

ANIKET BERA

ADDRESS: Brendan Iribe Center for Computer Science and Innovation, 5144, College Park, MD 20740
PHONE: +1 301-405-4209 (*Office*), +1 919-578-6233 (*Personal*)
EMAIL: ab@cs.umd.edu
WEB: <http://cs.umd.edu/~ab/>, [Google Scholar](#)

AREAS OF INTEREST:

Broad Areas: *Robotics, Affective Computing, Computer Graphics, Virtual Environments*

Specific Areas: *Social Robotics, Human-Robot Interaction, Physically-based Modelling and Simulation, AR/VR, Multi-agent Modeling, Motion Planning, Autonomous Vehicles, Cognitive modeling: Knowledge, reasoning, and planning for intelligent characters.*

EDUCATION

- 2012 - 2017 PhD in COMPUTER SCIENCE,
University of North Carolina, Chapel Hill
Advisor: Dinesh Manocha
- 2012 - 2015 MS in COMPUTER SCIENCE,
University of North Carolina, Chapel Hill
Advisor: Dinesh Manocha
- FEBRUARY 2012 MBA in INFORMATION AND COMMUNICATIONS TECHNOLOGY,
Jaypee Business School, India
- MARCH 2012 B.Tech in COMPUTER SCIENCE,
Jaypee Institute of Information Technology University, India

PROFESSIONAL EXPERIENCE

- 2019 - PRESENT ASSISTANT RESEARCH PROFESSOR at University of Maryland at College Park
Appointments: [Department of Computer Science](#),
[University of Maryland Institute for Advanced Computer Studies \(UMIACS\)](#),
[Maryland Robotics Center \(James Clark School of Engineering\)](#)
[Brain and Behavior Initiative \(BBI\)](#)
[Maryland Transportation Institute \(MTI\)](#),
Research on Social Robotics, Behavior AI and Physically-based Modelling
- 2018 - 2019 ASSISTANT RESEARCH PROFESSOR at **Dept of Computer Science, UNC Chapel Hill**
Research on automated crowd behavior learning and autonomous robot navigation
- 2017 - 2018 POSTDOCTORAL RESEARCH ASSOCIATE at **GAMMA Group, UNC Chapel Hill**
Research on data-driven large-scale pedestrian behavior and personality prediction
- 2012 - 2017 GRADUATE RESEARCH ASSISTANT at **GAMMA Group, UNC Chapel Hill**
Advisors: Dinesh Manocha
Research on data-driven crowd simulation, visual tracking, mixed reality simulations.
- SUMMER 2014 **LAB ASSOCIATE** at **Disney Research Los Angeles**
Advisor: Carol O'Sullivan
Research on crowd simulation, pedestrian tracking.
- SUMMER 2013 RESEARCH INTERN at **Intel Corporation**
Group: Advanced Visual Computing Group
Designed new crowd tracking algorithm and optimized on Intel chipsets and mobile devices.
- JUNE 2010-2011 RESEARCH INTERN at **Centre for Development of Advanced Computing**
Work on Development of Robust Document Analysis and Script Recognition

CURRENT RESEARCH SUPPORT / GRANTS AWARDED

- **National Science Foundation (NSF 19-589 CISE) (Co-PI)**
Project Title: EAGER: CPR-COVID-19 Prevention Robot in Dense Areas
Award Number (FAIN): 2031901
- **Brain and Behavior Initiative Grant FY20 (PI)**
Project Title: Learning Age and Gender Adaptive Gait Motor Control based Emotion using Deep Neural Networks and Affective Modeling.
- **State of Maryland: MPower COVID Grant 2020 (PI)**
Project Title: Developing an Artificial Intelligence Tool to improve Caregiver Engagement for Rural Child Behavioral Health Services.
- **Department of Defense (DoD DURIP 2020) (Co-PI)**
Project Title: Equipment Support for Cloud-based Intelligent VR Systems.
- **Maryland Department of Transportation State Highway Administration (Co-PI)**
Project Title: Evaluation of Smart Pedestrian Crosswalk Technologies.
- **National Institute of Standards and Technology (NIST) (Investigator)**
Project Title: Explainable AI Techniques for Robot Navigation.
- **Department of Defense (DoD) (Investigator)**
Project Title: Real Time Architecture for Emotional and Behavior Insights from Real- Time Gait-Analysis.

