Nithin Venkatesh Vasishta

Contact Information

141, B-20 Kendriya Vihar, Sec-38
Seawoods(W), Navi Mumbai - 400706

Phone: +91 89280 30658
Email: nithin127vasisth@gmail.com

Research

Modular task decomposition, Imitation learning, Lifelong Learning

Education

Universite de Montreal (Mila), Montreal, Canada — *Sept 2017 – July 2020*
Master of Science, Department of Computer Science and Operational Research

Relevant Courses:
- Autonomous Vehicles, Reinforcement Learning, Theoritical principles of Deep Learning, Probabilistic Graphical Models

Indian Institute of Technology Bombay, Mumbai, India — *July 2013 – May 2017*
Bachelor of Technology, Department of Mechanical Engineering

Relevant Courses:
- ML/CS: Advanced Machine Learning, Automatic Speech Recognition, Computer Vision
- Control of Non Linear Dynamical Systems, Underactuated Robotics (edX), Control of Mobile Robots(Coursera), Machine Design
- Optimisation, Numerical Analysis, Advanced Calculus

For a full list of courses: link

Professional Experience (Technical)

Project Scientist II
Guide: Prof. Shishir Kolathaya, IISc — *Fall 2023 – Present*

Leading the machine learning effort for quadrupedal locomotion at Stoch Lab, IISc
Designed a robust control system for 3D bipeds. Works reliably on inclines upto 30 degrees with payloads upto 5 kg *Involved:* Nonlinear control theory, model predictive control

Research Projects (Graduate)

Master's Thesis: Lifelong Learning of Concepts in CRAFT
Guide: Prof. Liam Paull, UdeM — *Winter 2019 – & Summer 2020*

Designed a three component system to automatically extract reusable concepts from various streams of experience. Extracted concepts, if done properly, represent the core causal mechanisms of the environment. This is used to increase the scope and efficiency of the planning algorithm.
Involved: Hierarchical Planning and Analysis, Basic NNs (report, code)

Representation Learning for Robot Navigation
Guide: Prof. Liam Paull, UdeM — *Spring 2018*

Experimented with variants of VAE, β-VAE and β-TCVAE to study the relationship between the degree of disentanglement of a representation and the performance of the algorithm. Agent was trained using Advantage Actor Critic (A2C) for lane following task.

Involved: Reinforcement Learning, VAEs, Pytorch, Python (report, code)

Analysing Disentanglement in Variational Autoencoders
Guide: Prof. Ioannis Mitliagkas & Prof. Liam Paull, UdeM — *Fall 2017*

Experimented with VAEs using different hyperparameters & loss functions, to analyse the degree and quality of disentanglement. A variety of disentanglement metrics and latent space reconstructions were for evaluation.

Involved: VAEs, disentanglement & distance metrics, Pytorch, Python (report, code)

Research Internships (Undergrad)

The AIR Lab, Robotics Institute, Carnegie Mellon University
Guide: Dr. Sebastian Scherer, Systems Scientist *Summer 2016*

Learning Optimal Parameters for Coordinated Helicopter Turns
Designed method that learns optimal parameters to perfectly match a coordinated helicopter turn
Developed a motion planning architecture that pre-processes and stores raw sensor data from helicopter demonstrations by an expert pilot. This data is used to extract optimal parameters for an existing motion planner. (tech report)

Involved: Reinforcement Learning (LfD, IRL), Evolutionary Algorithms, MongoDB, Python, C++

Department of Mechanical Engineering, École Polytechnique de Montréal
Guide: Prof. Sofiane Achiche, Associate Professor *Summer 2015*

Semi-automatic Control of Robotic Aid using Artificial Vision

Implemented object detection and classification algorithms for household objects. Reproduced AlexNet for Imagenet, along with existing classical methods. (report & code)

Involved: Deep Learning, Computer Vision, C++, MATLAB

Research Projects (Undergrad)

