Tanmay Randhavane

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Education

Ph.D. in Computer Science — *Chapel Hill, NC*

University of North Carolina at Chapel Hill — *November 2019*

- **Advisor**: Prof. Dinesh Manocha

M.S. in Computer Science — *Chapel Hill, NC*

University of North Carolina at Chapel Hill — *May 2017*

B.Tech. in Computer Science (with Honors) — *Chapel Hill, NC*

Indian Institute of Technology Bombay — *May 2015*

- with Minor in Statistics

Research Experience

Research Assistant — *Chapel Hill, NC*

GAMMA Research Group, UNC — *August 2015 - PRESENT*

- **Social Perception of Pedestrians**
  - Researched mathematical models for the perception of emotions, dominance, friendliness, and approachability of pedestrians using non-verbal movement cues such as trajectories, gaits, gestures, gazing.
- **Socially-Aware Robot Navigation**
  - Researched novel algorithms for robot navigation around humans based on their personalities, emotions, dominance, and friendliness.
- **Virtual Agent Simulation**
  - Developed novel algorithms for the simulation of virtual agents with different emotions, dominance, and friendliness levels.
- Webpage

Work Experience

Snap Inc. — *Venice, CA*

Research Intern — *May 2018 - August 2018*

- Researched algorithms to identify emotions from RGB videos using LSTM-based deep features and psychology-based affective features.
- Developed data-driven methods to simulate variety of emotions for virtual agents using gaits and gazing.

Amazon Development Center — *Bangalore, India*

Software Development Intern — *May 2014 - July 2014*

- Worked in the Amazon Fulfillment Technologies (AFT) team to create a testing framework for a data platform service.
- Developed a user friendly framework providing the ability to create functional and integration tests, to generate mock messages and to publish them to corresponding queues.

Projects

Virtual Digital Assistant for Augmented Reality

- Simulated a virtual lab assistant in AR with realistic appearance and friendliness characteristics.
- Implemented varying levels of friendliness for virtual agents based on gaits, gestures, and gazing.

Emotionally Intelligent Robot

- Implemented an emotionally-aware navigation algorithm on the Pepper robot navigating around multiple pedestrians.
- Robot performed navigation according to the pedestrians' emotions and dominance determined using their trajectories and facial expressions.

DEBS Grand Challenge: Smart Grids

Undergraduate Research Project — *January 2014 - May 2014*

- Designed a framework to process over a million events per second from smartplugs to identify outliers and predict energy requirements.
- Aman Mangal, Arun Mathew, **Tanmay Randhavane**, and Umesh Bellur. "Predicting power needs in smart grids." In Proceedings of the *8th ACM International Conference on Distributed Event-Based Systems*, pp. 298-301. ACM, 2014.

Skills and Interests

Skills	C, C++, C#, Java, Python, Unity, Unreal Engine, MATLAB, LaTeX, Git
Interests	Robotics, Virtual and Augmented Reality, Affective Computing, Computer Graphics, Artificial Intelligence
Relevant Coursework	Computer Graphics, Virtual Reality, Physically Based Simulation, AI, NLP, Autonomous Driving

