

CONTACT INFORMATION	Working remotely from Washington, WA	sarthakahuja.org sarthakahuja[at]outlook[dot]com
EDUCATION	<b>Robotics Institute, Carnegie Mellon University</b> , Pittsburgh Master of Science, Robotics, <i>GPA 4.24/4.33</i> Aug. 2018 - Aug. 2020 <b>Courses:</b> Computer Vision, Machine Learning, Visual Learning and Representation, Planning for Robotics, Deep Reinforcement Learning <b>Thesis:</b> Visual Assessment for Non-Disruptive Object Extraction <b>Indraprastha Institute of Information Technology</b> , Delhi Bachelor of Technology (Honors), Computer Science, <i>GPA 9.1/10.0</i> Aug. 2012 - May 2016	
EXPERIENCE	<b>Machine Learning Engineer II, Amazon Alexa AI</b> Aug. 2020 onwards Member of the dynamic routing science team in the <b>Natural Understanding</b> org building automated and scalable self-learning ML systems that predict and dynamically route user intents to appropriate Alexa actions. <b>Graduate Research Assistant, Robotics Institute</b> Oct. 2019 to Aug. 2020 Master's thesis research advised by Prof. Henny Admoni and Prof. Aaron Steinfeld. Worked on improving a robot's self-assessment capabilities - particularly reasoning about the effects of a robot's actions on the operating environment; learning vision-based physics intuition models that guide robots to conduct safe manipulation decisions. <b>Research Software Engineer, IBM Research India</b> July 2016 to July 2018 Member of the <b>Collaborative AI</b> team. Lead developer and researcher for <b>IBM Watson Recruitment</b> , a real-time data analytics platform that shortlists the most qualified candidates for a given job. Research focused in the domains of natural language processing (dynamic taxonomy generation and semantic similarity computation) and multi-agent systems (human behavior modeling in repeated social dilemmas). <b>Research Associate, PreCog Research Group, IIIT-Delhi</b> May 2016 to July 2016 Advised by Prof. Ponnurangam Kumaraguru. Developer on Project-O, Precog's social media analytics platform. Research focused in the domain of social systems and computer vision - particularly on patch-based visual summarization of social media events using discriminative learning. <b>Research Intern, Infosys Center for AI, IIIT-Delhi</b> May 2015 to July 2015 Core member of IIIT-Delhi's Autonomous Car Team - <b>Swarath</b> . Led a team of two, to design and develop the car's perception system; explored and deployed multiple SLAM algorithms for visual positioning and navigation using wearable and vehicle dashboard monocular cameras.	
SELECTED PEER-REVIEWED PUBLICATIONS	<ul style="list-style-type: none"><li>- Newman, B*; Biswas, A*, <b>Ahuja, S.</b>, Girdhar, S; Kitani, K; Admoni, H.; Examining the Effects of Anticipatory Robot Assistance on Human Decision Making, <b>International Conference on Social Robotics (ICSR) 2020</b></li><li>- <b>Ahuja, S.</b>, Admoni, H., Steinfeld, A.; Learning Vision-Based Physics Intuition Models for Non-Disruptive Object Extraction from Clutter, <b>International Conference on Intelligent Robots and Systems (IROS) 2020</b></li><li>- Vallam, R., <b>Ahuja, S.</b>, Chaudhuri, R., Sajja, S., Pimplikar, R., Mukherjee, K., Parija, G.; Interactive POMDPs for Social Decision Making with Dynamic Focus on Agents, <b>Proceedings of the International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS) 2019</b> (pp. 674-682)</li><li>- Goel, S., <b>Ahuja, S.</b>, Subramanyam, A., Kumaraguru, P.; #VisualHashtags: Visual Summarization of Social Media Events Using Mid-Level Visual Elements, <b>Proceedings of the ACM International Conference on Multimedia (ACMMM) 2017</b>, (pp. 1434-1442)</li></ul>	
SELECTED PATENTS AND APPLICATIONS	<ul style="list-style-type: none"><li>- <b>Ahuja, S.</b>, Mukherjee, K., Mondal, J., Singh, S.; App-lause - Automatic Audience Generation and Simulation for Immersive Rehearsals <b>U.S. Patent No. 10970898</b> (Granted 2021)</li><li>- <b>Ahuja, S.</b>, Singh, S., Parija, G., Chaudhuri, R., Kuchhal, M., Kataria, M.; SIdéal: System and Method for Attribute Weight Induction in a Multiple Recruiter Setting Exploiting Public Goods Games Framework, <b>U.S. Patent Application No. 15/842,066</b> (<i>pending</i>)</li><li>- George, D., Mondal, J., Singh, S., <b>Ahuja, S.</b>, Medicke, J., Klabzuba, A.; System and Method to Produce Generalized Representation of Job Description Documents and Calculate Similarity Using the Representation in Recruitment Domain, <b>U.S. Patent Application No. 15/854,837</b> (<i>pending</i>)</li></ul>	

