## Hasib Zunair


CONTACT INFORMATION

Montreal, Canada
904 Boul. Henri-Bourassa East, Apt 104
+15148934048

*Email*: hasibzunair@gmail.com
*Website*: hasibzunair.github.io
*Professional*: LinkedIn, GitHub


SKILLS

- **Research Expertise**: Computer Vision, Machine Learning, Image Recognition & Generation, Segmentation, Video Analysis, Object Detection, Visual Search, Technical Writing.
- **Programming Languages**: Python, Bash (Shell Scripting), Git, C++, Matlab.
- **Libraries & Programs**: NumPy, PyTorch, TensorFlow, Keras, OpenCV, imgaug, Scikit-learn, ONNX, CoreML, TensorBoard, Autodistill, LabelMe, Weights & Biases, Pytest.
- **Cloud Infrastructure & Deployment (CI/CD)**: Google Cloud Platform, Vertex AI, Docker, Flask, FastAPI, GitHub Actions, Gradio, Linux OS.
- **Team Management**: Led research teams from ideation, to development, to publication.
- **Product Management**: Led end-to-end development of novel algorithms from ideation, to planning, to design of the experiments according to industrial and business needs.

EDUCATION

**Ph.D. in Information Systems Engineering** Sep 2021 - Dec 2024
*Concordia University, Montreal, QC, Canada*
Thesis: Masked Supervised Models for Visual Learning
Advisor: Prof. Abdessamad Ben Hamza

**MAS.c in Quality Systems Engineering** Sep 2019 - Aug 2021
*Concordia University, Montreal, QC, Canada*
Thesis: Designing Efficient Deep Learning Models for Medical Diagnosis
Advisor: Prof. Abdessamad Ben Hamza

**B.Sc. in Electrical and Electronic Engineering** May 2013 - Dec 2017
*North South University (NSU), Dhaka, Bangladesh*
Capstone: Design and Implementation of an Automated Attendance System

INDUSTRY EXPERIENCE

**Applied ML Scientist** (Part-time) - *Decathlon, Montreal, Canada* Sept 2022 - Present
Developing machine learning and computer vision algorithms for sports use-cases and support the deployment on the cloud infrastructure and edge devices.

**ML Specialist** (5 months) - *Ericsson, Montreal, Canada* Feb 2024 - Jun 2024
Assisted three teams to build time-series forecasting models using proprietary historical data using machine learning. Also, delivered relevant ML tutorials and support project implementations.

**Research Scientist Intern** (12 months) - *Decathlon, Montreal, Canada* Sept 2021 - Aug 2022
Created image-based virtual try-on dataset using Decathlon products and developed FIFA to handle complex person poses while retaining the texture and embroidery of clothing items.

**Research Scientist Intern** (12 months) - *Decathlon, Montreal, Canada* Sept 2020 - Aug 2021
Researched approaches for semi-supervised image classification and developed STAR to improve Decathlon's existing computer vision models by leveraging large-scale unlabeled image data.

**ML Specialist** (6 months) - *Ericsson, Montreal, Canada* Oct 2021 - Mar 2022
Assisted two teams in detecting anomalies in proprietary historical time-series data using machine learning. Developed and delivered ML tutorials and support project implementations.

**ML Engineer** (4 months) - *Think Bricks LLC, Dhaka, Bangladesh* Apr 2019 - Aug 2019
Led and collaborated with a team of two interns and developed a deep learning model that improved diabetic retinopathy detection accuracy by 8% from fundus images, aiding doctors in diagnosis.

## Selected Publications

Full list of publications available on Google Scholar.

P.1 **RSUD20K: A Dataset for Road Scene Understanding In Autonomous Driving**. Hasib Zunair, Shakib Khan, A. Ben Hamza. In **ICIP**, 2024.

P.2 **Learning to Recognize Occluded and Small Objects with Partial Inputs**. Hasib Zunair, A. Ben Hamza. In **WACV**, 2024.