BIBLIOGRAPHY

Book Chapter:

- Realtime Pedestrian Tracking and Prediction in Dense Crowds - **Aniket Bera**, *David Wolinski, Jullian Pettre, Dinesh Manocha* [Book Chapter on Group and Crowd Behavior for Computer Vision, 2017]

Refereed Publications:

- ARC: Alignment-based Redirection Controller for Redirected Walking in Complex Environments-*Niall Williams, Aniket Bera, Dinesh Manocha* [IEEE Transactions on Visualization and Computer Graphics (TVCG Special Issue)], [IEEE Virtual Reality (VR 2021), Lisbon, Portugal]
- Text2Gestures: A Transformer Network for Generating Emotive Body Gestures for Virtual Agents-*Uttaran Bhattacharya, Nicholas Sergei Reukowski, Pooja Guhan, Abhishek Banerjee, Aniket Bera, Dinesh Manocha* [IEEE Virtual Reality (VR 2021), Lisbon, Portugal]
- Take an Emotion Walk: Perceiving Emotions from Gaits Using Hierarchical Attention Pooling and Affective Mapping-*Uttaran Bhattacharya, Christian Roncal, Trisha Mittal, Rohan Chandra, Kyra Kapsaskis, Kurt Gray, Aniket Bera, Dinesh Manocha* [European Conference on Computer Vision (ECCV 2020), Glasgow, United Kingdom]
- Emotions Don't Lie: An Audio-Visual Deepfake Detection Method using Affective Cues-*Trisha Mittal, Uttaran Bhattacharya, Rohan Chandra, Aniket Bera, Dinesh Manocha* [ACM Multimedia (ACMMM 2020), Seattle, United States]
- Generating Emotive Gaits for Virtual Agents Using Affect-Based Autoregression-*Uttaran Bhattacharya, Nicholas Reukowski, Trisha Mittal, Rohan Chandra, Aniket Bera, Dinesh Manocha* [International Symposium on Mixed and Augmented Reality (ISMAR 2020), Pernambuco, Brazil]
- Forecasting Trajectory and Behavior of Road-Agents Using Spectral Clustering in Graph-LSTMs-*Rohan Chandra, Tianrui Guan, Srujan Panuganti, Trisha Mittal, Uttaran Bhattacharya, Aniket Bera, Dinesh Manocha* [RA-L Robotics and Automation Letters / IEEE International Conference on Robotics and Automation (RAL/IROS 2020)]
- ProxEmo: Gait-based Emotion Learning and Multi-view Proxemic Fusion for Socially-Aware Robot Navigation-*Venkatraman Narayanan, Bala Murali Manoghar, Vishnu Sashank Dorbala, Dinesh Manocha, Aniket Bera* [IEEE International Conference on Robotics and Automation (IROS 2020)]

- CMetric: A Driving Behavior Measure using Centrality Functions- *Rohan Chandra, Uttaran Bhattacharya, Trisha Mittal, **Aniket Bera**, Dinesh Manocha* [IEEE International Conference on Robotics and Automation (IROS 2020)]
- EmotiCon: Context-Aware Multimodal Emotion Recognition using Frege’s Principle- *Trisha Mittal, Pooja Guhan, Uttaran Bhattacharya, Rohan Chandra, **Aniket Bera**, Dinesh Manocha* [IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2020), Seattle, USA]
- RoadTrack: Realtime Tracking of Road Agents in Dense and Heterogeneous Environments- *Rohan Chandra, Uttaran Bhattacharya, Tanmay Randhavane, **Aniket Bera**, Dinesh Manocha* [RA-L Robotics and Automation Letters / IEEE International Conference on Robotics and Automation (RAL/ICRA 2020), Paris, France]
- GraphRQI: Classifying Driver Behaviors Using Graph Spectrums- *Rohan Chandra, Uttaran Bhattacharya, Trisha Mittal, Xiaoyu Li, **Aniket Bera**, Dinesh Manocha* [IEEE International Conference on Robotics and Automation (ICRA 2020), Paris, France]
- How are you feeling? Multimodal Emotion Learning for Socially-Assistive Robot Navigation - ***Aniket Bera**, Tanmay Randhavane, Kurt Gray, Kyra Kapsaskis, Austin Wang, Dinesh Manocha* [IEEE International Conference on Automatic Face and Gesture Recognition (FG 2020), Buenos Aires, Argentina]
- STEP: Spatial Temporal Graph Convolutional Networks for Emotion Perception from Gaits- *Uttaran Bhattacharya, Trisha Mittal, Rohan Chandra, Tanmay Randhavane, **Aniket Bera**, Dinesh Manocha* [AAAI Conference on Artificial Intelligence (AAAI 2020), New York, USA]
- M3ER: Multiplicative Multimodal Emotion Recognition Using Facial, Textual, and Speech Cues- *Trisha Mittal, Uttaran Bhattacharya, Rohan Chandra, **Aniket Bera**, Dinesh Manocha* [AAAI Conference on Artificial Intelligence (AAAI 2020), New York, USA]
- EVA: Modeling Perceived Emotions of Virtual Agents using Expressive Features of Gait and Gaze- *Tanmay Randhavane, **Aniket Bera**, Kyra Kapsaskis, Kurt Gray, Dinesh Manocha* [ACM Symposium on Applied Perception (ACM SAP 2019), Barcelona, Spain]
- DensePeds: Pedestrian Tracking in Dense Crowds Using FRVO and Sparse Features- *Rohan Chandra, Uttaran Bhattacharya, **Aniket Bera**, Dinesh Manocha* [IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2019), Macau, China]
- TraPHic: Trajectory Prediction in Dense and Heterogeneous Traffic Using Weighted Interactions- *Rohan Chandra, Uttaran Bhattacharya, **Aniket Bera**, Dinesh Manocha* [IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2019), Long Beach, USA]
- FVA: Modeling Perceived Friendliness of Virtual Agents Using Movement Characteristics- *Tanmay Randhavane, **Aniket Bera**, Kyra Kapsaskis, Kurt Gray, Dinesh Manocha* [IEEE Transactions on Visualization and Computer Graphics (TVCG Special Issue)], [IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2019), Beijing, China]
- Socially-aware Human Learning - ***Aniket Bera**, Tanmay Randhavane, Dinesh Manocha* [Multimodal Learning from Videos, IEEE Conference on Computer Vision and Pattern Recognition 2019]
- Improving Social Human-Robot Teaming in Crowded Environments - ***Aniket Bera**, Tanmay Randhavane, Kurt Gray, Kyra Kapsaskis, Austin Wang, Dinesh Manocha* [Human-Robot Teaming Beyond Human Operational Speeds (*IEEE International Conference on Robotics and Automation 2019*), Montreal, Canada]
- The Emotionally Intelligent Robot: Socially-aware Human Prediction ***Aniket Bera**, Tanmay Randhavane, Kurt Gray, Kyra Kapsaskis, Austin Wang, Dinesh Manocha* [Long-term Human Motion Prediction Workshop 2019 & Human Movement Science for Physical Human-Robot Collaboration (*IEEE International Conference on Robotics and Automation 2019*), Montreal, Canada]
- Modeling Data-Driven Dominance Traits for Virtual Characters using Gait Analysis- *Tanmay Randhavane, **Aniket Bera**, Emily Kubin, Kurt Gray, Dinesh Manocha* [IEEE Transactions on Visualization and Computer Graphics (TVCG 2019)]

