Muhammad Midhat

Date of birth: 10/08/1994 | **Nationality:** Pakistani | **Sex:** Male | **Phone:** (+60) 1111671942 (Mobile) | **Email:** mianmidhat@gmail.com | **Website:** https://github.com/midhat81 | **LinkedIn:** https://www.linkedin.com/in/muhammad-midhat-3b06bb233/ |

Address: Lorong 1/7, KK2 UMPSA Gambang, 26300 Pahang Malaysia, D Block Floor 27 Room 13 Jln Jelatek, Kementah, 54200 Kuala Lumpur, 54200, Kuala Lumpur, Malaysia (Work)

ABOUT MYSELF

I am an experienced **Machine Learning Engineer** with a **Bachelor of Science degree from Government College University Faisalabad (2013–2017)** and currently pursuing my **Master of Science in Computing** at **Universiti Malaysia Pahang** (2024–2026). My academic journey includes successfully defending my **research proposal**, focusing on advanced AI topics. With over four years of experience at **Inoviks Soft Solution** (2019–2023), I have developed **cutting-edge solutions** in **Computer Vision** and **Natural Language Processing**. My expertise includes implementing advanced models like **YOLO**, **Faster R-CNN**, **U-Net**, and **Mask R-CNN** for tasks such as object detection, tracking, and segmentation. In **NLP**, I have worked on **sentiment analysis**, **entity recognition** (NLTK, SpaCy), and **topic modelling**, integrating **Large Language Models (LLMs)** and **Generative AI** to build innovative applications. Proficient in **Python**, **PyTorch**, **TensorFlow**, and **Scikit-Learn**, I specialize in delivering scalable, real-world AI solutions. Some of my key projects include **multi-camera 3D object tracking**, **emotion detection chatbots**, and **medical image segmentation** for tumour detection. I am eager to explore onsite or hybrid work opportunities, bringing my technical expertise and passion for innovation to impactful projects.

WORK EXPERIENCE

INOVIKS SOFT SOLUTION – FAISALABAD PAKISTAN, PAKISTAN

Address 38000, Faisalabad Pakistan, Pakistan | **Email** inovikssoftsolution94@gmail.com

MACHINE LEARNING ENGINEER – 02/2019 – 12/2023

1. Designed and implemented advanced ML models for **Computer Vision** tasks, including object detection (YOLO, Faster R-CNN) and image segmentation (U-Net, Mask R-CNN).
2. Developed and optimized **NLP** solutions for sentiment analysis, entity recognition, and topic modeling using frameworks like **NLTK**, **SpaCy**, and **Generative AI** tools.
3. Integrated **Large Language Models (LLMs)** to enhance NLP capabilities and deliver innovative AI-driven solutions.
4. Spearheaded end-to-end deployment of ML applications, ensuring scalability and performance in production environments.
5. Conducted research and experimentation to improve model accuracy and efficiency.
6. Collaborated with cross-functional teams to align AI solutions with business needs.

EDUCATION AND TRAINING

02/2024 – 02/2026 Gambang, Pahang, Malaysia

MASTER OF SCIENCE IN COMPUTING Universiti Malaysia Pahang Al-Sultan Abdullah

Expected Completion in February 2026.

Website https://www.umpsa.edu.my | **Field of study** Master of Computing |

Thesis TIME SERIES FORECASTING METHOD FOR INDUSTRIAL MACHINE's LOG DATA

11/2013 – 09/2017 Faisalabad, Pakistan

BSC HONS COMPUTER SCIENCE Government College University Faisalabad

An ontology-based model for the Healthcare Automation System, built with C#, VS Code, and Mysql, automates hospital operations, ensuring a paperless environment. Key features include managing laboratories, departments,

employees, doctors, patients, and their histories. It also handles medical, leave, supportive, medical, paramedical, nursing staff records, pathology, and comprehensive billing for seamless hospital management.

