Dr. Tanmay Randhavane

SENIOR SOFTWARE ENGINEER / MACHINE LEARNING RESEARCHER

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7 years of experience in interdisciplinary research and software development. Created 100s of datasets and published over 30 highly-cited interdisciplinary scholarly articles solving challenges in Mixed Reality, Robot Navigation, and Computer Vision.

Expertise

Expertise	Software Engineering and Development, Computer Vision, Machine Learning, Artificial Intelligence, Robotics, Autonomous Vehicles, Computer Graphics, Mixed Reality, Synthetic Data, Virtual Agents
Skills	Python, PyTorch, Azure ML, C, C++, C#, Java, Maya, Unity, Unreal Engine, MATLAB, LaTeX, Git, Visual Studio, Linux

Work Experience

Microsoft — *Redmond, WA*
SENIOR SOFTWARE ENGINEER — *September 2020 - Feb 2023*

- Built an end-to-end pipeline to create synthetic computer vision datasets using Maya and train machine learning models. Introduced dataset iteration in the computer vision training process to achieve higher accuracy ($30 - 40\%$ improvement).
- Generated $100s$ of synthetic datasets and enabled Microsoft HoloLens and 4 external customers to train and deploy machine learning models across different scenarios - Entertainment: People Safety, Hand Joint Detection, Industrial: Object tracking, Defect Detection.
- Analyzed the impact of each aspect of the synthetic data generation pipeline on object detection accuracy and optimized customer's resource allocation. The analysis and the associated datasets are under review at the biggest computer vision conference.
- Managed a summer intern building a robotics pipeline allowing an agile robot to find an object in the wild (99.18% accuracy) and detect defects (75.64% accuracy).

Microsoft Research — *Redmond, WA (Virtual Internship)*
RESEARCH INTERN — *May 2020 - July 2020*

- Built MoveBox, an open-sourced toolbox for animating motion captured movements onto Microsoft's library of avatars - Rocketbox. Developed the algorithm that allows users to puppeteer their virtual avatar by performing normal conversational gestures in front of a webcam.

University of Maryland — *College Park, MD*
FACULTY ASSISTANT — *January 2020 - May 2020*

- Released DeceptiveWalk, a gait and gesture dataset with deceptive behaviors and a data-driven deception metric.

GAMMA Research Group, UNC — *Chapel Hill, NC*
RESEARCH ASSISTANT — *August 2015 - December 2019*

- Social Perception of Pedestrians: Developed novel mathematical models for the perception of emotions, dominance, friendliness, and approachability of pedestrians using non-verbal movement cues such as trajectories, gaits, gestures, gazing. Achieved model accuracy of $> 80\%$ and improved pedestrian path prediction by 21%.
- Socially-Aware Robot Navigation: Researched novel algorithms for socially-aware robot and autonomous vehicle navigation that incorporate social perception of pedestrians. Robots avoided $10 - 30$ intrusions on personal space with $< 30\%$ overhead on the task time.
- Virtual Agent Simulation: Developed novel algorithms for the simulation of virtual agents with different emotions, dominance, and friendliness levels. Improved the AR/VR experience by $5 - 10\%$ as measured by the social presence metric.
- Released a labeled dataset of walking gaits (EWalk) and published $20+$ research articles.

Snap Inc. — *Venice, CA*
RESEARCH INTERN — *May 2018 - August 2018*

- Researched algorithms to identify emotions from walking videos using affective features. Simulated emotive virtual agents using gaits and gazing that significantly ($p < 0.02$) increased the users' sense of presence.

Amazon Development Center — *Bangalore, India*
SOFTWARE DEVELOPMENT INTERN — *May 2014 - July 2014*

- Developed a user-friendly framework in Amazon Fulfillment Technologies to efficiently create functional and integration tests, generate mock messages, and publish them to corresponding queues.

Education

M.S & Ph.D. in Computer Science — *Chapel Hill, NC*
UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL (ADVISOR: PROF. DINESH MANOCHA) — *November 2019*

- **Thesis**: Social Perception of Pedestrians and Virtual Agents Using Movement Features

B.Tech. in Computer Science (with Honors and Minor in Statistics, CGPA 3.62/4) — *Mumbai, India*
INDIAN INSTITUTE OF TECHNOLOGY BOMBAY — *May 2015*

Awards and Recognition

- Awards at SIGGRAPH MIG 2022, ACM Symposium on Applied Perception 2019, International Symposium on Mixed and Augmented Reality 2019.
- Media articles in Forbes, FastCompany, IndiaTimes, TechXplore, Medium, VentureBeat, Ideas & Discovery, Focus Italia, Neon, Zap Aeiou, Tuxboard, MobyGeek.