- Pedestrian Dominance Modeling for Socially-Aware Robot Navigation- *Tanmay Randhavane, **Aniket Bera**, Emily Kubin, Austin Wang, Kurt Gray, Dinesh Manocha* [IEEE/RSJ International Conference on Robotics and Automation (ICRA 2019), Montreal, Canada]
- PORCA: Modeling and planning for autonomous driving among many pedestrians - *Yuanfu Luo, Panpan Cai, **Aniket Bera**, David Hsu, Wee Sun Lee, Dinesh Manocha* [IEEE Robotics & Automation Letters (RAL 2018)]
- Data-Driven Modeling of Group Entitativity in Virtual Environments - ***Aniket Bera**, Tanmay Randhavane, Emily Kubin, Husam Shaik, Kurt Gray, Dinesh Manocha* [ACM Symposium on Virtual Reality Software and Technology (VRST 2018), Tokyo, Japan]
- The Socially Invisible Robot: Navigation in the Social World using Robot Entitativity - ***Aniket Bera**, Tanmay Randhavane, Emily Kubin, Austin Wang, Kurt Gray, Dinesh Manocha* [IEEE/RSJ International Conference on Intelligent Robots (IROS 2018), Madrid, Spain]
- LCrowdV: Generating labeled videos for pedestrian detectors training and crowd behavior learning - *Ernest Cheung, Tsan Kwong Wong, **Aniket Bera**, Dinesh Manocha* [Neurocomputing 2019]
- Efficient and safe vehicle navigation based on driver behavior classification - *Ernest Cheung, **Aniket Bera**, Emily Kubin, Kurt Gray, Dinesh Manocha* [IEEE Conference on Computer Vision and Pattern Recognition 2018, Salt Lake City, Utah]
- Classifying Driver Behaviors for Autonomous Vehicle Navigation - *Ernest Cheung, **Aniket Bera**, Emily Kubin, Kurt Gray, Dinesh Manocha* [Towards Intelligent Social Robots (IEEE/RSJ International Conference on Intelligent Robots 2018), Madrid, Spain]
- Socially Invisible Navigation for Intelligent Vehicles - ***Aniket Bera**, Tanmay Randhavane, Emily Kubin, Austin Wang, Kurt Gray, Dinesh Manocha* [Workshop on Planning, Perception and Navigation for Intelligent Vehicles (IEEE/RSJ International Conference on Intelligent Robots 2018), Madrid, Spain]
- Automatically Learning Driver Behaviors for Safe Autonomous Vehicle Navigation - *Ernest Cheung, **Aniket Bera**, Emily Kubin, Kurt Gray, Dinesh Manocha* [Workshop on Planning, Perception and Navigation for Intelligent Vehicles (IEEE/RSJ International Conference on Intelligent Robots 2018), Madrid, Spain]
- MixedPeds: Pedestrian Detection in Unannotated Videos using Synthetically Generated Human-agents for Training - *Ernest Cheung, Anson Wong, **Aniket Bera**, Dinesh Manocha* [AAAI 2018, Louisiana, USA]
- Identifying Driver Behaviors using Trajectory Features for Vehicle Navigation - *Ernest Cheung, **Aniket Bera**, Emily Kubin, Kurt Gray, Dinesh Manocha* [IEEE/RSJ International Conference on Intelligent Robots (IROS 2018), Madrid, Spain]
- F2FCrowds: Planning agent movements to enable face-to-face interactions - *Tanmay Randhavane, **Aniket Bera**, Dinesh Manocha* [Presence: Teleoperators & Virtual Environments, 2018]
- Aggressive, Tense, or Shy? Identifying Personality Traits from Crowd Videos - ***Aniket Bera**, Tanmay Randhavane, Dinesh Manocha* [International Joint Conference on Artificial Intelligence (IJCAI 2017), Melbourne, Australia]
- SocioSense: Robot Navigation Amongst Pedestrians with Social and Psychological Constraints - ***Aniket Bera**, Tanmay Randhavane, Dinesh Manocha* [IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2017), Vancouver, Canada]
- Interactive Crowd-Behavior Learning for Surveillance and Training - ***Aniket Bera**, Sujeong Kim, Dinesh Manocha* [IEEE Computer Graphics and Applications, Special Edition (CG&A 2016)]
- Online parameter learning for data-driven crowd simulation and content generation - ***Aniket Bera**, Sujeong Kim, Dinesh Manocha* [Computers & Graphics Journal 2016]
- Realtime anomaly detection using trajectory-level crowd behavior learning - ***Aniket Bera**, Sujeong Kim, Dinesh Manocha* [IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2016), Las Vegas, USA]