Address Government College University, Allama Iqbal Road, Faisalabad Pakistan, 38000, Faisalabad, Pakistan |

Website https://gcuf.edu.pk | **Field of study** Computer Science | **Final grade** 2.60/4.00 B |

Thesis Ontology Based Model for the Healthcare Automation System

LANGUAGE SKILLS

Mother tongue(s): **URDU**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C2	C1	C1	C1

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user

SKILLS

Python - Machine Learing | Machine Learning | Deep Learning | SQL (MySQL) | Familiarity with scikit-learn, TensorFlow Machine Learning libraries | Pandas, Numpy, Scikit-learn, Scipy libraries | Natural Language Preprocessing | Python ML and NLP libraries: Panda, Numpy, Scipy, Scikit-learn, Gensim, Flair, Spacy, TF Hub | Data Science: AI,ML, NLP, DL, Statistics, DM, Regression, NN,Segmentation, Classification, | COMPUTER VISION | Artificial Intelligence frameworks: Caffe, Darknet, YOLO | YOLO Object Detection Algorithm | Devops: Docker, Jenkins | Kubernetes, Docker-Swarm | With 3+ years of experience in Docker | PHP | Large Language Models LLMS | Generative Ai | HTML CSS | Javascript | NodeJs

PUBLICATIONS

2025

Time Series forecasting for text data: A review (Ongoing)

Time series forecasting for text data is an emerging field that combines natural language processing and time series analysis to predict future trends based on textual information over time. This review examines the current methodologies, challenges, and applications in this domain. Techniques such as recurrent neural networks, transformers, and sentiment analysis are explored for their efficacy in capturing temporal patterns and contextual information. The review also addresses the integration of external factors like market indicators and social media trends to enhance predictive accuracy. This ongoing analysis aims to provide a comprehensive overview of advancements and gaps, guiding future research directions in text-based time series forecasting.

2024

Deep Learning-Powered Facial Expression Resignation: Revolutionizing Emotion Defection.

“Deep Learning-Powered Facial Expression Recognition: Revolutionising Emotion Detection (ML-003)”
Accepted for Oral Presentation (Virtual) in EMSEE 2024.

Assoc. Prof. Dr Numan Arshid (Conference Chair)
On behalf of the EMSEE 2024 Organising Committee
Sunway University, No.5 Jalan Universiti
Bandar Sunway, 47500 Petaling Jaya,
Selangor, Malaysia
Email: numana@sunway.edu.my

Ehtisham Ali, Hassan Ibrahim, Jalal Uddin, Md Akbar Mohd Abdullah Al Mamun, Muhammad Midhat

RECOMMENDATIONS

Dr. Abbas Saliimi Bin Lokman Senior Lecturer

I have supervised Muhammad Midhat in his Master's research on time series forecasting using Large Language Models. He consistently demonstrates strong analytical thinking, a deep understanding of machine learning concepts,

and a proactive approach to problem-solving. Midhat is a dedicated and reliable student with great potential for research and professional work.

Email abbas@umpsa.edu.my

Doctor Muhammad Kashif Hanif Assistant Professor

Doctor Kashif Hanif is Currently working as an Assistant Professor at Government College University Faisalabad. I strongly recommend Muhammad Midhat to any program that is looking for a bright and motivated student.

Email mkashifhanifgcuf@outlook.com

Doctor Sami Ullah Assistant Professor

Doctor Sami Ullah is Currently working as an Assistant Professor at Government College University Faisalabad. I strongly recommend Muhammad Midhat to any program that is looking for a bright and motivated student.

