

# Hasib Zunair

Ph.D in Machine Learning & Computer Vision

**Email:** hasibzunair@gmail.com **Phone:** (514) 893-4048 **Location:** Toronto, Canada

**Website** **LinkedIn** **Google Scholar** **GitHub**

## WORK EXPERIENCE

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### Decathlon

Montreal, Canada

*Machine Learning Engineer*

*Sept. 2022 – June 2024*

- Developed machine learning (ML) algorithms, communicated with PM, collaborated with app dev team for real-time automated basketball game video analysis on mobile, using fine-tuning and model quantization techniques, **driving higher app engagement**.
- Created a **data annotation workflow**, **saving 7× time** and **reducing operational costs** in model development.
- Built detector to analyze marathon photos, **enabling automated market penetration** analysis for bike brands.
- Deployed APIs and optimized for inference efficiency, implementing model compression techniques like quantization, pruning, knowledge distillation, **reducing memory usage and latency**.
- Mentored an intern** in developing a domain-specific human pose estimation model for bike posture analysis.
- Tools:** Python, PyTorch, HF Transformers, ONNX, CoreML, FastAPI, Docker, GCP services, GitHub Actions.

*Machine Learning Research Intern*

*Sept. 2020 – Aug. 2022*

- Developed **generative AI virtual try-on algorithm**, **improved realism of images by 20%**, preserving clothing product details across diverse body types, **enhancing online shopping experience**; published in BMVC'22.
- Created **semi-supervised learning algorithm**, **owned feature to train models using unlabeled data to improve accuracy by 10%**, **save 6× time**, **reduce 5× cloud compute resources**; published in MMSports'21.
- Led and managed the two research projects** from ideation, dataset creation, algorithm development, experimental design, to writing design documentation and technical reports, aligned with business needs.
- Tools:** Python, PyTorch, TensorFlow, OpenCV, LabelMe, Docker, Gradio, HF Spaces.

### Concordia University

Montreal, Canada

*Machine Learning Researcher*

*Sept. 2019 – Dec. 2024*

- Designed and implemented deep learning algorithms in 2D & 3D vision **addressing complex real-world challenges** for image recognition, segmentation, generation etc., **improving predictive accuracy, compute- and data-efficiency** compared to existing state-of-the-art methods.
- Tailored advanced models like DINO, ViT, GANs, U-Net, SAM, CLIP, VLMs, applied unsupervised, self-supervised, zero-shot learning approaches, **resulting in industry collaborations** to build practical ML solutions.
- Led publications and presented at top-tier conferences (WACV, BMVC), oral presentation at BMVC'22 (top 5% acceptance rate), journals (IEEE TMI, IF: 10.6) and workshops (CVPR, ICML) **resulting in 1000+ citations**.
- Mentored 15 students from undergraduates to Ph.Ds through research projects, **publishing at several journals**.
- Tools:** Python, PyTorch, OpenCV, NumPy, Scikit-learn, Pillow, MMCV, Timm, Tensorboard, Weights & Biases.

### Ericsson

Montreal, Canada

*Machine Learning Specialist*

*Oct. 2021 – Mar. 2022 & Feb. 2024 – June 2024*

- Assisted 21 individuals in developing time-series forecasting and anomaly detection models, using internal data.
- Taught ML concepts, from image classification using **TensorFlow** to generative models with **PyTorch**.
- Recommended approaches, tools and libraries for **streamlining project development and deployment**.
- Guided development through code reviews and best practices to **ensure successful project completion**.

## EDUCATION

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### Concordia University

Montreal, Canada

*Ph.D and MAsC in Computer Vision, Machine Learning & Artificial Intelligence*

*Sep. 2019 – Dec. 2024*

### North South University

*B.Sc. in Electrical & Electronic Engineering*

Dhaka, Bangladesh

*May 2013 – Dec. 2017*

## SKILLS

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- Programming Languages:** Python, Bash (Shell Scripting).
- Tools & Libraries:** PyTorch, TensorFlow/Keras, OpenCV, NumPy, Scikit-learn, Weights & Biases, Pytest.
- Cloud Infrastructure and MLOps:** GCP, FastAPI, Docker, Gradio, Git, GitHub Actions, Kubernetes.

## OPEN-SOURCE CONTRIBUTIONS

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- [kornia/kornia](#) (GitHub Stars: >10K), Added implementation of MS-SSIM + L1 loss function as a core feature.
- [keras-team/keras](#) (GitHub Stars: >61K), Wrote tutorial code for 3D image classification from CT scans.
- [meituan/YOLOv6](#) (GitHub Stars: >5.7K), Fixed export of object detection models to ONNX format.

## SELECTED PUBLICATIONS

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Full list of publications available on [Google Scholar](#).