- GLMP-Realtime Pedestrian Path Prediction using Global and Local Movement Patterns - **Aniket Bera**, *Sujeong Kim, Dinesh Manocha* [IEEE International Conference on Robotics and Automation (ICRA 2016), Stockholm, Sweden]
- Interactive and adaptive data-driven crowd simulation - Sujeong Kim, **Aniket Bera**, *Dinesh Manocha* [IEEE Virtual Reality (IEEE VR 2016), South Carolina, USA]
- Interactive crowd content generation and analysis using trajectory-level behavior learning - *Sujeong Kim, Aniket Bera, Dinesh Manocha* [IEEE International Symposium on Multimedia (ISM 2015), Florida, USA]
- Efficient Trajectory Extraction and Parameter Learning for Data-Driven Crowd Simulation - **Aniket Bera**, *Sujeong Kim, Dinesh Manocha* [Graphics Interface (GI 2015), Halifax, Canada]
- REACH - Realtime Crowd tracking using a Hybrid motion model - **Aniket Bera**, *Dinesh Manocha* [IEEE International Conference on Robotics and Automation (ICRA 2015), Seattle, USA]
- Realtime Multilevel Crowd Tracking using Reciprocal Velocity Obstacles - **Aniket Bera**, *Dinesh Manocha* [IEEE International Conference on Pattern Recognition 2014, Stockholm, Sweden]
- AdaPT: Real-time Adaptive Pedestrian Tracking for crowded scenes - **Aniket Bera**, *Nico Galoppo, Dillon Sharlet, Adam Lake, Dinesh Manocha* [IEEE International Conference on Robotics and Automation (ICRA 2014), Hong Kong]
- Line Based Robust Script Identification for Indian Languages - *Bhupendra Kumar, Aniket Bera, Tushar Patnaik* [International Journal of Information and Electronics Engineering 2012]
- Fast vectorization and upscaling images with natural objects using canny edge detection - **Aniket Bera** [IEEE International Conference on Electronics Computer Technology 2011, India]
- Scene flow estimation from stereo video source - **Aniket Bera** [International Conference on Advances in Computing and Artificial Intelligence 2011, India]

Doctorate Thesis:

- Interactive Tracking, Prediction, and Behavior Learning of Pedestrians in Dense Crowds - **Aniket Bera**, *Advisor: Dinesh Manocha* [2017]

PATENTS FILED

- **Title:** System and Method for Multimodal Emotion Recognition
U.S. Provisional Application No.: 62/972456
Filing Date: February 10, 2020
- **Title:** System and method for Detecting Fabricated Videos
U.S. Provisional Application No.: 63/107803
Filing Date: October 30, 2020

INVITED TALKS

- Using Multimodal Behavior AI for Mental Health - *University of Maryland Baltimore Medical Center Event 2020, Baltimore, USA*
- Can your robot know what you're feeling? - *Kaziranga University 2020, Assam, India*
- The Future of Social Robotics - *Indian Institute of Technology Delhi 2019 (IIT-D), India*
- Social Prediction for Multiagent and Robot Systems - *National University of Singapore (NUS) 2018, Singapore*
- The Emotionally Intelligent Robot: Improving Social Human-Robot Teaming - *Indraprastha Institute of Information Technology Delhi 2019 (IIIT), India*
- Generating Labeled Videos for Simulation-based Crowd Behavior Learning - *European Conference on Computer Vision Workshop 2016, Amsterdam, Netherlands*

