Abderrazak CHAHID

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I am a data scientist with 2.5 years of postdoc research experience in data preparation, cleaning, annotation, and building and deploying machine learning models (ML) for defect detection in smart vision systems. In my PhD, I worked on signal processing-based feature extraction for different applications such as anomaly prediction. I designed image processing denoising algorithms based on the Schrödinger operator. I have more than 3.5 years of industrial experience in smart system design and implementation using embedded system platforms. **I am interested in data scientist opportunities to develop advanced systems for ML-powered applications.**

Selected Publications [Please check all my publications on my Google Scholar]

- Albalawi, Fahad, **Abderrazak Chahid**, et al. ”Hybrid model for efficient prediction of poly (A) signals in human genomic DNA” Methods 166 (2019): 31-39. [PDF]
- **Chahid, Abderrazak**, et al. ”Feature generation and dimensionality reduction using the discrete spectrum of the Schrödinger operator for epileptic spikes detection.” *IEEE Engineering in medicine and biology society (EMBC)*, pp. 2373-2376. [PDF]
- **Chahid, Abderrazak**, et al. "QuPWM: Feature extraction method for epileptic spike classification." *IEEE journal of biomedical and health informatics* 24, no. 10 (2020): 2814-2824. [PDF]
- Bahloul, Mohamed, **Abderrazak Chahid**, et al. "A multilayer perceptron-based carotid-to-femoral pulse wave velocity estimation using ppg signal." In *2021 IEEE EMBS International Conference on IEEE-BHI*, pp. 1-6. IEEE, 2021.[PDF]
- **Abderrazak Chahid**, et al. "A position weight matrix feature extraction algorithm improves hand gesture recognition." *42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society*, pp. 5765-5768. IEEE, 2020. [PDF]
- **Chahid, Abderrazak**, et al. ”Fish growth trajectory tracking using Q-learning in precision aquaculture.” *Aquaculture,* 2022). [PDF]
- Gabbar, Hossam A., **Abderrazak Chahid**, et al. ”CTIMS: Automated defect detection framework using computed tomography.” *Applied Sciences* 12, no. 4 (2022): 2175. [PDF]
- Gabbar, Hossam A., **Abderrazak Chahid**, et al. ”Tooth. AI: Intelligent Dental Disease Diagnosis and Treatment Support Using Semantic Network.” *IEEE Systems, Man, and Cybernetics Magazine* 9, no. 3 (2023): 19-27. [PDF]

Work Experience

Research Scientist — *Postdoctoral fellow* Apr 2021 - Sep 2023

Ontario Tech University, Canada

- Design **assisted and semi-automated image annotation** using Napari and VGG Image **Annotator** (VIA)
- Design database handling data collection, data preparation, visualization, and sharing on Firebase Google Cloud.
- Design a data collection node to screen road conditions using different sensors (3D Camera, IMU, LiDAR, GPS). [project demos]
- Design and integrate Drone-based data collection using DJI Mavic 3 / DJI Tello. [demo video]
- Design a hybrid deep learning-based system for automated X-ray CT inspection for industrial applications. [project demo]
- Design a smart dental diagnosis and treatment support using semantic networks using CT images. [project demo]
- Design and implement hybrid classification/object detection ML models for inspection of Highways in winter conditions
- Implement an incremental method based on a dynamic model confidence score thresholding for better data selection and training.
- Lead and collaborate with a team of 6 students, 4 trainees and a lab engineer
- 4 journal papers were published, 3 papers are under review, and 1 proposal fund award from MTO of Ontario.

