# JUSTIN JACOB

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## Work Experience

**Graduate Research Assistant**
Robotics and Computer Vision Lab, Ingenuity Labs, Queen's University | May 2025 – Present

- Developing a deep learning framework with PyTorch for non-invasive glaucoma monitoring using images acquired from microfluidic contact lenses.
- Developing deep learning models for medical image segmentation and classification to estimate intraocular pressure (IOP).
- Preprocessing, annotating and managing medical imaging datasets for model development.
- Evaluating models using quantitative metrics and improving performance through experimentation and hyperparameter tuning.

**Teaching Assistant**
Smith Engineering, Queen's University, Kingston, ON, Canada | Sept 2024 - Present

- TA for ELEC 475 – Computer Vision and Deep Learning, supporting laboratory instruction, project supervision and student mentoring
- Conduct tutorials and office hours and develop laboratory exercises, programming assignments and course projects.
- Supported additional courses including ELEC 471, MNTC 313, APSC 141 and APSC 142.

**Machine Learning Intern**
Pattern AI Labs by Agrima Tech, India | Jan 2024 – Apr 2024

- Supported the development, testing and deployment of machine learning models into production environments.
- Tested and validated machine learning models before deployment.
- Troubleshot inference and integration issues.
- Documented deployment workflows and technical procedures.

## Education

**MASc. in Electrical and Computer Engineering**
Queen's University, Kingston, Ontario, Canada, 2024- 2026
Co-Supervised by Dr. Michael Greenspan and Dr. Yong-Jun Lai.
GPA - 4.1/4.3

**B.Tech (Honors) in Computer Science & Engineering (Major), Electronics and Communication Engineering (Minor)**
APJ Abdul Kalam Technological University (KTU), Kerala, India, 2019 – 2023
Supervised by Prof. Lisha Kurian
Grade- 87.4%, First Class With Distinction

## Technical Skills:

Python, C++, PyTorch, TensorFlow, Hugging Face Transformers, scikit-learn, OpenCV, NumPy, Pandas, Matplotlib, Git, Linux, Medical Image Segmentation, Image Classification, Computer Vision, NLP, CNNs, Transformers

## Selected Publications

- **J. Jacob**, T. Afrin, Y. J. Lai, M. Greenspan. “A Deep Learning Framework for Vision-Based Intraocular Pressure Monitoring Using Microfluidic Contact Lenses.” *24th International Conference on Artificial Intelligence in Medicine (AIME)*, 2026.
- ***J. Jacob**, L. Kurian. “CNN-Based Approach for Diagnosis of Plant Diseases.” International Conference on Machine Intelligence in Research and Development (ICMIRD), 2023.*
- *L. Kurian, V. P. M., **J. Jacob**, M. C., P. Jayan, and S. Suresh. “Enhancing EV Adoption with Machine Learning-Powered Charging Station Locator.” International Conference on Machine Intelligence in Research and Development (ICMIRD), 2023.*
- *P. Varghese, **Justin Jacob**. “Wi-Fi Security: Mitigating Risks and Ensuring Data Protection.” International Conference on Electronics and Communication Engineering (ICECE), 2023.*

## Selected Research Projects

### *TrueText*

- *Developed a BERT-based AI-generated text detector using PyTorch and Hugging Face Transformers.*
- *Built a custom dataset from Reddit, news articles and AI-generated text.*
- *Benchmarked performance against existing AI text detection tools.*

### *DepressNet*

- *Developed a BERT-based NLP model for early mental health detection.*
- *Fine tuned transformer models using Hugging Face Transformers.*
- *Compared performance against SVM, Random Forest, Logistic Regression and other machine learning baselines.*

### *CNN-Based Plant Disease Diagnosis*

- *Developed a ResNet34-based convolutional neural network for automated plant disease classification.*
- *Built preprocessing and training pipelines including image normalization and augmentation.*
- *Evaluated model performance using accuracy, precision, recall and F1-score, achieving 95% validation accuracy.*

## Awards and Achievements

- Lance Stafford Larson Student Paper Award, IEEE Computer Society, Fall 2023
- Best Outgoing Student Award, CSE Dept, SNGCE, 2023
- Outstanding Volunteer Award, IEEE Computer Society Kerala Chapter, 2022
- 3rd Place, Project Expo, SNGCE - Plant Disease Identification using ML, 2022

## Leadership & Professional Activities

- Professional Development Coordinator, IEEE Canada- 2025 - Present
- Editor-in-Chief — IEEE Computer Society Compute Newsletter - 2026- Present
- Secretary, IEEE Student Branch, Queens University - 2025
- Secretary, Climate & Sustainability Space, IEEE Computer Society SYP, 2024 - 2025
- Chief Technology Officer (CTO), IEDC SNGCE, 2022- 2023
- Chairman, College Students Council, SNGCE, 2022-2023
- Chief Editor, IEEE R10 YP Scribld Magazine, 2023
- Founder Chair, IEEE Computer Society Student Branch Chapter, SNGCE | 2022