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Medha Sawhney

medha@vt.edu

EDUCATION

Virginia Tech, Blacksburg, Virginia, USA **GPA: 4.00 / 4.00** *May 2023 - Present*
PhD in Computer Science. Advisor: Anuj Karpatne

Virginia Tech, Blacksburg, Virginia, USA **GPA: 4.00 / 4.00** *Aug 2021 - May 2023*
MS Thesis in Computer Science. Advisor: Anuj Karpatne

Manipal Institute of Technology, MAHE, Manipal, India **GPA: 8.34 / 10.00 (3.53 / 4.00)** *Aug 2016 - Aug 2020*
Bachelor's in technology, Major -Electronics and Communication Engineering, Minor -Data Science

CORPORATE EXPERIENCE

Machine Learning Engineering Intern, Twitter *Jun 2022 – Aug 2022*
- End to end development and deployment of a broadly applicable ML model using XGBoost within the account health space
- Boosted Key performance indicators by 74%. Challenges: Data imbalance, feature sparsity, enormous data, data distribution drift

Machine Learning Engineer Hewlett-Packard R&D, Bangalore, India *Jan 2020 – June 2021*
- Engineered a self-resolution tool for PC issues, with a 3x BLEU score, employing AWD-LSTM and Natural Language Processing.
- Designed and implemented a dynamic troubleshooting tool for printer issues based on Recurrent Neural Networks
- Applied optimization strategies to build hardware-efficient and reliable ML models, including a) identifying performance bottlenecks using CUDA Kernel Profiling with NVIDIA Nsight Systems & Compute and b) examining ML models for bias

Automatic Driver Assistant Systems Team Intern, The Hi-Tech Robotic Systems, Gurgaon, India *May 2018 – Jul 2018*
- Developed a Computer Vision based Distraction Detection module using Deep Learning algorithms such as CNNs
- Cross-compiled a drowsiness detection product on ARM and constructed a unit testing framework for it, using Google test, in C++

ACADEMIC EXPERIENCE

Graduate Research Assistant, Science Guided Machine Learning Lab, Virginia Tech *Aug 2021– Present*
- Constructed an algorithm to detect microscopic bacteria cells with a 95% precision by utilizing artificially generated motion and temporal cues for an NSF funded cancer research project. Challenge: Hard to distinguish from background media
- Engineered an approach to predict force applied by a human cell on underlying fiber intersections using multi-object detection techniques in Computer Vision like RetinaNet
- Established a pipeline to convert phased-out microscopic imagery of human cell environment to fluorescent images using Pix2Pix and formulated statistical techniques to quantify the results

Graduate Research Assistant, Informatics Lab, University Libraries, Virginia Tech *Aug 2021 – Dec 2021*
- Developed a Computer Vision solution to detect plant wilting. Improved performance accuracy by 10% with traditional methods like Support Vector Machines and feature engineering. Challenges: class imbalance, small dataset, images of varying resolutions

Research Intern, IIIT Hyderabad, Hyderabad, India *May 2019 – Jul 2019*
- Designed and deployed an object recognition tool on NVIDIA Jetson TX2 board, funded by Defence Organisation (DRDO), India
- Successfully identified landmarks in aerial imagery also from viewpoints different than trained on, using YOLO and Deep Learning

AWARDS / HONORS

- Scholarship to attend Grace Hopper Celebration Conference by AnitaB.org and Virginia Tech, 2022
- Best Paper Presentation for "An Efficient Approach to Detect Driver Distraction during Mobile Phone Usage", ICECNS-GOA 2018
- 2nd place for building a conversational agent to raise awareness of STDs, OK Google: Let's Build Hackathon, WTM Manipal, 2018
- 2nd position in Advanced Robotics Challenge by World Robot Olympiad Association (WRO) for Tetris solving bot, 2017

VOLUNTEER EXPERIENCE

- External reviewer for KDD, 2022
- Guided a team of 30+ members as Coding Head, RoboManipal, official robotics student project team at MIT, Manipal 2018-2019
- Mentored 150+ students under the GirlScript Manipal Winter Programme on C++, Java, & Object Detection using OpenCV,2018

TECHNICAL SKILLS

- PyTorch • Jupyter Lab • BigQuery ML • Machine Learning • Deep Learning • TensorFlow
- Programming Languages: Python, Java, C++, MATLAB, R

PUBLICATIONS

Journal Publications

1. **Medha Sawhney***, Bhas Karmarkar*, Eric J. Leaman, Arka Daw, Anuj Karpatne, and Bahareh Behkam. “MEMTrack: A deep learning-based approach to micro-motor tracking in dense fibrous environments.” (under submission)

Peer-reviewed Workshop Proceedings

2. **Medha Sawhney***, Bhas Karmarkar*, Eric J. Leaman, Arka Daw, Anuj Karpatne, and Bahareh Behkam. “Detecting and Tracking Hard-to-Detect Bacteria in Dense Porous Backgrounds.” In Computer Vision for Animal Behavior Tracking and Modeling (CV4Animals) Workshop at CVPR 2023.

Preprints

3. Abinash Padhi*, Arka Daw*, **Medha Sawhney**, Maahi M. Talukder, Atharva Agashe, Sohan Kale, Anuj Karpatne and Amrinder Nain. “Deep Learning Enabled Label-free Cell Force Computation in Deformable Fibrous Environments.”