Email samiullahgcuf@outlook.com

Mr Haseeb Razzaq CEO

I am Haseeb Razaaq, CEO of Inoviks Soft Solutions, and it is my pleasure to write this reference for Muhammad Midhat. Muhammad graduated in 2017 with a BS in Computer Science from Government College University Faisalabad and has worked with us for five years, specialising in machine learning (ML), computer vision (CV), and natural language processing (NLP). During his tenure at Inoviks Soft Solutions, Muhammad demonstrated exceptional skills and dedication in various high-impact projects. His work in computer vision includes movement analysis, tumour detection, medical image segmentation, multi-modality image segmentation for medical diagnosis, and 3d object detection and tracking using multiple cameras. In the NLP domain, Muhammad has excelled in emotion detection, language model fine-tuning, deepfake detection, and chatbot creation. Please feel free to contact me if you need any further information.
Sincerely,
Haseeb Razaaq
CEO, Inoviks Soft Solutions

Email inovikssoftsolution94@gmail.com

PROJECTS

Deepfake Detection for Human Face Images and Videos

Purpose of the Project:
The Deepfake Detection project aims to develop a robust system to identify deepfake images and videos accurately. The primary objectives are to enhance digital media security, combat misinformation, and protect individuals' identities. By detecting subtle inconsistencies and artefacts introduced by deepfake techniques, the system differentiates between authentic and manipulated media, providing a tool for media forensics and integrity.
Tech Stacks Used
The project uses Python, TensorFlow, PyTorch, OpenCV, Dlib, and Detectron2. Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) are employed for feature extraction and temporal analysis. Additional tools include FaceForensics++ for training datasets and FFmpeg for video processing. Cloud platforms like Google Colab scalable and accelerated model training.
Results
The project achieved 97% accuracy in detecting deepfakes, showing robustness across various manipulation techniques and enabling near real-time video analysis. Key artefacts like unnatural expressions and mismatched lighting were identified. The system was deployed as a web service, offering an intuitive interface for media analysis, significantly enhancing digital media integrity and security.

Deep Learning-Based Lung Segmentation for Accurate Tuberculosis Detection

Purpose of the Project
The Deep Learning-Based Lung Segmentation project aims to develop an accurate system for detecting tuberculosis through precise lung segmentation. The primary goals are to enhance diagnostic accuracy, improve early detection rates, and facilitate better treatment planning. By focusing on lung regions in medical images, the system isolates areas affected by tuberculosis, aiding healthcare professionals in making informed decisions.
Tech Stacks Used
The project utilizes Python, TensorFlow, Keras, OpenCV, and scikit-learn. Convolutional Neural Networks (CNNs) are employed for image segmentation and feature extraction. The U-Net architecture is specifically used for its

effectiveness in medical image segmentation. The project also leverages medical image datasets such as the Montgomery and Shenzhen chest X-ray sets for training and validation.

Results

The lung segmentation model achieved high accuracy, with a dice coefficient 0.92, indicating precise lung boundary identification. This accuracy significantly improved the tuberculosis detection rates.

Sentiment Analysis with Deep Learning using BERT

Purpose of the Project

The Sentiment Analysis project aims to leverage deep learning techniques, specifically BERT (Bidirectional Encoder Representations from Transformers), to accurately determine the sentiment of textual data. The primary goals are to enhance the understanding of customer feedback, improve sentiment classification accuracy, and provide actionable insights for businesses. By analyzing sentiment in various texts, the system helps in making informed decisions based on public opinion and customer satisfaction.

Tech Stacks Used

The project uses Python, TensorFlow, PyTorch, and the Hugging Face Transformers library. BERT, a state-of-the-art language model, is employed for its superior ability to understand contextual information. Additional tools include NLTK for text preprocessing, sci-kit-learn for evaluation metrics, and pandas for data manipulation. Cloud platforms like Google Colab facilitate efficient training and deployment of the model.

Results

The sentiment analysis model achieved an accuracy of 93%, significantly improving sentiment classification compared to traditional methods. The system was robust across various datasets, including customer reviews, social media posts, and news articles. Deployed as an API, the tool offers real-time sentiment analysis capabilities, enabling businesses to gain valuable insights into customer opinions and market trends, thereby enhancing strategic decision-making processes.

