Muhammad Bilal Sarwar

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Education

National University of Sciences & Technology (NUST) **Islamabad, Pakistan**

MS in Computational Science & Engineering *Sep. 2022 – Present*

- **CGPA:** 3.69
- **Courses:** Model Checking, Data Analysis and Statistics, Graph Theory, Parallel Computing, Applied Mathematics, Applied Machine Learning, Deep Learning, Natural Language Processing
- **Thesis:** Formal Analysis of Path Planning for Autonomous Vehicles Using Probabilistic Model Checking

University of Engineering & Technology (UET), Taxila **Taxila, Pakistan**

Bachelor of Science in Electrical Engineering *Oct. 2017 – Oct. 2021*

- **Majors:** Signal Processing & Communications
- **Courses:** Computer Communication & Networks, Signals & Systems, Data Structures and Algorithms, Programming Fundamentals, Digital Signal Processing, Digital Communication, Communication Systems, Communication Electronics

Publications

Sarwar, M. Bilal, Raza, G. Musa, Sarwar, M. Ali, and Kim, B.-Seo. **Revolutionizing ICT with AI and ML: A Comprehensive Study of Current Applications and Future Potential** *in* IEIE Transactions on Smart Processing and Computing. (in press)

Experience

Research Associate **Jan. 2023 – Dec. 2023**

Geo Visual Analytics Lab, IGIS, NUST *Islamabad, Pakistan*

- Served as a Research Associate on a project focusing on "An Autonomous IoT Based Approach Towards Monitoring And Subsequently Identifying Invasive Dengue/Zika Vectors Prevalence and Possible Dengue Outbreak Area."
- Worked on computer vision for vector identification in autonomous monitoring systems, utilizing image processing techniques for real-time analysis of mosquito populations.
- Demonstrate proficiency in Computer Vision, Python, and C programming languages, leveraging them to develop real-time data collection and analysis solutions.
- Apply Raspberry Pi in implementing embedded systems, showcasing practical hardware and software integration expertise.
- Organized and led a comprehensive four-week workshop on Python programming for Computer Vision applications.

Technical Support Engineer **Jan. 2022 – Dec. 2022**

ZKTeco, Pakistan *Lahore, Pakistan*

- Diagnosed and resolved firmware and hardware issues in embedded systems.
- Utilized Python and C programming skills to integrate and optimize embedded systems seamlessly.
- Applied Linux expertise to ensure smooth integration of embedded systems with Linux platforms.
- Worked collaboratively with cross-functional teams to troubleshoot and resolve complex technical issues.
- Maintained detailed documentation of troubleshooting procedures for future reference.
- Actively pursued ongoing education, attending workshops to stay updated on embedded systems developments.

Technical Skills

Languages: C/C++, Python (OpenCV, Pandas, PyTorch, NumPy, Scikit-learn. etc.), R(ggplot2), Parallel Computing, MATLAB

Technologies/Frameworks: Model Checking (PRISM), Linux, LATEX(Overleafs), Microsoft Office, Machine Learning, Deep Learning, and Git.

Soft Skills: Time Management, Teamwork, Problem-solving, Documentation, Engaging Presentation

Projects

Adaptive Irrigated Agriculture Monitoring using Sensor Technology and Cloud Infrastructure

- Develop an Embedded Computing System for Adaptive Irrigated Agriculture Monitoring using sensor technology and cloud infrastructure.
- Deploy wireless sensors with embedded computing capabilities for real-time monitoring of soil moisture, temperature, and humidity.
- Enable continuous real-time monitoring of agricultural parameters through embedded computing nodes.
- Optimize resource usage, particularly water, through intelligent irrigation scheduling using embedded computing.

Car Price Prediction Using Machine Learning Techniques

- Contributed to the development of a machine-learning model for predicting the prices of cars based on their features.
- Collected and preprocessed a large dataset of car features and prices to train and validate the machine-learning model.
- Conducted experiments to evaluate the model's performance and compared it with existing car price-prediction models.

IoT-based Health Monitoring System

- Develop a real-time health monitoring system using IoT for tracking vital signs.
- Wearable devices with sensors for continuous monitoring.
- Secure communication protocol for data transmission to a central server.
- Implement analytics algorithms on the server for real-time health insights.
- Enable remote access to health data for users and healthcare professionals. Implement alert systems for abnormal health parameters.
- Successfully developed a scalable health monitoring system for improved health awareness and timely interventions.

Selection and Implementation of an algorithm to detect edges in the images using MATLAB

- Conducted extensive research on different edge detection algorithms and evaluated their performance on sample images.
- Utilized MATLAB functions to implement the chosen algorithm and customize the parameters for optimal edge detection results

Achievements

- **PEEF Scholar:** National University of Sciences and Technology, Islamabad
- **PEEF Scholar:** University of Engineering and Technology Taxila
- **Sportsmen Scholar:** Punjab College Okara
- **Captain:** University (UET Taxila) Volleyball's Team