P.3 **Masked Supervised Learning for Semantic Segmentation**. Hasib Zunair, A. Ben Hamza. In **BMVC**, 2022 (Oral Presentation).

P.4 **Fill in Fabrics: Body-aware Self-supervised Inpainting for Image-based Virtual Try-on**. Hasib Zunair, Yan Gobeil, Samuel Mercier, A. Ben Hamza. In **BMVC**, 2022.

P.5 **VISTA: Vision Transformer Enhanced by U-Net and Image Colorfulness Frame Filtration for Automatic Retail Checkout**. Md Shihab Istiak Hossain, Nazia Tasnim, Hasib Zunair, Labiba Kanij Rupty, Nabeel Mohammed. In **CVPR Workshop**, 2022.

P.6 **Synthetic COVID-19 Chest X-ray Dataset for Computational Analysis**. Hasib Zunair, A. Ben Hamza. In **ICML Workshop**, 2021.

P.7 **Sharp U-Net: Depthwise Convolutional Network for Biomedical Image Segmentation**. Hasib Zunair, A. Ben Hamza. In **Computers in Biology and Medicine**, 2021.

P.8 **STAR: Noisy Semi-Supervised Transfer Learning for Visual Classification**. Hasib Zunair, Yan Gobeil, Samuel Mercier, and A. Ben Hamza. In **ACM Workshop**, 2021.

P.9 **MoNuSAC2020: A Multi-organ Nuclei Segmentation and Classification Challenge**. Ruchika Verma, Neeraj Kumar, Hasib Zunair, A. Ben Hamza et al.. In **IEEE Transactions on Medical Imaging**, 2021.

P.10 **Uniformizing Techniques to Process CT scans with 3D CNNs for Tuberculosis Prediction**. Hasib Zunair, Aimon Rahman, Nabeel Mohammed, and Joseph Paul Cohen. In **MICCAI Workshop**, 2020.

## Software Projects

All of my projects details are available on my website and the code on github.

`[Machine Learning Competitions]`

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

`[Datasets]`

- Bangladesh Road Scene Understanding Dataset for Autonomous Driving, 2024 - (Link)
- Public Synthetic Dataset of COVID-19 Chest X-rays, 2021 - (Link)

`[Other Projects]`

- Monocular-to-3D Virtual Try-On, 2021 - (Webpage, Report, Video, Slides, Code)
- Low to High Resolution Knee MRI Reconstruction, 2019 - (Code)
- Deep Learning based Thyroid Nodule Segmentation from Ultrasound Images, 2020 - (Code)

## Open-Source Contributions

meituan/YOLOv6 (GitHub Stars: >5100), Fix export of YOLO models to ONNX format.

kornia/kornia (GitHub Stars: >7600), Add MS-SSIMLoss reconstruction loss function as a feature.

keras-team/keras (GitHub Stars: >57000), Wrote tutorial code for 3D image classification.

## Awards & Scholarships

| | |
|---|---|
| Concordia University Graduate Doctoral Fellowship for Ph.D | 2021 |
| Concordia Internation Tuition Award of Excellence for Ph.D | 2021 |
| Concordia Merit Entrance Scholarship for Ph.D | 2021 |
| Two-year MITACS Accelerate Fellowship for MASc. | 2020 |
| Concordia Merit Entrance Scholarship for MASc. | 2019 |
| Best Student Paper Award, ICSSA, Kuching, Malaysia | 2018 |
| Winner (First Prize), IEEE SS12 Maker Fair, Hyderabad, India | 2017 |