Detecting Fake News Classifier using LSTM

Purpose of the Project

The Fake News Detection project aims to develop a classifier using Long Short-Term Memory (LSTM) networks to accurately identify fake news articles. The primary objectives are to combat misinformation, ensure the integrity of news content, and provide a reliable tool for media verification. By analyzing textual patterns and linguistic features, the system distinguishes between legitimate and deceptive news stories.

Tech Stacks Used

The project employs Python, TensorFlow, and Keras for building and training the LSTM model. NLTK and spaCy are used for text preprocessing and feature extraction. The dataset includes credible sources like the FakeNewsNet dataset for training and evaluation. The project leverages scikit-learn for performance metrics, and Cloud platforms such as Google Colab to expedite model training and deployment.

Results

The LSTM-based fake news classifier achieved an accuracy of 91%, demonstrating a high level of reliability in identifying deceptive news articles. The model effectively captured contextual and sequential information, enhancing its robustness across different types of news content. Deployed as a web service, the tool provides a user-friendly interface for real-time news verification, contributing to the fight against misinformation and promoting the dissemination of accurate news.

Question answering with Distil BERT

Purpose of the Project

The Question Answering project aims to use DistilBERT, a lighter and faster version of BERT, to develop a robust question-answering system. The primary goals are to provide accurate answers to user queries, enhance information retrieval, and improve user experience in applications like chatbots and virtual assistants.

Tech Stacks Used

The project utilizes Python, TensorFlow, and the Hugging Face Transformers library. DistilBERT is employed for its efficiency and speed. Additional tools include NLTK for text preprocessing and scikit-learn for evaluation metrics. cloud platforms like Google Colab facilitate model training and deployment.

Results

The DistilBERT-based system achieved high accuracy and speed in answering queries, offering precise and relevant responses. Deployed as an API, it provides real-time question-answering capabilities, significantly enhancing the functionality of applications requiring natural language understanding.

A Deep Learning Approach to Human Activity Recognition in Surveillance Videos

Purpose of the Project

The Human Activity Recognition project aims to develop a deep learning system to accurately identify and classify human activities in surveillance videos. The primary goals are to enhance security monitoring, improve incident detection, and support automated video analysis. By recognizing activities such as walking, running, or suspicious behavior, the system aids in timely and effective responses to potential security threats.

Tech Stacks Used
The project utilizes Python, TensorFlow, and Keras for building and training the deep learning models. Convolutional Neural Networks (CNNs) and Long Short-Term Memory (LSTM) networks are employed for spatial and temporal feature extraction. OpenCV is used for video processing, while NVIDIA GPUs and cloud platforms like Google Colab and AWS EC2 provide the necessary computational power. The project leverages datasets such as UCF101 and HMDB51 for training and validation.
Results
The deep learning model achieved an accuracy of 95% in recognizing various human activities, demonstrating its effectiveness and reliability. The system was robust across different video conditions and environments. Deployed as a real-time monitoring tool, it offers a user-friendly interface for security personnel to analyze live video feeds, significantly enhancing surveillance capabilities and response efficiency.

Car parking space detection using OpenCV

Purpose of the Project
The Car Parking Space Detection project aims to develop a system using OpenCV to accurately detect available parking spaces in real-time. The primary goals are to optimize parking space utilization, reduce the time spent searching for parking, and enhance overall parking management. By analyzing video feeds from parking lots, the system identifies vacant and occupied spaces, providing valuable information to drivers and parking authorities.
Tech Stacks Used
The project employs Python and OpenCV for image processing and computer vision tasks. Techniques such as background subtraction, contour detection, and edge detection are utilized to identify parking spaces. Additional tools include NumPy for numerical operations and Flask for developing a web-based interface. Raspberry Pi and IP cameras are used for video capture and real-time processing. Cloud platforms like AWS provide storage and computational resources.
Results
The parking space detection system achieved high accuracy in identifying vacant and occupied parking spaces, with a detection accuracy rate of 92%. The system demonstrated robustness in various lighting and weather conditions. Deployed as a real-time application, it offers a user-friendly interface for drivers and parking management to monitor parking availability. This significantly reduces the time drivers spend searching for parking and improves overall parking efficiency.