- Classifying Group Emotions for Socially-Aware Autonomous Vehicle Navigation - *IEEE Conference on Computer Vision and Pattern Recognition Workshops 2018, Utah, USA*
- Interactive Surveillance Technologies for Dense Crowds - *Association for the Advancement of Artificial Intelligence 2018 Fall Symposium Series 2018 (Artificial Intelligence in Government and Public Sector), Virginia, USA*
- Behavior Modeling for Autonomous Driving - *Association for the Advancement of Artificial Intelligence 2018 Fall Symposium Series 2018 (Reasoning and Learning in Real-World Systems for Long-Term Autonomy), Virginia, USA*
- Group and Crowd Behavior for Computer Graphics and Robotics Applications - *Delhi Technological University (DTU) 2015, India*
- Tracking Dense Crowds using GPGPUs - *Intel Event 2013, Oregon, USA*

PUBLIC DATASETS

- *Simulated pedestrian dataset with varying crowd density, population, lighting conditions, background scene, camera angles, agent personality and noise level to help in training models for crowd understanding, including pedestrian detection, crowd classification, etc.* Link: <http://gamma.cs.unc.edu/LCrowdV/#dataset>
- *A public domain dataset, EWalk, with videos of walking individuals. We also provide their gaits in the form of 3D positions of 16 joints and labeled emotions obtained using a perception study.* Link: <http://gamma.cs.unc.edu/GAIT/#EWalk>
- *Emotion-Gait is a dataset consisting of human gaits annotated with 4 emotion labels: angry, happy, neutral and sad. It consists of 2,177 real gaits and 4,000 synthetic gaits. Of the 2,177 real gaits, 342 were collected by and the remaining 1,835 were taken from the [Edinburgh Locomotion Mocap Database (ELMD)]*
Link: <https://gamma.umd.edu/researchdirections/affectivecomputing/step>
- *High resolution crowd dataset captured in dense pedestrian crossings in India. Dataset consists of videos of indoor and outdoor scenes recorded at different locations, each with 30-80 pedestrians.* Link: <http://gamma.cs.unc.edu/RCrowdT/>
- *A traffic dataset (TRAF) comprising of dense and heterogeneous traffic. The dataset consists of the following road-agents: cars, busses, trucks, rickshaws, pedestrians, scooters, motorcycles, carts, and animals and is collected in dense Asian cities.*
Link: <https://go.umd.edu/TRAF-Dataset>
- *A dense crowd dataset (DensePeds) captured in dense crowd and multi-agent environments. The dataset contains detailed labels and trajectories for dense crowd scenes.*
Link: <https://www.gamma.umd.edu/researchdirections/autonomousdriving/densepeds/>

MEDIA/NEWS COVERAGE

- “This Robot Can Guess How You’re Feeling by the Way You Walk” - *WIRED*.
Link: <https://www.wired.com/story/proxemo-robot-guesses-emotion-from-walking/>
- “ProxEmo: Can AI Detect Your Emotion Just By How You Walk?” - *Forbes*.
Link: <https://www.forbes.com/sites/cognitiveworld/2020/03/29/can-ai...>
- “UMD Researchers: Could Robots Prevent Spread Of COVID-19” - *CBS/TV*.
Link: <https://baltimore.cbslocal.com/video/4702853-umd-researchers-could...>
- “There’s a new AI that can guess how you feel just by watching you walk” - *Fast Company*.
Link: <https://www.fastcompany.com/90375885/>
- “Identifying perceived emotions from people’s walking style” - *Tech Xplore*.
Link: <https://techxplore.com/news/2019-07-emotions-people-style.html>
- “Indian Researcher & His Team Build AI That Can Tell How We Feel Just By Seeing Us Walk” - *Times of India*.
Link: <https://www.indiatimes.com/technology/science-and-future/...>