SELECTED  
PROJECTS

**Informed Multi-Representation Multi-Heuristic A\***

- Implemented an informed version of MRMHA\* that uses past plans to control future state expansions; Used Conditional-VAEs to learn a sampling distribution (Ichter et al. ICRA 2018) over state expansions on subsets of the state-space to better schedule expansions from their corresponding queues.

**Assistive Sketching and Animation Using Shape-Aware Moving Least Squares Deformations**

- Developed an end-to-end sketching platform which assists an artist to draw complex non-convex 2D characters and dynamically animate them using a Kinect; Implemented drawing tools using bezier curves, distance-transform based skeletonization, and shape-aware deformations (Sharma et al. SA 2015).

**Semi-Supervised Stance Detection in Tweets**

- Implemented a heuristic-based semi-supervised learning approach, LDA2Vec (Moody CoNLL 2016) for stance detection that learns a coherent and informed embedding comparable to Para2Vec, concurrently bolstering interpretability of topics by creating representations similar to those in Latent Dirichlet Allocation.

**Deep Learning Based Dynamic Taxonomy Generation**

- Developed a semi-supervised learning approach for dynamically generating a large taxonomy over a large dataset of keywords; Proposed a novel LSTM based architecture that learns over random branches of a small seed taxonomy and uses the trained model to place unseen words under an appropriate parent word.

**Speech-Based Distress Detection**

- Created an android application that uses a two-stage contextual supervised learning algorithm (Sharma et al. TASLP 2015) to robustly detect speech based distress activity in urban spaces; Developed a web dashboard to monitor the generated alarms and mine for large-scale occurrence patterns in real-time data.

**Multi-Agent Path Planning (MAPP) for Warehouse Butlers**

- Hacked an implementation of Pacman to create a simulator with multiple robots trying to reach their resp. goals simultaneously. Implemented a Multi-Agent Path Planning Algorithm (Wang et al. ECAI 2010) and analyzed characteristic warehouse designs and how they affect the quality of the generated plans.

**CoDrive: Crowd Sourced Memory Sharing**

- Built a crowd-sourcing based android application to allow temporary sharing of phone memory space among peers easily and securely.

ACADEMIC  
SERVICE

- Reviewer, Conference on Information and Knowledge Management 2019
- Reviewer, International Conference on Robotics and Automation 2021
- Reviewer, International Conference on Intelligent Robots and Systems 2021
- Reviewer, IEEE Robotics and Automation Letters 2021

WORKSHOPS  
ATTENDED

**International Institute of Information Technology**, Hyderabad  
Summer School, Deep Learning in Computer Vision

July 2016

SELECTED  
HONORS AND  
AWARDS

- Nominated for Best Student Paper at IROS 2020 for the paper “Learning Vision-Based Physics Intuition Models for Non-Disruptive Object Extraction from Clutter”.
- Awarded the Graduate Student Conference Funding by the Graduate Student Assembly and the Provosts Office to present research at AAMAS 2019.
- J.N. Tata Scholar - Awarded the J.N. Tata Scholarship 2019 for pursuing graduate studies at CMU.
- Runners-Up, Space Innovation Challenge 2018, CMU Tepper School of Business.
- Winning Team, Consensys Award at HackInOut 2017, for the developing “VoteChain - Blockchains for Decentralized Elections”.
- Awarded the IBM Manager’s Choice Award 2016.
- Awarded the **All Round Performance Medal** for outstanding overall performance in curricular and extra-curricular activities in the B.Tech. (CSE) program 2016.
- First Prize in the Technical Paper Presentation event at Cogenesis 2016, Delhi Technological University for “Multi-Sensor Data Fusion for Human Activity Recognition”.
- Best Demo Award in the Elevator Pitch Event at IIIT-Delhi Research Showcase 2015 for “Distress Detection”.

TEACHING  
EXPERIENCE

**Teaching Assistant**

- 46-891: Mining Unstructured Data, CMU Fall 2018
- CSE344/544: Computer Vision, IIIT-Delhi Winter 2016
- CSE201: Advanced Programming, IIIT-Delhi Monsoon 2015
- CSE102: Data Structures and Algorithms, IIIT-Delhi Winter 2015
- CSE101: Introduction to Programming, IIIT-Delhi Monsoon 2014