020 | Pittsburgh, USA
GPA 4.22/4.33

IIIT-DELHI

B.TECH. IN COMPUTER SCIENCE
May 2016 | Delhi, India
GPA 9.1/10.0

TECHNICAL SKILLS

Github: <https://github.com/thecoldviews>

Languages: Python, C++, MATLAB, Java

ML Tools: Spark, Pandas, scikit-learn

Deep Learning: Pytorch, Tensorflow

Robotics: ROS, OpenCV, V-REP, PCL

Platforms: SPSS, AWS, Android Studio

OS: Linux, Windows

PUBLICATIONS

- **Interactive POMDPs for Social Decision Making with Dynamic Focus on Agents**

Vallam, R., Ahuja, S., et al. | **AAMAS 2019**

- **Similarity Computation Using the Semantic and Syntactic Structure among Jobs Titles**

Ahuja, S., Mondal, J. et al. | **ICSOC 2017**

- **Visual Summarization of Social Media Events Using Mid-Level Visual Elements**

Goel, S., Ahuja, S., et al. | **ACMMM 2017**

- Visit [Google Scholar](#) for the complete list.

PATENTS

- **Candidate Selection Using a Gaming Framework** (2019)

Pub. No. **US20190188646A1**

- **Triplet Representations to Assess Similarity Between Job Description Documents** (2019)

Pub. No. **US20190197482A1**

COURSEWORK

Machine Learning

Computer Vision

Deep Reinforcement Learning

Deep Learning for Computer Vision

Data Structures and Algorithms

Planning for Robotics

AWARDS

- Recipient of the **GSA Conference Funding** for presenting research at **AAMAS (2019)**

- Recipient of the **J.N. Tata Scholarship** for pursuing higher education (2018)

- Recipient of the **Manager's Choice Award** at IBM Research India (2017)

- Recipient of the **Gold Medal for All-Round Performance** at IIIT-Delhi (2016)

WORK EXPERIENCE

THE ROBOTICS INSTITUTE (CMU) | GRADUATE RESEARCH ASSISTANT

Jan 2019 - present | Pittsburgh, USA

- Proposed object-conditioned multi-view CNNs to predict, a priori, the resulting stability of partially occluded cluttered scenes and guide a robot in safely extracting objects.
- Developed a data-simulation pipeline using MuJoCo to generate synthetic data for training the model and used domain randomization to transfer it to real-world scenes.
- Delivered a real-time pipeline for object detection using Mask-RCNN and accomplished object-correspondence across multiple-views using deep feature matching.
- Successfully demonstrated an overall reduction in the manipulation failure rate around careful object selection by **15%** on our collected dataset (under review at **IROS 2020**).

IBM RESEARCH LAB | RESEARCH ENGINEER - MACHINE LEARNING (ML)

July 2016 - July 2018 | Delhi, India

- Spearheaded the design of the Apache Spark based ML component for **Watson Recruitment** - an AI powered job application tracking and candidate matching system.
- Collaborated with 3 remote teams and wrote the complete software stack for real-time resume processing, cloud data management, model training and model deployment.
- Introduced a document matching algorithm that used domain-specific hierarchical representations to out-perform LDA/Doc2Vec baselines on our proprietary datasets.
- Developed a dynamic particle allocation method for resource efficient modeling of nested belief states of agents participating in a public goods game.
- Achieved an early stage improvement of **16%** in the running mean-square error in simulated games. Presented the research work at **AAMAS 2019** and filed one patent.

PRECOC RESEARCH GROUP (IIIT-DELHI) | RESEARCH ASSOCIATE

May 2016 - July 2016 | Delhi, India

- Developed an unsupervised discriminative clustering method that used iteratively trained SVMs for patch-based visual summarization of social media events.
- Reduced the search space for user queries (by **99%**) all the while maintaining a high coverage and interpretability that was verified through a user-study.
- Presented the resulting paper at **ACM Multimedia 2017** in Mountain View, USA.

SWARATH RESEARCH GROUP (IIIT-DELHI) | RESEARCH INTERN

May 2015 - July 2015 | Delhi, India

- Designed and developed the ROS infrastructure (design patterns, test suite, topics, messages) for the perception system of a drive-by-wire autonomous E-rickshaw.
- Implemented multiple monocular SLAM algorithms such as LSD-SLAM and ORB-SLAM and rigorously tested their effectiveness on a collected dataset of Indian roads.
- Delivered workshops on ROS, Git and C++ to 40 junior interns and mentored them in developing perception algorithms for pedestrian and lane detection - leading to our team's qualification for the **Mahindra Driverless Car Challenge**.

SELECTED PROJECTS

- **Informed Multi-Representation Multi-Heuristic A* (CMU):** Used Conditional VAEs to learn a sampling distribution over state expansions on subsets of the state-space to better control expansions from corresponding queues. [\[link\]](#)
- **Assistive Sketching and Animation (CMU):** Developed an end-to-end platform which assists an artist to draw and animate complex non-convex 2D characters using distance-transform based skeletonization and shape-aware deformations. [\[link\]](#)
- **Stance Detection in Tweets (CMU):** Implemented a heuristic-based semi-supervised learning approach, LDA2Vec, that combines the benefits of Para2Vec and LDA by learning a coherent and interpretable embedding of topics. [\[link\]](#)
- **Speech-Based Distress Detection over Mobile Devices (IIIT):** Implemented a two-stage supervised learning algorithm to detect distress activity on a user's mobile device and predict occurrence patterns over crowd-sourced real-time data. [\[link\]](#)
- **Multi-Sensor Data Fusion for Ego-Centric Human Activity Recognition (IIIT):** Created a system for sensor fusion between accelerometer data from a smart watch and structured optical flow from an egocentric cameras for human activity detection. [\[link\]](#)