- **PEEKABOO: Hiding Parts of an Image for Unsupervised Object Localization.** [Hasib Zunair](#), A. Ben Hamza. In *BMVC*, 2024.
- **Learning to Recognize Occluded and Small Objects with Partial Inputs.** [Hasib Zunair](#), A. Ben Hamza. In *WACV*, 2024.
- **Masked Supervised Learning for Semantic Segmentation.** [Hasib Zunair](#), A. Ben Hamza. In *BMVC*, 2022 (**Oral Presentation, Top 5%**).
- **Sharp U-Net: Depthwise Convolutional Network for Biomedical Image Segmentation.** [Hasib Zunair](#), A. Ben Hamza. In *Computers in Biology and Medicine*, 2021 (**Impact Factor: 7.7**).
- **A Multi-organ Nuclei Segmentation and Classification Challenge.** Ruchika Verma, Neeraj Kumar, [Hasib Zunair](#), A. Ben Hamza. In *IEEE Transactions on Medical Imaging*, 2021 (**Impact Factor: 10.6**).

## MACHINE LEARNING COMPETITIONS

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|---|------|
| • Product Counting for Retail, AI City Challenge, CVPR Workshop - <b>3rd Place</b> ( <a href="#">Paper</a> , <a href="#">Code</a> , <a href="#">Leaderboard</a> ) | 2022 |
| • Tuberculosis Type Classification from 3D CT Scans, ImageCLEF - <b>2nd Place</b> ( <a href="#">Paper</a> , <a href="#">Code</a> , <a href="#">Leaderboard</a> )  | 2021 |
| • Nuclei Segmentation from Whole Slide Images, MoNuSAC - 11th Place ( <a href="#">Paper</a> , <a href="#">Code</a> , <a href="#">Leaderboard</a> )                | 2020 |
| • Tuberculosis Prediction, ImageCLEF - 5th Place ( <a href="#">Paper</a> , <a href="#">Code</a> , <a href="#">Leaderboard</a> )                                   | 2019 |
| • Bengali Digit Recognition, bengali.ai - 6th Place ( <a href="#">Paper</a> , <a href="#">Code</a> , <a href="#">Leaderboard</a> )                                | 2018 |

## MENTORING & SUPERVISION

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- Mominul Islam. **CosSIF**. In *Computers in Biology and Medicine*, 2024 (**Impact Factor: 7.7**).
- Deponker Sarker Depto, Md. Mashfiq Rizvee. **Leukemia detection**. In *Computers in Biology and Medicine*, 2022.
- Md Shakib Khan, Kazi Nabiul Alam, Abdur Rab Dhruba. **Knowledge Distillation in Melanoma Detection**. In *Computers in Biology and Medicine*, 2022.
- Deponker Sarker Depto, Shazidur Rahman, Md. Mekayel Hosen, Mst Shapna Akter, Tamanna Rahman Reme. **Blood Cell Segmentation**. In *Tissue and Cell*, 2021.
- Tamanna Rahman Reme. **Malaria Classification**. In *Tissue and Cell*, 2021.

## CERTIFICATIONS & TRAINING

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|---|------|
| • Agile Crash Course: Agile Project Management; Agile Delivery. | 2024 |
| • Google Cloud Machine Learning - Vertex AI.                    | 2023 |
| • Effective MLOps - Model Development.                          | 2023 |
| • Terraform for Beginners using GCP - Google Cloud (Hands-on).  | 2023 |
| • Kubernetes for the Absolute Beginners - Hands On.             | 2023 |
| • Docker for the Absolute Beginner - Hands On - DevOps.         | 2023 |
| • Deep Learning + Reinforcement Learning Summer School.         | 2021 |

## AWARDS & SCHOLARSHIPS

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| • Concordia University Graduate Doctoral Fellowship and International Tuition Award of Excellence for Ph.D. | 2021       |
| • MITACS Accelerate Fellowship for two years for MASc.  | 2020       |
| • Concordia Merit Entrance Scholarship for Ph.D and MASc.   | 2021, 2019 |

## ACADEMIC SERVICES

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- **Reviewer:** WACV'24, BMVC'22, 3DV'22-'24, Pattern Recognition Letters'22, Physics in Medicine and Biology'21-'22.
- **Lab Demonstrator:** COMP6771 - Image Processing, Winter'21 and Winter'22; COMP333 - Intro to Data Analytics, Fall'21 at Concordia University. Taught image processing and data analysis concepts and implementations using Python, OpenCV, NumPy, Scikit-learn, Pandas, Matplotlib to graduate level courses of 80 students and guided course projects.

## MEDIA COVERAGE

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- "One of our students did something crazy with transfer learning.", Jeremy Howard, fast.ai.
- "Semi-supervised visual learning using large-scale sport image data.", Concordia University.
- "A multi-year training program for AI professional development at Ericsson.", Concordia University.