- “AI uses camera footage to track pedestrians in dense crowds” - *VentureBeat*.
Link: <https://venturebeat.com/2019/06/26/ai-uses-camera-footag...>
- “Detecting Emotion Through Gait” - *AI Today Podcast*.
Link: <https://www.cognilytica.com/2020/05/06/ai-today-podcast-141-...>
- “Emotions Can Be Predicted From A Person’s Walking Style: Scientists Develop Algorithm” - *International Business Times*.
Link: <https://www.ibtimes.com/emotions-can-be-predicted-persons-walking...>
- “AI identifies human emotion based on walking style” - *Medium*.
Link: <https://medium.com/artificial-intelligence-network/ai-identifies...>
- “A path for all walks of life!” - *Ideas & Discoveries*.
Link: <https://www.pressreader.com/usa/id-magazine/20190901/282544429866813>
- “AI classifies people’s emotions from the way they walk” - *VentureBeat*.
Link: <https://venturebeat.com/2019/07/01/ai-classifies-peoples-emotions...>
- “Ready, Set, Brake!” - *Association of American Universities / UNC*.
Link: <https://www.aau.edu/research-scholarship/featured-research-topics...>
- “AI uses camera footage to track pedestrians in dense crowds” - *VentureBeat*.
Link: <https://venturebeat.com/2019/06/26/ai-uses-camera-footage-to...>
- “New Computer Science Building unveiled on Maryland Day” - *The Sentinel*.
Link: <https://pgs.thesentinel.com/2019/05/02/new-computer-science-building...>
- “New software can track many individuals in a crowd” - *Science*.
Link: <https://www.sciencemag.org/news/2017/04/new-software-can-track...>
- “Une nouvelle intelligence artificielle peut deviner les sentiments des gens en les regardant marcher” - *Tuxboard (French)*.
Link: <https://www.tuxboard.com/une-nouvelle-intelligence-artificielle-peut-devi..>
- “Restoring Pather Panchali is not a violation of authorship and sanctity” - *Malayala Manorama*.
Link: <https://english.manoramaonline.com/entertainment/entertainment-news...>
- “The colour of film nostalgia” - *DailyO*.
Link: <https://www.dailyo.in/arts/film-colourisation-pather-panchali-satyajit...>
- “রঙ্গীন হল ‘পথের পাঁচালী’” - *EiSamay (Bengali)*.
Link: <https://eisamay.indiatimes.com/entertainment/cinema/pather-panchali...>
- “Satyajit Ray की आइकॉनिक फिल्म Pather Panchali को रंगीन बनाने पर मचा विवाद, अनिकेत बेरा ने इस तकनीक पर की बात” - *Patrika (Hindi)*.
Link: <https://www.patrika.com/bollywood-news/satyajit-ray-pather-pancha...>
- “‘ক্লাসিককে ছোঁয়ার প্রয়োজন নেই’, বিতর্কে রঙিন পথের পাঁচালী -” *The Indian Express (Kolkata Edition)*.
Link: <https://bengali.indianexpress.com/entertainment/coloured-version...>
- “കളറിംഗ് പാതർ പഞ്ചലിയുടെ രംഗങ്ങൾ -” *Samayam (Malayalam)*.
Link: <https://malayalam.samayam.com/video-gallery/cinema/satyajit-ray-s-...>
- “‘পথের পাঁচালী’র শরীরে নতুন রঙ -” *ETV (Bengali)*.
Link: <https://www.ekushey-tv.com/‘পথের পাঁচালী’র শরীরে নত-...>
- “L’IA qui peut reconnaître l’humeur d’une personne en analysant sa démarche” - *Neon Magazine (French)*.
Link: <https://www.neonmag.fr/lia-qui-peut-reconnaitre-lhumeur-dune..>
- “রঙ্গীন পথের পাঁচালী -” *SNewz (Bengali)*.
Link: <https://snewz.in/pather-panchali-in-color/54152/>
- “AI mới này có thể đoán cảm giác của con người thông qua dáng đi” - *Genk (Vietnamese)*.
Link: <http://genk.vn/ai-moi-nay-co-the-doan-cam-giac-cua-con-nguoi...>

