

GEMAL HISUIN

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Machine Learning Engineer

Innovative computational machine learning engineer with a proven track record of over 6 years, specializing in computer vision and image processing. I excel in developing and deploying cutting-edge solutions that leverage the power of software development, deep learning, and machine learning algorithms. I bring a unique perspective to designing and implementing high-performance computer vision systems for diverse applications, including generative AI.

Computer Vision • Image Processing • Deep Learning • Object-Oriented Programming • Machine Learning • Concurrency & Multithreading • Data Structures • Color science • Visual Computing • Algorithms • Generative AI • Camera and Color Calibration • Pattern Recognition • Spectral Imaging • 3D Reconstruction • Distributed System • Regression • Convolutional Neural Networks (CNN) • Recurrent Neural Network (RNN) • Big Data

Languages: Python, Java, C/C++

Web: JavaScript, HTML5, CSS3, React, NodeJS

Web Services: REST

Web/App Servers: Apache, JeTTY

Frameworks: Spring, Django, Express, Scikit-learn, TensorFlow, Flask, PyTorch

Databases: MySQL, PostgreSQL

Design Patterns: Singleton, Factory, MVC, Publish-Subscribe

SDLC: Agile, Waterfall

Tools: Git, JIRA, Eclipse, IntelliJ, PyCharm

Platforms: Linux, Windows

Big Data: Hadoop, Spark, Hive, HBase, Flume

Machine Learning and Deep Learning: CNN, RNN, U-Net, LSTM, HRNet, Regression, SVM, KNN

PROFESSIONAL EXPERIENCE

CAREER NOTE: Available for full-time, W-2 employment | Willing to relocate

KUOPIO UNIVERSITY HOSPITAL'S MICROSURGERY CENTER, Kuopio, Finland • 2022

A hub for collaboration, knowledge sharing, and innovation in the realm of advanced surgical techniques.

Intern (Machine Learning Engineer):

Developed deep learning-based segmentation models and designed comprehensive database system for efficient storage, visualization, and analysis of medical hyperspectral images, as part of a completed Master's thesis.

- Developed a deep learning-based segmentation model for accurate and automated segmentation of medical hyperspectral images.
- Collaborated with a multidisciplinary team of researchers and medical professionals to define project requirements and ensure alignment with clinical objectives.
- Utilized deep learning frameworks to train and fine-tune convolutional neural networks (CNNs), U-Net and HRNet for accurate segmentation of medical neurosurgical hyperspectral images.
- Implemented preprocessing techniques to enhance image quality
- Conducted extensive experimentation and validation to assess the model's performance and refine segmentation results.

- Integrated the segmentation model into a user-friendly software interface, allowing medical professionals to interactively visualize and analyze segmented images.
- Collaborated with database experts to design and implement a robust database system, ensuring efficient storage, retrieval, and management of medical spectral images.

Technologies Used: HRNet, Resnet, CNN, Deep Learning, Hyperspectral Imaging, SQL, Python, TensorFlow, Keras, MATLAB, DICOM

INFORMATION NETWORK SECURITY AGENCY, Addis Ababa, Ethiopia · 2014-2020

Government organization managing security and availability of information systems and networks.

Machine Learning and Computer Vision Engineer · 2018-2020

Developed and optimized algorithms for computer vision applications, specializing in image-based projects and scalable regression analysis.

- Developed and optimized computer vision algorithms, including generative adversarial networks (GANs), for biometric image processing, object detection, feature extraction, and tracking. Implemented GAN-based models to synthesize realistic and diverse biometric images for enhanced analysis and recognition.
- Collaborated with distributed systems teams to enhance deep learning sequential models, specifically convolutional LSTM and GANs, for a 3D printing product, with a focus on improving biometric image analysis and generating high-fidelity synthetic biometric data.
- Conducted experiments, evaluated algorithm performance, and made enhancements to achieve superior results in regression analysis of biometric images using generative AI concepts.
- Integrated computer vision techniques, including GANs, into biometric applications, enhancing accuracy, robustness, and performance in video/image-based projects.
- Successfully deployed computer vision systems that delivered significant improvements in object detection, recognition, regression analysis, and biometric image processing, leveraging generative AI methodologies.

Technologies Used: Python, C, C++, OpenCV, TensorFlow, Git

Numerical Developer · 2014-2018

Developed and optimized numerical algorithms for biometric applications, resulting in faster and more accurate processing times.

- Conducted research on biometric feature extraction and implemented state-of-the-art algorithms
- Collaborated with engineers and researchers to develop biometric recognition technologies using machine learning, image processing, computer vision, and pattern recognition.
- Designed and implemented machine learning models for biometric feature extraction
- Developed and optimized algorithms for biometric data preprocessing, enhancing data quality and reducing noise.
- Integrated machine learning algorithms with image processing and computer vision techniques to enhance biometric recognition accuracy.
- Implemented deep learning-based architectures for face recognition and fingerprint recognition.
- Contributed to the development of a robust and scalable biometric recognition system, capable of handling large-scale datasets.

Technologies Used: Python, C/C++, OpenCV, TensorFlow

PUBLICATIONS

"Initial Design for a Neurosurgical Hyperspectral Imaging (HSI) Database" – IEEE CBMS2022

ACADEMIC PROJECTS

Maharishi International University, Fairfield, Iowa (2023):

- **Real-time Stock Market Analysis and Price Prediction:** Developed a system for analyzing stock market data in real-time, visualizing the trends, and making price predictions from Kafka and Spark streaming.

Technologies Used: *Apache Kafka, Spark, HBase, Hive, HDFS, Flume*

Norwegian University of Science and Technology, Gjøvik, Norway (2020):

- **Semantic Segmentation on Cityscapes Dataset:** A computer vision project that involves using Recurrent Residual Neural Network based on U-Net model (R2-Unet) for semantic segmentation on the Cityscapes dataset. The goal of the project was to segment the urban scene images from the Cityscapes dataset into different semantic classes such as roads, buildings, pedestrians, vehicles, and vegetation. The project has many potential applications in areas such as autonomous driving, urban planning, and environmental monitoring.

Technologies Used: *Python, TensorFlow, OpenCV, NVIDIA GPU, Jupyter Notebook*

University of Jean Monnet, Saint Etienne, France (2021):

- **3D Reconstruction from Multiple Images:** Developed algorithms for reconstructing 3D models from a set of images. The project involved extracting feature points, estimating camera poses, and triangulating the points to generate a 3D representation of the scene.

Technologies Used: *OpenMVG, COLMAP, SIFT, Zhang's method, OpenGL, Three.js*

- **Deep Learning-Based Colorization of Grayscale Images:** Implemented a deep learning model for automatic colorization of grayscale images. The project involved training CNN to learn the mapping between grayscale and color images.

Technologies Used: *PyTorch, Convolutional Neural Network (CNN), U-Net, CUDA, Python*

EDUCATION

Master of Science in Computer Science

(In progress via distance education; expected completion 2025)

Maharishi International University – Fairfield, Iowa

Erasmus Mundus Joint Master's Degree in Computational Color & Spectral Imaging (Computer Science) 2020 – 2022

<https://cosi-master.eu/about/overview-of-program>

Norwegian University of Science & Technology (1st Semester) – Gjøvik, Norway

University of Jean Monnet (2nd Semester) – Saint-Etienne, France

University of Eastern Finland (3rd Semester) – Joensuu, Finland

Bachelor of Degree in Information Technology, 2009 – 2014

Mekelle University – Mekelle Institute of Technology