Publications

Main Papers

- **Tanmay Randhavane**, Aniket Bera, and Dinesh Manocha. "F2FCrowds: Planning agent movements to enable face-to-face interactions." *Presence: Teleoperators and Virtual Environments* 26, no. 2 (2017): 228-246
- **Tanmay Randhavane**, Aniket Bera, Emily Kubin, Austin Wang, Kurt Gray, and Dinesh Manocha."Pedestrian Dominance Modeling for Socially-Aware Robot Navigation." *2019 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 5528-5535. IEEE, 2019.
- **Tanmay Randhavane**, Aniket Bera, Kyra Kapsaskis, Kurt Gray, and Dinesh Manocha."*FVA*: Modeling Perceived Friendliness of Virtual Agents Using Movement Characteristics." *In TVCG Special Issue for 2019 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*, IEEE, 2019.
- **Tanmay Randhavane**, Aniket Bera, Kyra Kapsaskis, Rahul Sheth, Kurt Gray, and Dinesh Manocha."*EVA*: Generating Emotional Behavior of Virtual Agents using Expressive Features of Gait and Gaze." *ACM Symposium on Applied Perception 2019 (SAP '19)*, ACM, 2019.
- **Tanmay Randhavane**, Aniket Bera, Emily Kubin, Kurt Gray, and Dinesh Manocha."Modeling Data-Driven Dominance Traits for Virtual Characters using Gait Analysis." *In IEEE Transactions on Visualization and Computer Graphics (TVCG).*, 2019.
- **Tanmay Randhavane**, Aniket Bera, Kyra Kapsaskis, Uttaran Bhattacharya, Kurt Gray, and Dinesh Manocha. "Identifying Emotions from Walking using Affective and Deep Features." *Under Review for IEEE Transactions on Affective Computing (TAFFC).* **Best Poster Award at ACM Symposium on Applied Perception 2019 (SAP '19).**
- **Tanmay Randhavane**, Uttaran Bhattacharya, Kyra Kapsaskis, Aniket Bera, Kurt Gray, and Dinesh Manocha. "The Liar's Walk: Detecting Deception with Gait and Gesture." *Under Review.*

Contributed Papers

- Uttaran Bhattacharya, Trisha Mittal, Rohan Chandra, **Tanmay Randhavane**, Aniket Bera, and Dinesh Manocha. "STEP: Spatial Temporal Graph Convolutional Networks for Emotion Perception from Gaits" *AAAI Conference on Artificial Intelligence*, 2020.
- Aniket Bera, **Tanmay Randhavane**, and Dinesh Manocha."The Emotionally Intelligent Robot: Improving Socially-aware Human Prediction in Crowded Environments." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshop*, 2019.
- Rohan Chandra, Uttaran Bhattacharya, **Tanmay Randhavane**, Aniket Bera, and Dinesh Manocha. "RoadTrack: Tracking Road Agents in Dense and Heterogeneous Environments." *Under Review*
- Aniket Bera, **Tanmay Randhavane**, Emily Kubin, Husam Shaik, Kurt Gray, and Dinesh Manocha."Data-driven modeling of group entitativity in virtual environments." *In Proceedings of the 24th ACM Symposium on Virtual Reality Software and Technology (VRST)*, p. 31. ACM, 2018.
- Aniket Bera, **Tanmay Randhavane**, Emily Kubin, Austin Wang, Kurt Gray, and Dinesh Manocha."The Socially Invisible Robot Navigation in the Social World Using Robot Entitativity." In *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 4468-4475. IEEE, 2018.
- Aniket Bera, **Tanmay Randhavane**, Rohan Prinja, and Dinesh Manocha."Sociosense: Robot navigation amongst pedestrians with social and psychological constraints." *In 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 7018-7025. IEEE, 2017.
- Aniket Bera, **Tanmay Randhavane**, and Dinesh Manocha."Aggressive, Tense or Shy? Identifying Personality Traits from Crowd Videos." In *IJCAI*, pp. 112-118. 2017.
- Aniket Bera, Sujeong Kim, **Tanmay Randhavane**, Srihari Pratapa, and Dinesh Manocha."GLMP-realtime pedestrian path prediction using global and local movement patterns." *In 2016 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 5528-5535. IEEE, 2016.
- Sahil Narang, Andrew Best, **Tanmay Randhavane**, Ari Shapiro, and Dinesh Manocha."PedVR: Simulating gaze-based interactions between a real user and virtual crowds." *In Proceedings of the 22nd ACM conference on virtual reality software and technology (VRST)*, pp. 91-100. ACM, 2016.

Awards and Recognition

- **Best Poster Award** at ACM Symposium on Applied Perception 2019 (SAP '19).
- **Best Presentation Award** at Doctoral Consortium in *International Symposium on Mixed and Augmented Reality* (ISMAR 2019).
- Secured **All India Rank 10** (out of more than 450,000 candidates) in IIT JEE-2011.
- "Identifying perceived emotions from people's walking style", *TechXplore*, July 12, 2019.
- "There's a new AI that can guess how you feel just by watching you walk", *FastCompany*, July 15, 2019.
- "A Path for All Walks of Life", *Ideas & Discovery, ID Media*, September 2019.