- “রঙিন ‘পথের পাঁচালী’ নিয়ে যত কাণ্ড -” *Priyo, Prothomalo (Bengali)*.
Link: <https://www.prothomalo.com/onnoalo/prose/রঙনি-‘পথের-পাঁচালী’-নযি়ে-যত-ক>
- “‘পথের পাঁচালী’তে রঙ, সোশ্যাল মিডিয়ায় মিশ্র প্রতিক্রিয়া -” *Bangi News (Bengali)*.
Link: <http://www.banginews.com/web-news...>
- “আমার কাছে ‘পথের পাঁচালী’ সাদাকালো ছবি হিসেবেই ম্যাজিকাল থাকবে -” *Anadabazaar Patrika (Interview)*.
Link: <https://www.anadabazar.com/entertainment/aniket-bera-opens-up-on...>
- “Pather Pachali restored in colour” - *Dhaka Tribune*.
Link: <https://www.dhakatribune.com/showtime/2020/06/01/watch-pather-pachali...>
- “Cientistas ensinaram IA a perceber como nos sentimos pela nossa forma de andar” - *ZAP aeiou (Portuguese)*.
Link: <https://zap.aeiou.pt/cientistas-ensinaram-ia-perceber-nos-sentimos-pela...>
- “Contemporary directors open to Pather Panchali coloration experiment but swear by Ray classic” - *Cinestaan*.
Link: <https://www.cinestaan.com/articles/2020/jun/3/25869/contemporary...>
- “Pather Panchali, A Satyajit Ray Film, Recreated By US-based AI Professor” - *Republic TV*.
Link: <https://www.republicworld.com/entertainment-news/regional-indian-cinema/pather...>
- “Professor defends colourisation of Satyajit Ray’s ‘Pather Panchali’ as ‘academic experiment’” - *Scroll.in*.
Link: <https://scroll.in/reel/963474/professor-defends-colourisation-of-satyajit...>
- “Other Print Media and TV features/articles related to Pather Panchali” - *UMD WWW*.
Link: <http://www.cs.umd.edu/ab/PatherPanchali>
- “Colouring Ray’s Pather Panchali: Cultural Icons Not Under Attack” - *The Indian Express*.
Link: <https://indianexpress.com/article/entertainment/regional/iconic-satyajit...>
- “US-based Artificial Intelligence Professor colours ‘Pather Panchali’ as quarantine experiment” - *The Quint*.
Link: <https://www.thequint.com/entertainment/indian-cinema/colouring-rays-pather-panchali...>
- “Iconic Satyajit Ray film Pather Panchali gets a controversial touch of colour” - *The Indian Express*.
Link: <https://indianexpress.com/article/entertainment/regional/iconic-satyajit...>
- “Many-splendoured thing: A classic in polychrome as quarantine experiment” - *The Telegraph (Editorial Board)*.
Link: <https://www.telegraphindia.com/opinion/part-of-satyajit-ray-pather...>
- “US-based Bengali prof uses AI to restore earliest surviving film of India” - *Times of India*.
Link: <https://timesofindia.indiatimes.com/city/kolkata/us-based-bengali-prof-uses-ai...>
- “Researchers Collaborate to Address COVID-19” - *UMB News*.
Link: <https://www.umaryland.edu/news/archived-news/september-2020/researchers....>
- “UMIACS Faculty Receive MPower Funding to Improve Mental Telehealth Services Using AI” - *UMIACS News*.
Link: <https://www.umiacs.umd.edu/about-us/news/umiacs-faculty-receive...>
- “Sci-Fi Social Distancing?” - *Maryland Today*.
Link: <https://today.umd.edu/articles/sci-fi-social-distancing-...>
- “A New Meaning for Mental Health ‘Screening’” - *Maryland Today*.
Link: <https://today.umd.edu/articles/new-meaning-mental-health...>

PROFESSIONAL SERVICE

- **Associate Editor:** *IROS 2020*
- **Session Chair:** Navigation and Collision Avoidance in *IROS 2020*
- **Session Chair:** Crowds & Perception in *IEEE Virtual Reality 2020*
- **Session Chair (3 Sessions):** (i) Human Modeling, (ii) Cognitive Modeling, (iii) Vision: Tracking and Detection in *AAAI 2020*
- **Session Chair:** Human Detection and Tracking in *ICRA 2019*
- **Program Committee** in *IEEE VR 2018, 2019, 2020, 2021*
- **Program Committee** in *AAAI 2018, 2019, 2020*
- **Program Committee** in *IJCAI 2018, 2019, 2020*
- **Grant Reviewer/Panel** for *American Association for the Advancement of Science (Reviewed 6 Proposals - RDO-ICG (International Collaboration Grant) 2018/2019)*
- **Grant Reviewer/Panel** for *Estonian Research Council 2020: (Reviewed 2 Research Proposals)*

REVIEWER: **ICRA** (2014, 2015, 2016, 2017, 2018, 2019, 2020), **IROS** (2014, 2015, 2016, 2017, 2018, 2019, 2020), **ACM CHI** (2018, 2019), **IEEE R-AL** (2016, 2017, 2018, 2019, 2020), **AAAI** (2018, 2019, 2020), **IJCAI** (2017, 2019, 2020), **SIGGRAPH** (2019, 2020), **SIGGRAPH Asia** (2019, 2020), **ACM ToG** (2017, 2018, 2019), **IJRR** (2016, 2017, 2018, 2019), **Computers & Graphics** (2018), **Computer Graphics & Applications** (2018), **Applied Mathematical Modelling** (2018), **ACM TAP** (2018, 2019), **IEEE TPAMI** (2018, 2019), **IEEE VR** (2016, 2017, 2018, 2019, 2020, 2021), **IEEE Transactions on Multimedia** (2018, 2019, 2020), **PLOS ONE** (2017, 2018, 2019), **Autonomous Robots** (2020), **Multimodal Technologies and Interaction** (2020), **Computer Graphics Forum** (2019, 2020), **Sensors** (2017, 2018), **Journal of Imaging** (2017)

CURRENT AND PRIOR DIVERSITY ACTIVITIES:

1. My department has nominated me to represent my department at the **University of Maryland Diversity and Inclusion Council 2020-2021** to re-vitalize our diversity and inclusion efforts.
2. I was the President of the **Computer Science Student Association (CSSA)** for the year **2016-2017** during my graduate school at UNC. I represented all graduate students from different cultural backgrounds, mentored international students, negotiated salaries and benefits, and represented student issues with the faculty. I also organized and invited faculty and companies for talks.
3. As a research faculty at UNC, I was a part of the search/hiring committee (five members) for a new **Diversity Coordinator position** in 2018, which was a major initiative to increase the racial and gender diversity in the undergraduate and graduate programs at UNC.
4. I also represented the department at the **Graduate and Professional Student Federation (GPSF)** meetings and discussed various student issues/solutions.
5. Organized the annual **Maze Day** at UNC with other faculty, inviting **students with visual impairments** to the department to experience a wide variety of educational tools and opportunities designed just for them, and helped raise corporate sponsorship.

