

Hasib Zunair

Ph.D Candidate in Computer Vision (Expected December 2024)

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

WORK EXPERIENCE

Decathlon

Montreal, Canada

Applied Machine Learning Scientist

Sept. 2022 – June 2024

- Developed machine learning (ML) algorithms like object and shot detection for **stat-tracking basketball game videos** in real-time using model quantization, elevating playing experience and driving higher app engagement.
- Created a **data annotation workflow**, **accelerating model development**, saving $7\times$ time and reducing costs.
- Built detector to **identify bikes** from marathon images to improve identifying penetration rate of bike brands.
- Deployed **cloud-based ML APIs** to serve scalable computer vision solutions, optimized models for efficiency.
- Mentored an intern in developing a domain-specific **human pose estimation** model for bike posture analysis.
- **Tools:** Python, PyTorch, YOLOv6, YOLOv8 Pose, ONNX, CoreML, FastAPI, Docker, GCP services, Weaviate.

Research Scientist Intern

Sept. 2020 – Aug. 2022

- Trained new **semi-supervised image classification algorithm** using large-scale unlabeled data, saving $6\times$ time, reducing $5\times$ cloud compute costs, boosts robustness compared to existing methods. Optimized method on **sport-or-not**, **yoga-pose** and **sport classification**, improving predictive accuracy; published in MMSports'21.
- Developed state-of-the-art **algorithm** and created a dataset using clothing products for **image-based virtual try-on**, preserving clothing texture, embroidery and handling complex person poses; published in BMVC'22.
- Led and **managed all the steps of the two research projects** from ideation, to planning and development of algorithms, to design of the experiments according to industrial and business needs, leading to publications.
- **Tools:** Python, TensorFlow, PyTorch, OpenCV, NumPy, Scikit-learn, LabelMe, Docker, Gradio, HF Spaces.

Concordia University

Montreal, Canada

Graduate Machine Learning Researcher

Sept. 2019 – Dec. 2024

- Designed accurate and efficient **deep learning** algorithms in **computer vision** for image generation, recognition, segmentation, object detection, addressing complex challenges. Tailored models like DINO, ViT, cGAN, ResNet, LeViT-UNet, DETIC, CLIP and SAM and applied unsupervised, self-supervised, **zero-shot learning** paradigms.
- Led publications and presented work at top conferences and journals like **WACV**, **BMVC**, **ICIP** and **IEEE TMI**, and workshops at **CVPR**, **ICML** and **MICCAI**, showcasing novel findings in computer vision, **890+ citations**.
- Collaborated with **product teams** in industry and external researchers to develop innovative ML solutions.
- Mentored **15 students from undergraduates to Ph.Ds** in deep learning research, guiding development.
- **Tools:** Python, PyTorch, OpenCV, NumPy, Scikit-learn, Pillow, MCMC, Timm, Tensorboard, Weights & Biases.

Ericsson

Montreal, Canada

Machine Learning Specialist

Feb. 2024 – June 2024

- Assisted 11 individuals in building **time-series forecasting** models using proprietary historical data.
- Taught **machine learning concepts** including **Building Large Language Models (LLMs) using PyTorch**.
- Recommended approaches, tools and libraries for **streamlining project development** and deployment.

Machine Learning Specialist

Oct. 2021 – Mar. 2022

- Assisted 10 individuals in **detecting anomalies** in historical time-series data using machine learning.
- Taught machine learning concepts, including **Building Machine Learning (ML) Models using TensorFlow**.
- Guided project implementation through code reviews to **ensure successful project completion**.

EDUCATION

Concordia University

Ph.D. in Information Systems Engineering

Montreal, Canada

Sept. 2021 – Dec. 2024

Concordia University

MASc in Quality Systems Engineering

Montreal, Canada

Sept. 2019 – Aug. 2021

North South University

B.Sc. in Electrical & Electronic Engineering

Dhaka, Bangladesh

May 2013 – Dec. 2017

SKILLS

- **Programming Languages:** Python, Bash (Shell Scripting), HTML, CSS
- **Libraries:** PyTorch, TensorFlow, OpenCV, NumPy, Scikit-learn, ONNX, CoreML, Weaviate, Weights & Biases, Pytest.
- **Cloud Infrastructure Tools:** Google Cloud Platform, FastAPI, Docker, Gradio, HF Spaces, GitHub Actions.

SELECTED PUBLICATIONS

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

- Product Counting for Retail, AI City Challenge, CVPR Workshop - **3rd Place** ([Paper](#), [Code](#), [Leaderboard](#)) 2022
- Tuberculosis Type Classification, ImageCLEF - **2nd Place** ([Paper](#), [Code](#), [Leaderboard](#)) 2021
- Nuclei Segmentation, MoNuSAC - 11th Place ([Paper](#), [Code](#), [Leaderboard](#)) 2020
- Tuberculosis Prediction, ImageCLEF - 5th Place ([Paper](#), [Code](#), [Leaderboard](#)) 2019
- Bengali Digit Recognition, bengali.ai - 6th Place ([Paper](#), [Code](#), [Leaderboard](#)) 2018

OPEN-SOURCE CONTRIBUTIONS

- [keras-team/keras](#) (GitHub Stars: >61000), Wrote tutorial code for 3D image classification.
- [meituan/YOLOv6](#) (GitHub Stars: >5600), Fix export of models to ONNX format.
- [kornia/kornia](#) (GitHub Stars: >9500), Add MS-SSIMLoss reconstruction loss as a feature.

DATASETS

- **Bangladesh Road Scene Understanding Dataset for Autonomous Driving.** In *ICIP*. 2024
- **Public Synthetic Dataset of COVID-19 Chest X-rays.** In *ICML Workshop*. 2021

AWARDS & SCHOLARSHIPS

- 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

SUPERVISION & MENTORING

- Mominul Islam. **CosSIF: Cosine similarity-based image filtering to overcome low inter-class variation in synthetic medical image datasets.** In *Computers in Biology and Medicine*, 2024 (**Impact Factor: 7.7**).
- Deponker Sarker Depto, Md. Mashfiq Rizvee. **Quantifying imbalanced classification methods for Leukemia detection.** In *Computers in Biology and Medicine*, 2022.
- Md Shakib Khan, Kazi Nabiul Alam, Abdur Rab Dhruba. **Knowledge distillation approach towards Melanoma detection.** In *Computers in Biology and Medicine*, 2022.
- Deponker Sarker Depto, Shazidur Rahman, Md. Mekayel Hosen, Mst Shapna Akter, Tamanna Rahman Reme. **Automatic segmentation of blood cells from microscopic slides.** In *Tissue and Cell*, 2021.
- Tamanna Rahman Reme. **Analysis of deep learning architectures on high variation Malaria parasite classification.** In *Tissue and Cell*, 2021.

ACADEMIC SERVICES

- **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

- **"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.