Ababacar Michel SARR

Mechatronic Engineer

Junior Mechatronics Engineer with hands-on experience in industrial automation, sensor integration, and deep learning-based fault diagnosis. Specialized in Python, CREO, and control systems. Eager to apply advanced diagnostic models and predictive maintenance techniques in industrial environments.

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EDUCATION

Shanghai University 2021-2025
Major: Master of science in Mechatronics Engineering Shanghai, China
Thesis: Multi-sensor multimodal fusion bearing fault diagnosis based on deep learning.
Classes: Control system, Smart structures, Machine Learning, MEMS, Micro nano systems engineering, Design and Engineering application, Robotics Technology and Application, Modern optical measurement technology, Machine Vision and Image Processing, Smart Sensors, Innovation Methodology and Academics Seminars.

Shandong University of Science and Technology 2017-2021
Major: Bachelor of science in Mechatronics Engineering Qingdao, China
Thesis: Designed a small-scale vertical-axis wind turbine prototype with optimized blade geometry.
Classes: Mechanical drawing, Electronic circuit principles, Theoretical mechanic, Metal material and Heat Treatment, Electronics technology, Geometric Dimensioning and Tolerancing, Mechanical Principle and Design, Advanced Manufacturing, Mechanic of Material, Microcontroller, PLC, Machinery Fault diagnosis, Control Technology, Hydraulic and Transmission, CAD/CAM, FEA, Power Supply, Mechatronics System, Modern Enterprise Management.

WORK EXPERIENCE

LIBO HEAVY INDUSTRIES *September 2020 – December 2020*
Internship *Shandong, China*

- Gained valuable experience during an internship at Libo Heavy Industries, support design of conveyor belt components in CREO, reducing material cost by 3%, manufacturing from concept design to implementation.
- Collaboration with experienced engineers allowed for the application of theoretical knowledge in practical scenarios.
- Participated in control system integration Programmed PLC control logic for conveyor safety systems, cutting downtime by 9%.
- Conducted crack analysis and other evaluations for innovations.

Shanghai University *September 2021 – June 2025*
Research *Shanghai, China*

- Designed and implemented a robust diagnostic framework using convolutional neural networks (fine tuning) for feature extraction from vibration, acoustic, and temperature data processing more than 10,000 samples.
- Employed sensor fusion and noise-resilient techniques to improve classification under real-world noisy conditions(-10dB).
- Applied data preprocessing, transformation (GASF, spectrogram), and augmentation to ensure model robustness.
- Integrate models (ResNet18, ConvNeXt) and implement custom attention-based fusion modules for improved fault recognition.
- Achieved significant improvement in fault classification accuracy across multiple real-world datasets with an accuracy of 99%.

COMPETENCE

- Simulation & Modeling: Proficient in system modeling and analysis (FEA, CAM, CAD) using tools such as ANSYS, SIMULINK, and CREO.
- Sensors and Actuators: Hands-on experience with accelerometers, pressure and temperature sensors, motors, solenoids, and control systems. Knowledge of renewable energy systems (e.g., wind turbines).
- Programming: Skilled in Python (PyTorch), Assembly Language, and PLC programming for embedded and automation systems.
- System Integration: Capable of integrating complex systems and ensuring seamless communication between mechanical, electrical, and software components, embedded systems.
- Diagnostics & Troubleshooting: Strong problem-solving abilities in identifying and resolving faults in mechatronic and embedded systems.
- Soft Skills: Effective communicator and collaborator with leadership, innovation, and critical thinking strengths.
- Tools: Proficient in Microsoft Office (Excel, PowerPoint, Word), Keynote, PYCHARM(Pytorch), and CAD tools.
- Languages: **Native**: French, Wolof, Serere. **Fluent**: English. **Professional**: Mandarin. **Beginner**: Spanish.

PROJECTS

- **3D Object Recognition Based on Deep Learning**
  Literature & Implementation Study – Shanghai University

Analyzed deep learning techniques (MVCNN, RotationNet, View-GCN) applied to multi-view 3D object recognition.
Focused on CNN-based feature extraction, viewpoint selection, and performance evaluation using ModelNet datasets.
Tools: PyTorch, CIFAR10, ImageNet, CNN architectures (VGG, ResNet)

- **Design and Simulation of a MEMS Accelerometer**
  Shanghai University – MEMS Engineering Project
  Designed a capacitive MEMS accelerometer prototype and simulated its performance using ANSYS.
  Analyzed acceleration response across axes and proposed fabrication steps (oxidation, photolithography, etching).
  Applied silicon anisotropic material properties and mechanical stress simulations.
  Tools: ANSYS, SHAPR3D, MEMS concepts

- **Smart Piezoelectric Structure Simulation**
  Shanghai University – Smart Structures Project
  Modeled a piezoelectric smart structure using multilayer composite materials and simulated mechanical response under moment loading.
  Created mesh and coordinate system in ANSYS, visualized deformation and displacement profiles.
  Evaluated potential for energy harvesting and adaptive material behavior.
  Tools: ANSYS Workbench, Composite Modeling

- **Design and Analysis of a Gearbox Reducer**
  Shandong University of Science and Technology – Mechanical Design Project
  Designed a speed-reduction gearbox including gear ratio selection, shaft layout, bearing arrangement, and housing.
  Performed analytical calculations for gear sizing, torque transmission, and contact stress using AGMA standards.
  Created detailed 3D CAD models and technical drawings of gears, shafts, and casing components.
  Simulated gear meshing and load distribution to verify durability and efficiency.

PUBLICATIONS

- A trusted fault diagnosis approach fusing graph convolution and transformer (AICS)
- A novel multi-sensor multi-granularity attention fusion method for bearing fault diagnosis (UNDER REVIEW)
- A novel Multimodal fusion deep learning approach for bearing fault diagnosis (UNDER REVIEW)