

# Bhavinkumar Patel

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Toronto, Ontario



## Professional Experience

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### Intermediate Controls Specialist

#### Besnovo Inc.

JAN. 2018 – CURRENT

- Researching various non-destructive techniques that can measure paint thickness and detect paint for closed-loop laser control.
- Designed a closed-loop motion control algorithm of the Automated Guided Vehicle (AGV) with mecanum wheels.
- Designed and implemented an Ultra-Wideband based indoor positioning system (IPS) of the AGV using the C++ language.
- Developed and integrated sensor fusion algorithm (Extended Kalman Filters).
- Verified and validated the IPS and sensor fusion algorithms.
- Experienced with Matlab/Simulink modelling and auto code generation.
- Experience integrating Can Serial Communications Protocols (CANOpen) with Beckhoff PLCs.
- Formed FMEA (Failure Mode Effects Analysis) process for the laser de-coating system.
- Researched various non-destructive techniques that can identify materials (aluminum or composite) under the paint.
- Designed a conceptual diagram of the Automatic Robotic Painting System for commercial aircraft.

### System Integration Engineer

#### Caterpillar Inc.

APR. 2017 – DEC. 2017

- Developed test procedures to validate the test environment.
- Designed, maintained and executed test procedures in alignment with test design guidelines and strategy.
- Experienced with developing and verifying embedded software using hardware in the loop equipment and software (E.g. dSpace, National Instruments).
- Experienced with dSpace Control Desk and Automation Desk.
- Formed FMEA (Failure Mode Effects Analysis) process for drill rig machine.
- Formulated software technical design specification and integration documentation for the drill rig machine.
- Coordinated with multiple teams to resolve system design and integration issues.

### Control Firmware Engineer

#### Rockwell Automation

OCT. 2015 – OCT. 2016

- Designed motion control algorithms for AC induction motor drives.
- Experienced in building models using Matlab/Simulink and Stateflow.
- Generated C-code from Simulink models and uploaded them on the hardware.
- Created and executed automated software test plans and cases.
- Integrated Simulink models into one final integration model for tests on the real-time simulator using RTLAB software.
- Operated demo unit of PowerFlex 755 drive to understand the system better.
- Experienced working in a Scrum and Agile environment.

### Electrical Supervisor I

#### Mortenson Construction

JAN. 2014 – OCT. 2015

- Supervised the sub-contractor personnel to ensure the contractor performs all work to agreed standards for safety, health and environment.
- Carried out inspection, monitoring of contractor activities, ensuring records are maintained, including as-built data.
- Analyzed HVDC converter station electrical schematics and ensure all specific factors are correctly incorporated.

- Provided engineering support, troubleshoot operational problems, and offer alternate resolutions.
- Analyzed substation & wind turbine electrical schematics and specifications for accuracy and ensuring that all specific factors are correctly incorporated.

## Education

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### Master of Science - Control Engineering

SEPT. 2011 – MAY 2013

#### Lakehead University, Thunder Bay

Thesis: Development and Implementation of High Performance and High Efficiency Interior Permanent Magnet Synchronous Motor (IPMSM) Drive

### Bachelor of Engineering - Electrical Engineering

JULY 2009 – MAY 2011

#### Lakehead University, Thunder Bay

Capstone Project: Automatic Light Level Control System in a Room

### Electronics Engineering Technology - Control Systems

SEPT. 2006 – MAY 2009

#### Seneca College of Applied Arts & Technology, Toronto

Capstone Project: Controlling a Robotic Arm Manipulator with a PLC

## Skills

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### Programming languages

- MATLAB
- C / C++
- Python
- HTML5
- CSS3
- Ladder Logic

### Development tools

- Microsoft Visual Studio
- Beckhoff TwinCAT
- Simulink
- Stateflow
- dSpace ControlDesk
- OpenCV

### Operating system

- Microsoft Windows
- MacOS
- Linux/Unix

### Languages

- English
- Hindi
- Gujarati

## Publications

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Bhavinkumar Patel, M. Nasir Uddin, Md. Mizanur Rahman, Bala Venkatesh, "Performance of a Loss Model Based Nonlinear Controller for IPMSM Drive Incorporating Parameter Uncertainties", IEEE Transactions on Power Electronics, Sept. 2018

Bhavinkumar Patel, M. Nasir Uddin, "Adaptive Neuro-Fuzzy and Loss Minimization Based High Performance Control of IPMSM", IEEE Energy Conversion Congress and Exposition (ECCE), Sept. 2015

Bhavinkumar Patel, M. Nasir Uddin, "Development of a Nonlinear Loss Minimization Control of an IPMSM Drive with Flux Estimation", IEEE International Electric Machines & Drives Conference (IEMDC), May 2013