HELMI BALHOUDI

Industrial IT and Automation Engineering Student
ML | MLOps | Robotics Enthusiast

Ariana / Tunis
+216 28 702 361
balhoudihelmi@gmail.com
linkedin.com/helmi-balhoudi
BalHelmi
www.helmi.com

EDUCATION

2021 – 2024 **Engineering degree in Industrial IT and Automation** — **Software & Embedded System Class**
INSAT – National Institute of Applied Science and Technology, University of Carthage
• **Speciality :** Intelligent Systems Engineering. **Top 10% of the class.**
• **Courses :** Database / Programming / Robotics / Embedded systems / Control Engineering / Data Analysis / Machine Learning / Electronics / Applied mathematics.

2019 – 2021 **Graduated Integrated Preparatory Cycle** — **MPI – Maths, Physics, and IT, Common Stream Class**
INSAT – National Institute of Applied Science and Technology, University of Carthage
• **Courses :** Maths / Information science / Physics / Assembly x86 / C / C++.

EXPERIENCE

2023 **Machine Learning Intern** — **ADEEKT**
• Developed a chatbot using PyTorch and Deep Learning techniques, achieving 85% accuracy on dialogues with a small training dataset.
• Created an interactive Tkinter UI for the chatbot, facilitating testing during development.
• Containerized the chatbot with Docker, yielding a 60% deployment time cut, 80% fewer conflicts.
Technologies: `PyTorch / NLP / NLTK / Python / Tkinter / Docker`

2022 **Computer Vison Intern** — **Innovant Studio**
• Developed and implemented a computer vision approach for crop-line detection and heading angle error estimation within ±1.5 degrees in agricultural applications.
• Designed and trained deep learning models using convolutional neural networks (CNN) and image processing techniques to detect crop lines in real-time, Achieving an average accuracy of over 90%.
• Implemented micro-ROS with different board like, STM32, Arduinom jetson Nano.
Technologies: `ROS / Gazebo / Python / C++ / Embedded Systems / Computer vision / CNN`

PROJECTS

2023 **Facial Emotion Recognition** — **End Of Year Project**
• Conducted a comprehensive theoretical study of ML & AI techniques for emotional face recognition.
• Preprocessed a facial image dataset, **FER-2013** (20% test, 80% train), comprising a wide range of facial expressions.
• Built and fine-tuned a cutting-edge CNN-based ML models to classify emotions, achieving an impressive accuracy rate of 85% for the 3-class model and 70% for the 7-class model, exceeding industry benchmarks.
Technologies: `Computer Vision / Machine Learning / Python / Tensorflow / OpenCV`.

2023 **Ball & Beam System** — **CAD – Computer Aided Design Class Project**
• Engineered and optimized both the electrical and mechanical systems with precision.
• Designed and implemented a highly accurate PID controller for precise control of the Ball & Beam system, attaining a remarkable precision level of ±0.5cm.
• Built a seamless interface between LabVIEW and Arduino by leveraging the VISA API, streamlining data acquisition processes for enhanced efficiency and analysis.
Technologies: `Control System / LabView / Maths / Solidworks / Proteus`.

2021 **Autonomous Robot** — **Aerobotix INSAT**
• Competed with a 4-member team to design and build a fully autonomous robot excelling in hockey shooting and basketball throwing.
• Achieved 1.9 mm/m position control error using a PID controller based on position, velocity, and orientation, elevating accuracy by 45%.
• Explored a novel self-tuning control algorithm, reducing positioning errors by 25%, and ensuring stability.
Technologies: `Control System / STM32 / Arduino Mega / Encoder sensors / C++ / SolidWorks`.

Other projects : AI Play Snake / Language Detection / Customer Satisfaction / Research in Mobile Robots

ACHIEVEMENTS

2023 • **Complited the Data Scientist Career Path offered by Microsoft Learn, Profile : helmibalhoudi-2705**
2022 • **Participated in the 1st edition of the BotCamp Hakathon hosted by RAS INSAT, Seabot, Evident Canada**
2021 • **Ranked 11th/235 in Tunisia, 348th/2400 Worldwide in the Competitive Programming, IEEEXtreme15.0**

SKILLS

Certifications - **Machine Learning Specialization**.
MLOps tools - MLflow, Hagging Face, Azure ML Studio.
Machine Learning - Tensorflow, Pytorch, Keras, NLP, Nltk.
Computer Vision - Image & Signal Processing, CNN , Numpy, Matplotlib.
Embedded System - Arduino, STM32, Rasperry Pi.
Robotics - ROS, Gazebo, Matlab, Simulink, SolidWorks.
Programming Language - Python, C/C++, Assembly x86, Javascript.

CAMPUS & NONPROFITS

Technical team @ **NRW4.0**.
Member @ **RAS INSAT**.
Member @ **Aerobotix INSAT**.
Member @ **IAS INSAT**.