Semantic Segmentation A 2D-Medical Image-Segmentation with PyTorch and MONAI.

Purpose of the Project
The 2D-Medical Image Segmentation project aims to utilize semantic segmentation techniques to accurately segment medical images, aiding in precise diagnosis and treatment planning. The primary goals are to improve the accuracy of medical image analysis, enhance the efficiency of medical workflows, and support healthcare professionals in identifying critical structures within medical images.
Tech Stacks Used
The project employs Python, PyTorch, and MONAI (Medical Open Network for AI) for building and training the segmentation models. Convolutional Neural Networks (CNNs) and architectures like U-Net are utilized for their effectiveness in medical image segmentation. Additional tools include NumPy for numerical operations, OpenCV for image processing, and Matplotlib for visualization. Cloud platforms like Google Colab provide the necessary computational resources for training and deployment.
Results
The semantic segmentation model achieved high accuracy, with a dice coefficient of 0.94, indicating precise segmentation of medical images. The system demonstrated robustness across various medical imaging modalities, such as MRI and CT scans. Deployed as a user-friendly application, it allows healthcare professionals to upload and analyze medical images efficiently, significantly enhancing diagnostic accuracy and treatment planning.

Path Hole Detection using CNN

Purpose of the Project
The Path Hole Detection project aims to develop a system using Convolutional Neural Networks (CNNs) to accurately detect potholes in road surfaces. The primary goals are to improve road maintenance, enhance driving safety, and reduce vehicle damage caused by potholes. By analyzing images or video feeds from road surfaces, the system identifies potholes, enabling timely repairs and maintenance.
Tech Stacks Used
The project employs Python and TensorFlow/Keras for building and training the CNN models. OpenCV is used for image preprocessing and video frame extraction. The dataset includes images of road surfaces with and without potholes for training and validation. Additional tools include NumPy for numerical operations and Matplotlib for visualization. Cloud platforms like Google Colab provide the computational power for efficient model training and deployment.
Results
The pothole detection model achieved an accuracy of 90% in identifying potholes on various road surfaces. The system demonstrated robustness across different lighting conditions and types of road surfaces. Deployed as a real-time

application, it offers a user-friendly interface for road maintenance authorities to monitor and detect potholes from video feeds, significantly enhancing road safety and maintenance efficiency.

Detect Direction and Count Vehicles using YOLOv8

Purpose of the Project
The Detect Direction and Count Vehicles project aims to develop a system using YOLOv8 (You Only Look Once) to accurately detect, count, and track the direction of vehicles in real-time. The primary goals are to improve traffic management, enhance road safety, and provide valuable data for urban planning. By analyzing video feeds from traffic cameras, the system identifies vehicle types, counts them, and tracks their movement directions.
Tech Stacks Used
The project employs Python and the YOLOv8 framework for object detection and tracking. OpenCV is used for video processing and frame extraction. The system utilizes pre-trained YOLOv8 models fine-tuned on traffic datasets, which include various types of vehicles and traffic scenarios. Additional tools include NumPy for numerical operations and Matplotlib for visualizations. Cloud platforms like Google Colab necessary computational resources for real-time processing and model deployment.
Results
The YOLOv8-based system achieved high accuracy in detecting and counting vehicles, with an accuracy rate of 95%. The system also effectively tracked vehicle directions, providing reliable data on traffic flow patterns. Deployed as a real-time application, it offers a user-friendly interface for traffic management authorities to monitor and analyze traffic conditions, significantly enhancing traffic control and urban planning efforts.