CTO, Design Engineer — *Startup experience* Mar 2020 - Dec 2020

Aquash Technology Startup (Stage I), KSA

- Design/manufacturing a **Jetson** nano-based system to **collect sensor data** and control feeding for Tilapia fish aquarium.
- Manual data **cleaning, preparation and annotation** of the collected underwater camera images using LabelMe
- Design online **visualization and monitoring**, using **Grafana**, of the feeding process, fish growth, and fish health
- Design an object detection model to assess the fish health diagnosis. Implement a real-time optimal feeding strategy
- Manage the **AWS** assets used for **model deployment** and the hosting of the website
- Participate in the market assessment and potential collaborator/client discussions
- Follow up and coordinate with the external outsourcing (website and logo)

Electric Arc Fault Detection System Design — *Master's thesis internship* Apr 2014 - Aug 2014
Institut Jean Lamour (IJL), France

- Design and implement an electrical arc fault **detection algorithm** based on an active filter
- implement an FFT-based detection algorithm using spectral and statistical indicators (features)
- Develop a Matlab user interface tool to integrate the developed detection algorithm
- Validate the algorithm simulated Hardware-In-the-Loop (HIL) using Matlab and VHDL-AMS modeled power loads.
- Participate in writing my first IEEE journal paper as a co-author. [PDF]

Requirement management for automotive applications — *B. Eng's thesis internship* Feb 2013 - July 2013
Continental Automotive France

- **Phase 1**: Requirement management for the automotive industry:
  - Participate in creating the requirement management system for the company using emails, specs documents, meetings' notes.
  - Write the clients/stockholders' needs and translate them into concise and traceable technical specifications
  - Formulate the list of requirements and define the different tests to be conducted to satisfy the clients' needs.
- **Phase 2**: Apply the requirement management framework to case study of crank sensor simulator:
  - Define the technical specification and test of the target crank sensor simulator
  - Design a crank signal generator using an analog differential amplifier and fabricate the first prototype
  - Test/validate and write a final specification document of the designed system

Education

Electrical and Computer Engineering — *Ph.D* Feb 2015 - Nov 2020
King Abdullah University of Science and Technology (KAUST), Thuwal, KSA
Thesis: Pre-processing and Feature Extraction Methods for Smart Biomedical Signal Monitoring (PDF)

Embedded Systems and Micro-systems — *Master's of Science* Sep 2013 - Aug 2014
Universite de Lorraine, Nancy, France
Novel single-phase active power filter for arc fault detection

Electrical Engineering — *1 year Exchange* Sep 2012 - July 2013
INSA Toulouse - Institut National des Sciences Appliquées de Toulouse, France
I was awarded an excellence scholarship to study the last engineering year at INSA of Toulouse

Technical skills

- Data visualization and annotation: Matplotlib, Seaborn, Tableau, Napari, PyQT5, VTK, Label Studio, LabelMe.
- Training and deployment technologies: Azure, AWS, EC2, S3, Flask API, Digital Research Alliance of Canada, Google Firebase.
- **Advanced algorithm** : signal/image filtering, spectral analysis, feature extraction, parameter estimation, optimization
- **Computer vision** using **deep learning** models: CNN, GAN, RNN, Yolov4, ResNET.
- **Programming languages**: Python, C++, C, Matlab, HTML, CSS, MySQL,
- **Machine learning** frameworks: PyTorch, TensorFlow, Keras, Sklearn, PySpark,
- **MLOPs platforms**: Terraform, Jenkins, MLFlow, Tensorboard, AWS Sagemaker, Docker, Anaconda, Github.
- **Deployment/Test** embedded systems using NVIDIA Jetson Nano, RTOS, TensorRT, ONNX, GPU, IoT, SPI, etc.
- Project and **team management:** Jira, Confluence, Slack.

Awards

- *Jan 2021*: *Student Research Excellence Awards and Student Academic Accomplishment Awards*: his award is presented in recognition of the academic accomplishments and research impact created by our leading students in the fields of Applied Mathematics and Computer Science (AMCS), Computer Science (CS), Electrical and Computer Engineering (ECE), and Statistics.
- *Jun 2020*: **Africa-Middle East Finalist at the 2020 EMBC Student Paper Competition**: for my paper entitled "A Position Weight Matrix Feature Extraction Algorithm Improves Hand Gesture Recognition"

Languages

English: Full professional proficiency ***French***: Full professional proficiency