The IIT Bombay Mars Rover Project
Guide: Prof. PJ Guruprasad, Aerospace, IITB *October 2015 – December 2016*

Experimented with robotic arm and gripper design, implemented a rover positioning system with Google maps integration, and surveyed on-board biological testing facilities in existing mars rovers

Involved: ROS, C++, SolidWorks, ANSYS, RasPi, IMU, assembly and testing of rover
Report and summary of the system here

Using Haptic Feedback to Improve Learning and Retention Capabilities
Guide: Prof. Abhishek Gupta, ME & Prof. Aziz Khan, HSS, IITB *Spring 2016*

Implemented a haptic guided position (HGP) program to facilitate the learning of english alphabets, with the aim to improve retention capabilities in kids with learning disabilities
Involved: OpenHaptics Toolkit, 3D systems - Touch device, C++

Generation of 2D Microstructures for Crack Propagation & Stress Analysis
Guide: Prof. Parag Tandaiya, ME, IITB *Summer 2014*

Developed a GUI to simulate microstructures resembling solid grains using voronoi tessellations, and developed a method to facilitate the analysis of crack propagation and stress distribution.

Involved: MATLAB, ABAQUS; Report and code here

Course Projects

Reinforcement Learning in Carrom (report;code)
Statistical v/s Neural Machine Translation (report)
Camera Calibration using Vanishing Points (code)
InfoGANs for Music (code)
ATRIAS 2.0 Analysis (report)
Automatic Laser Etching Machine (report)

Professional Experience (Non Technical)

Sr. Research & Development Engineer — CTO's office *Fall 2022 – Summer 2022*

Coordinated activities across 3 data science pods, clinical innovations team and the CTO's office
Coordinated the launch of sleep-awake algorithm 4.0 that gives 98.6% detection accuracy *Involved:*

Leadership skills, RNNs, Decision Trees

Executive Assistant to CEO — Production Manager *Winter 2020 – Winter 2021*

Executed the production of MRF poking machine project from raw material sourcing to final automation testing (without my involvement the project would have to be scrapped and we would've lost an important customer)
Dealt with vendors, delegated component manufacturing jobs, chalked out action plans for timely machinery dispatch *Involved:* Strong management and leadership skills

Technical Skills

Programming: C/C++, Python, Matlab, mongoDB, LaTeX

Software Packages: Machine Learning: Pytorch, Tensorflow, Theano, Scikit-learn

Robotics: ROS/Gazebo, OpenCV, OpenHaptics, SolidWorks

Achievements and Awards

- Secured an **All India Rank of 97** in IIT-JEE'13 (Main) out of more than 1,400,000 candidates
- Secured an **All India Rank of 301** in IIT-JEE'13 (Adv.) out of more than 150,000 candidates
- Secured an **All India Rank of 17** in the KVPY'12. Offered with prestigious **KVPY Fellowship**
- Represented the Mars Rover Team, IIT-Bombay at Boeing's Aerospace Innovation Summit 2015

Positions of Responsibility

- Organiser, Learning Agents Reading Group (Mila)
- Department Academic Mentor 2016
- Institute Cultural Mentor Film & Media 2014
- Customer Relations Representative, EmotionalFulls 2014-15

Other activities

- Assisted in the mental health awareness campaign "Bring back that smile" for Mood Indigo 2014
- Liased with "Think Foundation" for platelet donor registration drives in Mood Indigo 2013
- Led a team of 28 organisers for the execution of Design, Digital Arts and Chef's Corner for the Asia's Largest College Cultural Festival, Mood Indigo 2014

Yoga is an integral part of my life – from the what I eat, how I sit to what I expect from my body physically and mentally. I specialized in editing and cinematography during my stint as the convener of the film making club at IIT Bombay and I've had some of the most exhilarating experiences of my life performing in front of a crowd – be it stand-up comedy or theatre.

References

Prof. Shishir Kolathaya

UdeM | E–Mail | Webpage

Prof. Liam Paull

UdeM | E–Mail | Webpage