

# Nikhil Podila

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## SUMMARY

A Masters graduate with **Robotics specialization** and **over 2 years of professional experience as Data Scientist** implementing end-to-end ML solutions. With an innovation record of 2 academic theses, an IEEE publication and 2 patent filings, I have developed the skillset and expertise to implement efficient solutions.

## EDUCATION

Master of Science (M.Sc. Thesis) in Electrical Engineering – Intelligent Systems      September 2019 – October 2022  
McGill University – GPA 3.9/4      Montreal, Canada

Courses: Applied Machine Learning, Reinforcement Learning,  
Learning & Optimization for Robot Control, Optimization & Optimal Control.

Bachelor of Engineering (B.E.) in Electrical and Electronics Engineering      August 2013 - June 2017  
PES Institute of Technology (PESIT) – GPA 9.37/10      Bangalore, India

## PROFESSIONAL EXPERIENCE

### **Data Scientist**

July 2017 – July 2019  
Bangalore, India

ABB Global Industries and Services Ltd.

- Improved prediction of semiconductor failures in Electric Drives to >0.7 recall by developing proof-of-concepts on detecting operational anomalies and fault prediction.
- Developed time-series forecasting of dynamical system operating states using autoregressive and RNN methods in **Python**, leading to 20% lesser false positives in Electric Drive faults prediction.
- Launched anomaly detection system pilot with live **Microsoft (MS) PowerBI** prediction visuals on a wind turbine farm.
- Led the team in successful migration of failure prediction system from codebase in **R** to **PySpark** on **Azure DataBricks**.
- Monitored data input and maintained blob files on **MS Azure Data Lake Store** for the Predictive Maintenance team.
- Assisted Data Engineer in scaling & monitoring failure prediction to 50+ drive units on **MS Azure Data Factory**.
- Responsible for evaluation of Analytics tools by start-ups as part of the 1<sup>st</sup> ABB India Technology Ventures Pitchfest.
- Mobilized additional investment in predictive maintenance research through stakeholder engagement in pilot project.
- Implemented and assessed condition monitoring algorithms on ML platforms (**Azure ML Studio, MS HDInsight**)
- Influenced condition monitoring code reuse in a cross-division collaboration by implementing it in production on a custom **C#** based distributed computing platform.
- Co-designed a custom sprint backlog with Product Owner to meet research-oriented needs of the Data Science team.
- Collaborated with DevOps engineers for maintaining **Git** repository and regular code reviews.

### **Intern - Data Analytics**

February 2017 – June 2017 | June 2016 – August 2016  
Bangalore, India

ABB Global Industries and Services Ltd.

- Established data analysis metrics, data source requirements and pitched a research proposal for setting up the analytics team for Electric Drives R&D in India.
- Arranged an extensive report of data science use cases with sensor data analysis in **R**.
- Streamlined data from multiple sensor sources in 20+ drive units for use in fault prediction & analytics.
- Assisted team to automate manual testing by linking inventory & sensor databases on **MS Azure Blob Storage & SQL**.

### **Graduate Teaching Assistant**

January 2020 – December 2021  
Montreal, Canada

McGill University

- ECSE 324 Computer Organization (Winter 2020) – Organized lab experiments for students using an ARM SoC board and evaluated student's demonstrations.
- COMP 202 Foundations of Programming (Fall 2020, Winter 2021) – Hosting student presentations, live sessions on Zoom for over 200 students, office hours to clear student's questions and grading assignments and final project.
- COMP 597 Topics in Computer Science 4 – Applied Robotics (Fall 2021) – Responsible for grading students' assignments submitted using C++ and ROS.

## **PROJECTS**

Online inertial parameter estimation for manipulator robot control (M.Sc. Thesis) July 2020 – August 2022

- Developed a superior method for adapting dynamic models online while ensuring physical consistency in parameters.
- Innovated a weights-reparameterised machine learning method for estimating interpretable robot models.
- Improved convergence of robot inertial parameter estimation with prior parameter estimates using **PyTorch** & **Scipy**.
- Simulated tracking control with ML robot models on Open Dynamics Robot and KUKA manipulators using **C++**, **ROS**, **Gazebo** & **Pinocchio** libraries in **Linux**.

Reinforcement learning algorithms applied to optimization & control problems January 2017 - May 2017

- Devised a hybrid non-linear control method for cart-pole balancing using Energy method (Swing-up) & LQR (stabilization), resulting in a simpler switching system between the control phases.
- Compared Q-learning, Policy gradient and actor-critic methods for cart-pole stabilization using **MATLAB**.
- Integrated Energy method swing-up and RL stabilization to stabilise control 40% faster than results in literature.

Mobile Robot Perception with Computer Vision May 2016 - December 2016

- Developed SIFT (Scale Invariant Feature Transform) and SURF (Speeded-Up Robust Features) image feature extraction for detecting mobile robot environment within 100ms.
- Implemented FABMAP (Fast Appearance Based Mapping) to map mobile robot environment for robot localization.

## **PUBLICATIONS AND RECOGNITION**

- Spot Award: Outstanding value delivery and invention filing in ABB Drives R&D, 2018
- US Patent: Method and system for monitoring condition of Electric Drives, ABB, 2018
- US Patent: Anomaly detection system and method for Electric Drives, ABB, 2018
- IEEE Paper: Comparison of reinforcement learning algorithms applied to the cart-pole problem, ICACCI 2017
- Academic Award: Among top 10 best performers in B.E. 2017 graduating batch, PESIT, 2017