

PRANAV MILIND KHANOLKAR

Toronto, Ontario, Canada | [✉ khanolkarpranav30@gmail.com](mailto:khanolkarpranav30@gmail.com) | [☎ +1-647-878-1671](tel:+16478781671) | [LinkedIn](#) | [Google Scholar](#) | [Website](#)

EDUCATION

Doctor of Philosophy: Mechanical and Industrial Engineering
University of Toronto, St. George Campus, Toronto, Canada

Expected Graduation Year: August 2024
GPA – 3.85 / 4

Master of Science: Industrial Engineering
The Pennsylvania State University, University Park Campus, PA, USA

Graduation Year: May 2020
GPA – 3.85 / 4

Bachelor of Engineering: Mechanical Engineering
University of Mumbai, Fr. Conceicao Rodrigues Institute of Technology, India

Graduation Year: May 2017
CGPA - 8.59 / 10

SKILLS

Programming Languages: Java (Basic), Python (Intermediate), R (Intermediate), MATLAB (Basic), HTML (Basic)
AI: Machine Learning & Deep Learning (Sckit Learn, Keras, PyTorch, TensorFlow), Natural Language Processing (nltk)
Application Software: SolidWorks, OnShape, AutoCAD, Autodesk Inventor, ANSYS Workbench, Power BI, Tableau, Minitab
Research Skills: Statistical Analysis, Literature Review and Analysis, Qualitative Coding and Analysis, Case Study Analysis, Grant Writing

EXPERIENCE

Graduate Researcher – Ready Lab, University of Toronto
Toronto, Ontario, Canada

September 2020 – present

- Currently conducting case studies to understand the decision-making process behind the selection, development, and implementation of the right AI-based automation methods catered to an industry's product design process.
- Conducted a focused literature review (108 peer-reviewed publications) of different AI methods that are specifically deployed in different stages of the engineering design process and illustrate how these methods assist engineers. [[Link to publication](#)]
- Leveraged natural language processing and web-scraping to assess the prevalence of AI education in mechanical engineering curricula of accredited Canadian universities, highlighting the importance of AI education. [[Link to publication](#)] [[Link to dataset](#)]
- Mentored five undergraduate students in conducting and presenting literature reviews and academic writing for research.

Mitacs Accelerate Research Intern – University of Toronto & RPS Composites
Toronto, Ontario, Canada

September 2021 – August 2022

- Received Mitacs Accelerate Internship Award for the project, 'A New Automated Approach for Engineering Design and Manufacturing Specification Generation' in collaboration with industry partner – RPS Composites.
- Reviewed and reported the shortcomings of the industry's traditional composite design process, using sensitivity analysis and interviews with the company's engineering team.
- Developed automation programs for design of composite based products and their manufacturing specifications, bill of materials, and drawing-exchange-format (DXF) files for CNC machining.
- Deployed these automation programs which proved 10x faster than their traditional design processes. [[Link to publication](#)]

Graduate Researcher – THRED Lab, The Pennsylvania State University
State College, Pennsylvania, US

June 2019 – May 2020

- Collaborated with faculties from Engineering Design and Industrial Engineering departments to conduct interdisciplinary research.
- Researched and analyzed various AI-based algorithms related to this research project on improving the speed of finite element analysis without compromising the accuracy of the results.
- Developed Deep Learning algorithms for rapid prediction of strain fields in aluminum microstructures with 96% accuracy and 20x faster than the traditional finite element analysis software. [[Link to publication](#)] [[Link to dataset](#)]
- Mentored an undergraduate and a fellow graduate student on their respective projects related to this work.

CERTIFICATIONS

- [IBM AI Engineering Professional Certificate](#) – Coursera
- [NLP - Natural Language Processing with Python](#) – Udemy
- [Python for Data Science and Machine Learning Bootcamp](#) – Udemy
- [Six Sigma and Lean: Quantitative Tools for Quality and Productivity Professional Certificate offered by TU Munich](#) – EDX
- **Product Design and Analysis** – by CADD Centre Training Services Pvt. Ltd.

ACADEMIC PROJECTS

Comparative Analysis of Self-Supervised Learners

December 2021

- Reviewed and documented five self-supervised learning (SSL) algorithms (MoCo, SimCLR, BYOL, SwAV, Barlow Twins).
- Performed qualitative analysis using T-SNE plots and on these five SSL algorithms using the CIFAR10 dataset and their comparison with supervised learning method for classification.
- Performed quantitative analysis of these self-supervised learning (SSL) algorithms by evaluating their models' transfer learning ability using out-of-distribution testing for image classification.
- Developed an ensemble of these five SSL methods and supervised learning methods to assess the improvement in image classification compared to the individual methods.

Statistical analyses of the BRFSS for effective monitoring of weight-related concerns

December 2020

- Analyzed the Behavioral Risk Factor Surveillance System (BRFSS) dataset, containing information of 276 variables that include interview information, location, demographics, health, and medical information of 437436 respondents.
- Performed K-means clustering to observe the patterns based on the US state population and Body Mass Index (BMI).
- Created logistic regression models, predicting Heart Attack Diagnosis, Cancer Diagnosis, and Diabetes Diagnosis, with Drinking and Smoking as the predictors.
- Conducted logistic regression tests to analyze if adding BMI score to the prediction models with only Drinking and Smoking as the predictors of such disease diagnoses will render the model a better fit.

Design Improvement of Debris Subsystem for Tennant Floor Scrubbers – Designing Product Families

December 2019

- Led a team of seven graduate students to assess the product platforms for Tennant Floor Scrubber models T300, T500 and T600.
- Evaluated and established the current commonality between the three scrubbers' components/modules that can be platformed for improved efficiency in manufacturing system.
- Performed commonality assessment using Product Commonality Index (PCI) for the debris subsystem.
- Performed a variety assessment using Generational Variety Index (GVI) by mapping consumer needs to engineering requirements and current components of the scrubbers.
- Performed Commonality-Variety Tradeoff for design assessment and changes to be recommended.
- Constructed a Design Structure Matrix (DSM) to analyze the interface between components to assess the propagation, risk and impact due to design-changes and provided a report highlighting the final recommendations for improving design and platforming.

Remote Order Taking – Discrete Event Simulation

May 2019

- For a given dataset, analyzed and optimized the number of servers required for a drive-through restaurant- chain in the area to improve efficiency according to desired performance standards using discrete event simulations in Python.
- Performed a sensitivity analysis to observe the change in the required number of operators if more branches were added.
- Quantified the uncertainty based on input distribution models fitted according to given data.

TEACHING EXPERIENCE

TA – APS100 Orientation to Engineering

Term: Fall 2023

(University of Toronto)

- Facilitated active online learning activities and sessions for classes of 300-325 students.
- Graded and provided student feedback on course assignments which focused on topics such as time management, and engineering ethics.

TA – MIE258 Engineering Economics and Accounting

Terms: Fall 2024, Fall 2023, Fall 2022

(University of Toronto)

- Conducted weekly tutorials and Q&A sessions for approx. 50 students on concepts of engineering economics and accounting.
- Supervised and graded midterm and final exams.
- Prepared video lectures featuring revision of concepts and assignment details.

OTHER EXPERIENCE

Section Editor, Engineering – The Canadian Science Fair Journal

July 2022- present

- Lead a team of team of five graduate students and researchers across different universities in Canada and connect them to high-school students (aged 12-18 years).
- Assign engineering research articles submitted to the engineering editors for review and mentorship.
- Review, guide and publish research articles by mentoring young authors through the process of writing their first scientific paper.
- Provide detailed suggestions and revisions to student papers with the aim of helping them develop their scientific writing and literacy skills.