Bone Fracture Detection with Deep Learning

Purpose of the Project
This project focuses on developing an automated **bone fracture detection system** using advanced deep-learning techniques. The goal is to assist radiologists by providing a reliable tool for early fracture detection through the analysis of X-ray images, enhancing diagnostic accuracy and reducing human error in medical imaging.
Tech Stacks Used
- **Python, TensorFlow, Keras**: For building and training deep learning models.
- **ResNet-50 & ResNeXt-101**: For image classification and feature extraction.
- **Feature Pyramid Networks (FPN)**: For improved object detection and localization.
- **Flask**: For creating a web-based interface for the system.

Results
The model achieved impressive performance with precise localization of fractures in X-ray images, demonstrated through bounding boxes and confidence scores. Example results include:
- **Shoulder fracture**: Confidence scores of 41% and 49%.
- **Finger fracture**: Confidence scores between 25% and 44%.
- **Wrist fracture**: Confidence score of 34%.
- These visualizations show the model's ability to assist healthcare professionals in the early detection of fractures.

Multimodal Retrieval using Text and Image Embeddings

Purpose of the Project
This project explores **multimodal retrieval**, integrating **text embeddings** and **CLIP (Contrastive Language–Image Pretraining) image embeddings** to enable seamless querying across text and image data. The goal is to bridge the gap between **textual** and **visual** information, allowing for more accurate and context-aware retrieval from both modalities.
Tech Stacks Used
- **CLIP (Contrastive Language–Image Pretraining)**: For embedding images and text into a shared space, enabling efficient multimodal retrieval.
- **Text Embeddings**: To encode textual queries and match them with relevant images.
- **Python**: For model implementation and query handling.

Results
The model successfully retrieved relevant data using text and images:
- **"What do Steller's Jays eat?"**: Retrieved information about their diet along with an image of the bird.
- **"How do we recognize Blue Jays?"**: Provided details on their appearance alongside a visual representation.
- This demonstrates the powerful synergy between text and image embeddings, enhancing the accuracy of retrieval across multiple data types.

Using Computer Vision to Estimate Vehicle Speed YOLO11

Purpose of the Project
This project aims to estimate **vehicle speed** using advanced **computer vision** techniques for **traffic analysis** and **smart city development**. By analyzing CCTV footage from the M6 highway, the project demonstrates a reliable method for **real-time speed estimation**.

Tech Stacks Used

- **YOLO11**: For object detection and tracking vehicles in video footage.
- **ByteTrack**: For vehicle tracking in continuous frames.
- **OpenCV**: For applying perspective transformation to correct the camera angle and map movements accurately.
- **Python**: For implementation and speed estimation calculations.

Results

The model successfully detected vehicles and estimated their speeds in **km/h** by calculating displacements in real-world coordinates. This demonstrates the practical application of AI in **traffic management** and offers a foundation for further tasks such as **vehicle classification** and **congestion monitoring**.

HONOURS AND AWARDS

Awarded the Laptop for highest achiever in class by Higher Education Commission of Pakistan.

Awarded HEC (Higher Education commission) of Pakistan Merit and Need Based Scholarship for Undergraduate program

SHORT COURSES AND CERTIFICATE

22/08/2022 – 22/08/2022
Data Science Foundation

22/08/2022 – 22/08/2022
Python for Machine Learning

24/08/2022 – 24/08/2022
Data Visualization using Python

24/08/2022 – 24/08/2022
Unsupervised Machine Learning with K-means

24/08/2022 – 24/08/2022
Introduction to Deep Learning

24/08/2022 – 24/08/2022
Supervised Machine Learning with Logistic Regression and Naïve Bayes

COURSERA CERTIFICATIONS AND LICENSES

31/08/2022
Programming for Everybody Python

Given in November 2024 for successfully completing the AI Engineer Test provided by Pro5.

03/09/2022
Mining Quality Prediction Using Machine & Deep Learning

05/09/2022
Tools for Data Science IBM

11/09/2022
Supervised Machine Learning: Regression and Classification

Neural Networks and Deep Learning

Python Project for AI & Application Development

AWS Cloud Technical Essentials

Databases and SQL for Data Science with Python

AI ENGINEER CERTIFICATE