TEACHING RECORD

COURSES

- Instructor for *COMP 790-058: Autonomous Robots and Multi-Agent Simulation for Crowds*, 2017
- Teaching Assistant for *COMP 116: Introduction to Scientific Programming*, 2013 and '*COMP 581: Introduction to Robotics*, 2014'
- Multiple students (current and past) have enrolled in the '*Advanced Topics in Engineering*' course and the '*Pathway to the Ph.D.*' program with me as their faculty instructor/advisor. These courses give students the opportunity to do an independent research project on a topic relevant to their academic program and are supervised by a faculty.

STUDENT SUPERVISION

GRADUATE STUDENTS

- **Vishnu Sashank Dorbala** (*University of Maryland*): Human-Robot Collaboration [Dorbala et al. 2020]
- **Pooja Guhan** (*University of Maryland*): Multimodal Behavior AI using Causal Discovery [Guhan et al. 2020]
- **Rama Prashanth** (*University of Maryland*): Social Robotics, Navigation, COVID-Bot
- **Niall Williams** (*University of Maryland*): Redirected Walking, VR [Williams et al. 2020]
- **Arjun Ambalam** (*University of Maryland*): Social Human-Robot Collaboration
- **Pooja Kabra** (*University of Maryland*): Character Generation, VR/AR
- **Bala Sai Sudhakar** (*University of Maryland*): Social Robotics, Navigation, COVID-Bot [Sudhakar et al. 2021]
- **Arpit Maclay** (*University of Maryland*): Autonomous Vehicles, Traffic Risk Detection
- **Abhishek Banerjee** (*University of Maryland*): Zero-shot Learning, Affective Computing [Banerjee et al. 2021]
- **Videsh Suman** (*University of Massachusetts Amherst*): Autonomous Vehicles, Traffic Risk Detection [Suman et al. 2021]
- **Venkatraman Narayanan** (*University of Maryland*): Social Robotics, Navigation [Narayan et al. 2020, 2021]
- **Rohan Chandra** (*University of Maryland*): Autonomous Vehicles, Crowd Tracking, Multi-agent tracking and prediction [Chandra et al. 2019, 2020, 2021]
- **Uttaran Bhattacharya** (*University of Maryland*): Human behavior learning, psychology and behavior understanding related projects [Bhattacharya et al. 2019, 2020, 2021].
- **Trisha Mittal** (*University of Maryland*): Multi-modal emotion classification and learning. [Mittal et al. 2020, 2021]
- **Janakiraman Kirthivasan** (*University of Maryland*): (Former student) Social Robotics, Navigation
- **Jack Sturtevant** (*University of Maryland*): (Former student) Social Robotics, Navigation
- **Ernest Cheung** (*University of North Carolina*): (Former student) Driver Behaviors, Autonomous Vehicles, Pedsetrian Tracking [Cheung et al. 2016, 2017, 2018]
- **Tanmay Randhavane** (*University of North Carolina*): (Former student) Socially driven VR and robotics, Behavior AI [Randhavane et al. 2017, 2018, 2019, 2020]
- **Vasavi Gajarla** (*University of North Carolina*) (Former student) Behavior AI
- **Rohan Prinja** (*University of North Carolina*) (Former student): Human-robot Interaction
- **Aditya Murthy** (*Chalmers University of Technology, Sweden*): Affective Computing

UNDERGRADUATE STUDENTS

- **Jiayi Xu (April)** (*University of North Carolina*): Character Generation, VR, Computer Graphics
- **Ritwika Das** (*University of North Carolina*): VR, Computer Graphics
- **Austin Wang** (*University of North Carolina*): (Former student) Behavior AI,
- **Mehul Arora** (*Indian Institute of Information Technology Allahabad, India*): Affective Computing
- **Rahul Madhogarhia** (*National Institute of Technology Karnataka, India*): Affective Computing
- **Anson Wong** (*University of North Carolina*): (Former student) Data-driven pedestrian detection and crowd behavior classification using a large virtually-generated labeled image dataset. Co-authored [Cheung et al. 2016]
- **Changhao Liu** (*University of North Carolina*): (Former student) Realtime anomaly detection using various trajectory-level features.
- **Husam Shaik** (*University of North Carolina*): (Former student) 3D modeling various large-scale environments and human-like characters and using crowd simulation models.
- **Josh Taekman** (*University of North Carolina*): (Former student) Plausible group trajectory planning for human-like characters and building a 2D visualizer.