

# NITHIN VASISHTA

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## CONTACT INFORMATION

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## 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, Theoretical 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](#), [RBCCPS](#), [IISc](#)

*April 2023 – Present*

Designed a robust control system based on convex MPC for bipedal robots. Simulation results: Reliable on inclines up to 30 degrees with payloads up to 5 kg. Along with this I am coordinating the machine learning effort for quadrupedal locomotion at Stoch Lab, IISc

*Involves:* Model predictive control, reinforcement learning, legged robots

## RESEARCH PROJECTS (GRADUATE)

### Master's Thesis: Concept Learning in CRAFT

Guide: [Prof. Liam Paull](#), [UdeM](#)

*Winter 2019 & Summer 2020*

Formulated a three component system for hierarchical environment that extracts reusable concepts from demonstrations and uses them to plan. Extracted concepts, if done properly, represent the causal mechanism of the environment. These concepts are shown to significantly boost performance in CRAFT – a simple 2D environment. ([report](#), [code](#))

### Representation Learning for Robot Navigation

Guide: [Prof. Liam Paull](#), [UdeM](#)

*Spring 2018*

Experimented with variants of VAE,  $\beta$ -VAE and  $\beta$ -TCVAE to study the relationship between the degree of disentanglement of the representation and the performance of the agent. Agent was trained using Advantage Actor Critic (A2C) for lane following task. ([report](#), [code](#))

*Involved:* Reinforcement Learning, VAEs, Pytorch, Python

### 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. ([report](#), [code](#))

*Involved:* VAEs, disentanglement & distance metrics, Pytorch, Python

RESEARCH INTERNSHIPS (UNDERGRAD)	<b>The AIR Lab, Robotics Institute, Carnegie Mellon University</b>	
	<i>Guide: <a href="#">Dr. Sebastian Scherer</a>, Systems Scientist</i>	<i>Summer 2016</i>
	<b>Learning Optimal Parameters for Coordinated Helicopter Turns</b> Designed a method that learns optimal parameters to perfectly match a coordinated helicopter turn and a motion planning pipeline that pre-processes and stores raw sensor data from helicopter demonstrations. ( <a href="#">tech report</a> ) <i>Involved:</i> Reinforcement Learning (LfD, IRL), Evolutionary Algorithms, MongoDB, Python, C++	
	<b>Department of Mechanical Engineering, École Polytechnique de Montréal</b>	
	<i>Guide: <a href="#">Prof. Sofiane Achiche</a>, Associate Professor</i>	<i>Summer 2015</i>
	<b>Semi-automatic Control of Robotic Aid using Artificial Vision</b> Implemented a classification algorithm based on AlexNet for household objects ( <a href="#">report &amp; code</a> ) <i>Involved:</i> Deep Learning, Computer Vision, C++, MATLAB	
RESEARCH PROJECTS (UNDERGRAD)	<b>The IIT Bombay Mars Rover Project</b>	
	<i>Guide: <a href="#">Prof. P.J. Guruprasad</a>, Aerospace, IITB</i>	<i>October 2015 – December 2016</i>
	Implemented a rover positioning system with Google maps integration and surveyed on-board biological testing facilities in existing mars rovers <i>Involved:</i> ROS, C++, Python	
	<b>Using Haptic Feedback to Improve Learning and Retention Capabilities</b>	
	<i>Guide: <a href="#">Prof. Abhishek Gupta</a>, ME &amp; <a href="#">Prof. Aziz Khan</a>, HSS, IITB</i>	<i>Spring 2016</i>
	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 <i>Involved:</i> OpenHaptics Toolkit, 3D systems - Touch device, C++	
	<b>Generation of 2D Microstructures for Crack Propagation &amp; Stress Analysis</b>	
	<i>Guide: <a href="#">Prof. Parag Tandaiya</a>, ME, IITB</i>	<i>Summer 2014</i>
	Developed a GUI to simulate microstructures resembling solid grains using voronoi tessellations to facilitate the analysis of crack propagation and stress distribution. <i>Involved:</i> MATLAB, ABAQUS; Report and code <a href="#">here</a>	
COURSE PROJECTS	Reinforcement Learning for Carrom ( <a href="#">report;code</a> )	Neural Machine Translation ( <a href="#">report</a> )
	Camera Calibration using Vanishing Points ( <a href="#">code</a> )	Automatic Laser Etching Machine ( <a href="#">report</a> )
PROFESSIONAL EXPERIENCE (NON TECHNICAL)	<b>Sr. Research &amp; Development Engineer — CTO's office</b>	
	<i>Fall 2022 – Summer 2022</i>	
	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 <i>Involved:</i> Leadership skills, RNNs, Decision Trees	
	<b>Executive Assistant to CEO — Production Manager</b>	
	<i>Winter 2020 – Winter 2021</i>	
	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) <i>Involved:</i> Strong management and leadership skills	
TECHNICAL SKILLS	PROGRAMMING	C/C++, Python, Matlab, mongoDB, L <sup>A</sup> T <sub>E</sub> X
	SOFTWARE	Machine Learning: Pytorch, Tensorflow, Theano, Scikit-learn
	PACKAGES	Robotics: ROS/Gazebo, OpenCV, OpenHaptics, SolidWorks

ACHIEVEMENTS AND AWARDS	<ul style="list-style-type: none"> <li>• Secured an <b>All India Rank of 97</b> in IIT-JEE'13 (Main) out of more than 1,400,000 candidates</li> <li>• Secured an <b>All India Rank of 301</b> in IIT-JEE'13 (Adv.) out of more than 150,000 candidates</li> <li>• Secured an <b>All India Rank of 17</b> in the KVPY'12. Offered with prestigious <b>KVPY Fellowship</b></li> <li>• Represented the Mars Rover Team, IIT-Bombay at Boeing's Aerospace Innovation Summit 2015</li> </ul>	
POSITIONS OF RESPONSIBILITY	<ul style="list-style-type: none"> <li>• Organiser, Learning Agents Reading Group (Mila)</li> <li>• Department Academic Mentor 2016</li> <li>• Institute Cultural Mentor Film &amp; Media 2014</li> <li>• Customer Relations Representative, EmotionalFalls 2014-15</li> </ul>	
OTHER ACTIVITIES	<p>Led a team of 28 organisers for the execution of Digital Arts and Chef's Corner, Mood Indigo 2014</p> <p>I specialized in editing and acting 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.</p>	
REFERENCES	<b>Prof. Shishir Kolathaya</b> UdeM   <a href="#">E-Mail</a>   <a href="#">Webpage</a>	<b>Prof. Liam Paull</b> UdeM   <a href="#">E-Mail</a>   <a href="#">Webpage</a>