## Invited Talks & Tutorials

| | |
|---|---|
| Build and Deploy Custom Docker Images for Object Recognition (Link) | 2023 |
| Deep Learning in Computer Vision with PyTorch, NSU (Link) | 2023 |
| Intro to Deep Learning with NumPy, NSU (Link) | 2022 |
| Building ML models with TensorFlow, Ericsson Canada (Link) | 2021 |
| How to get started with building Computer Vision systems, NSU (Link) | 2021 |
| 3D image classification from CT scans, Keras, TensorFlow (Link) | 2020 |
| Programming with Python, NSU (Link) | 2019 |
| Intro to Deep Learning for Image Classification using Python, NSU (Link) | 2019 |
| Basics of Image Processing and Computer Vision, NSU (Link) | 2018 |
| Intro to Robotics (ROBO101), a semester-long series of workshops, NSU | 2018 |

## Certifications & Training

| | |
|---|---|
| Udemy - "Agile Crash Course: Agile Project Management; Agile Delivery" (Link) | 2024 |
| Udemy - "GitHub Actions - The Complete Guide" (Link) | 2023 |
| Udemy - "Terraform for Beginners using GCP - Google Cloud (Hands-on)" (Link) | 2023 |
| Udemy - "Google Cloud Machine Learning - Vertex AI" (Link) | 2023 |
| W&B - "Effective MLOps - Model Development" (Link) | 2023 |
| Udemy - "Google Cloud Platform (GCP) Fundamentals for Beginners" (Link) | 2023 |
| Udemy - "Kubernetes for the Absolute Beginners - Hands On" (Link) | 2023 |
| Udemy - "Docker for the Absolute Beginner - Hands On - DevOps" (Link) | 2023 |
| CIFAR - "Deep Learning + Reinforcement Learning Summer School" (Link) | 2021 |
| Coursera - "Deep Learning Specialization" (Link) | 2019 |
| Coursera - "Introduction to TensorFlow for AI, ML, DL" (Link) | 2019 |
| Coursera - "Convolutional Neural Networks in TensorFlow" (Link) | 2019 |
| Coursera - "IBM Machine Learning with Python" (Link) | 2019 |

## Academic Services

Reviewer: Winter Conference on Applications of Computer Vision (WACV), 2024
Reviewer: British Machine Vision Conference (BMVC), 2022, 2024
Reviewer: International Conference on 3D Vision (3DV), 2022, 2023, 2024
Reviewer: Pattern Recognition Letters (PRL), 2022
Reviewer: Physics in Medicine and Biology (PMB), 2021, 2022

## Teaching Experience

Lab Demonstrator, COMP 6771: Image Processing, *Concordia University* 2022
Lab Demonstrator, COMP 333: Intro to Data Analytics, *Concordia University* 2021
Lab Demonstrator, COMP 6771: Image Processing, *Concordia University* 2021

## 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.
- Jingnan Cao, "**Human Pose Estimation for Bike Posture Analysis**", In **Decathlon SportsLab, France**, 2023.
- Khundker Mohammad Sarwar Khalid, Farhan Ishraq Omi, Mohammed Bashem, "**Improving Masked Supervision for Semantic Segmentation**", 2023.
- Kazi Ramisa Rifa, Khalid Bin Shafiq, "**Bangladeshi Traditional Virtual Try-On with Deep Learning Techniques and Computer Vision**", 2023.
- Rejuana Islam, Fairooz Rahman, Md. Khaled Zohani Tonmoy, Mahmud Khan, "**Synthetic Data Generation for Imbalanced Medical Image Classification**", 2023.
- Ifad Uz Zaman, Sudipta Bhatta, Sadia Jeesan Ayesha, "**Improving Knowledge Distillation for Medical Image Classification**", 2022.
- 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**", In **Tissue and Cell**, 2021.
- Tamanna Rahman Reme, "**Analysis of Deep Learning Architectures on High Variation Malaria parasite Classification**", In **Tissue and Cell**, 2021
- Labib Chowdhury, "**Robust deep speaker recognition: Learning latent representation with joint angular margin loss**", In **Applied Sciences**, 2020

## Community Activities

***Founding President***, IEEE Robotics and Automation Society, North South University 2017
Conducted technical workshops for undergraduate students on building mobile robots and led teams in organizing and participating in national and international robotics competitions.

## 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.