Varun Agrawal | CV

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Education

Georgia Institute of Technology — **Atlanta, GA**
PhD Robotics Candidate, School of Interactive Computing — *2017–Present*
Advisor: Dr. Frank Dellaert

Georgia Institute of Technology — **Atlanta, GA**
MS Computer Science — *2019*
Specializing in Computational Perception, Robotics, & Machine Learning
Thesis: Visual Attribute Labeling of Images, Advisor: Dr. James Hays

National Institute of Technology — **Surat, India**
B.Tech (magna cum laude), Computer Science and Engineering — *2013*
Thesis: A Fast Facial Expression Recognition System, Advisor: Dr. M. A. Zaveri

Publications

Constraint Manifolds for Robotic Inference and Planning	*ICRA 2023*
Proprioceptive State Estimation for Legged Robots with Kinematic Chain Modeling	*Humanoids 2022 (Oral)*
Deep IMU Bias Inference for Robust Visual-Inertial Odometry with Factor Graphs	*RAL 2022*
Continuous-time State & Dynamics Estimation using a Pseudo-Spectral Parameterization	*ICRA 2021*
Masked reconstruction based self-supervision for human activity recognition	*ISWC 2020*
Scene Perspective Framing with Visual Question Answering Dialog	*CVPR 2019 Workshop on Language and Vision*
TextureGAN: Controlling Deep Image Synthesis with Texture Patches	*CVPR 2018 (Spotlight)*
Adaptive Industrial Robot Control for Designers	*eCAADe 2017*
Web-based Tools For Supporting Student-driven Capstone Design Team Formation	*ASEE 2017*
VideoPose: Estimating 6D object pose from videos	*Arxiv*
iMHS: An Incremental Multi-Hypothesis Smoother	*Arxiv*
Unbiasing Semantic Segmentation For Robot Perception using Synthetic Data Feature Transfer	*Arxiv*

Patents

Selecting content items based on received term using topic model	*US Patent 10,452,710*

Theses

Visual Attribute Labeling of Images	*Masters Thesis, 2019*
Fast Facial Expression Recognition	*Undergraduate Thesis, 2013*

Work Experience

Borg Lab, Georgia Tech — **Atlanta, GA**
Graduate Research Assistant — *January 2019–*
Perform research on state estimation for legged robots using Factor Graph based smoothing approaches. Maintainer of GTSAM.

Skydio — **Redwood City, CA**
Software Engineer Intern — *May 2021–July 2021*
Developed new methods for landmark-free bundle adjustment and visual odometry.

Institute for Human Machine Cognition — **Pensacola, FL**
Research Intern — *May 2020–July 2020*
Research on proprioceptive state estimation for humanoid robots. Results published in Humanoids 2022.

Argo AI **Pittsburgh, PA**
Software Engineer Intern *May 2018–July 2018*
Research on rapid object detection models for use in autonomous driving.

Eye Team, Georgia Tech **Atlanta, GA**
Graduate Research Assistant *Spring 2018*
Researcher on various topics in Computer Vision, Machine Learning, Graphics and Robotics.

CS 4476/6476 Computer Vision, Georgia Tech **Atlanta, GA**
Graduate Teaching Assistant *Fall 2016, 2017*
Graduate Teaching Assistant for the Undergraduate and Graduate Computer Vision class taught by Prof. James Hays. Responsibilities include assisting students on various Computer Vision assignments related to Scene Understanding, Face Recognition and Deep Learning, as well as providing clarifications on concepts and grading.

Collaborative & Advanced Robotic Manufacturing Lab, Georgia Tech **Atlanta, GA**
Graduate Research Assistant *2015–2016*
The Collaborative & Advanced Robotic Manufacturing Lab (CARM) performs applied research in perception and robotics with the goal of turning fundamental research performed by Georgia Tech into actionable systems that can be used by Georgia Tech's industry partners. Advised by Dr. Larry Sweet.
- Pick-and-Place project to detect and track objects in cluttered environments using ROS and UR10 robots, with DENSO Manufacturing.
- Dual Robot Manufacturing and Redundancy Resolution for fuselage manufacturing with Boeing. I wrote the KUKA KRC drivers to allow for direct robot interfacing that is used by various labs in Georgia Tech.
- Project to develop an edge based tracker that uses state of the art Computer Vision techniques to track a car door in real time with a latency of 5ms with PSA Peugeot.

Pindrop **Atlanta, GA**
Software Engineer Intern *May 2016–July 2016*
- Worked with the Cloud Services team to develop microservices for calculating phone reputation scores in order to gauge the veracity of a possibly fraudulent phone calls.
- Used Python, Go and Docker to build highly scalable services and APIs to service 10 of the 15 largest financial institutions in the U.S., saving up to $10 million annually from phone call fraud.

Microsoft Corporation **Hyderabad, India**
Software Engineer, MACH *2013–2015*
- Microsoft Key Talent FY15
- Built a Data Analytics Toolbox for analyzing petabytes of cross-domain data and inferring data items and results to power various scenarios for the Entertainment Segments within the Bing search engine.
- Services and apps to power Microsoft's Quoting, Agreements and Core Services in the Enterprise Commerce space, responsible for over $60 billion of Microsoft's enterprise revenue.

Microsoft Corporation **Hyderabad, India**
Software Engineer Intern *May-July 2012*
- Operations tool for the Enterprise Service Bus (ESB).
- Used for real time management of ESB servers and monitoring against failures.

Awards

2018: Google Summer of Code Mentor Summit Travel Scholarship (Declined)

2017: Marshall D. Williamson Fellowship - Outstanding MS CS student, College of Computing, Georgia Tech

2017: 3^{rd} place in The Home Depot Deep Learning Hackathon at Georgia Tech

2016: 2^{nd} - Microsoft Research Open Source Challenge

2015: 3^{rd} - Microsoft India Build The Shield CTF Competition

2014: Microsoft FY15 Key Talent Award

2014: 1^{st} - Microsoft India General Quiz
2014: 1^{st} - Microsoft Capture The Flag Competition
2012: 6^{th} in India - SecurIT All India Capture Flag (InCTF)
2012: $64^{th}/1300$ - **ACM ICPC** On-site National Round
2011: 1^{st} in India - Amazon What's Your Cloud Idea? Competition

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