Cyril Bou-Harb

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About me: An inspired and relentless computer scientist with a profound passion for AI and ML, continuously advancing my skills through extensive online learning. Eager to dive into SWE or AI/ML roles. Please look at my Github repository for all my projects.

Programming Languages: Java, Python, JavaScript, TypeScript, C, C++, SQL, HTML, CSS, R, C#
Frameworks: TensorFlow, Keras, Pandas, NumPy, PyTorch, SciPy, Matplotlib, Seaborn, Scikit-learn
Developer Tools: Git, AWS, Jupyter Notebook, Vim, Docker, Arduino, Android Studio, Agile, Scrum, Jira, Linux, CI/CD, CUDA
Awards: Chancellor's Award (*UMass*), Certificate of high scholastic achievement (*Phi Kappa Phi*), Best Use of an AI Model (*HackHer*)
Certifications: Machine Learning Specialization (DeepLearnig.AI)

Education

University of Massachusetts Amherst **GPA 3.95 (Commonwealth Honors College)** **Expected Graduation: Dec 2024**

• **B.S. in Computer Science** and **B.S. in Mathematics** (Concentration: Statistics and Data Science)

Coursework: Data Structures and Algorithms, Software Engineering, Artificial Intelligence, Machine Learning, Statistics, Discrete Math, Appl of Data Management, Multivariable Calc, Differential Equations, Ethics & Social Issues in Computing, Applied Linear Algebra, NLP.

Experience

AI Engineer Intern | *FADEL* ***Sep. 2024 - Present***

- Leading the development of a large-scale face detection system for image rights, fine-tuning state of the art models.
- Managing data collection and preprocessing, ensuring diversity in pose, lighting, and facial features. Using tools for alignment, cropping, and augmentation.
- Evaluating face detection models, balancing accuracy and efficiency to meet scalability and client requirements.

AI Engineer Intern | *CODE Technologies* ***July 2024 - Aug. 2024***

- Developed a matching system within an app to identify patterns and target individuals for project donations and engagement.
- Leveraged DeepFace's FaceNet model and RetinaFace for high-accuracy facial recognition to verify and identify individuals.
- Automated the web scraping of publicly available data using Selenium and employed NLP-based techniques to create a weighted scoring system, assessing the likelihood of profile matches.
- Achieved an 80-85% accuracy rate in identifying matching profiles, allowing the app to effectively target individuals with personalized outreach strategies, significantly increasing engagement and enhancing the platform's value.

Undergraduate LLM Research Volunteer | *Manning CICS* ***Dec. 2023 - Feb. 2024***

- Fine-tuned LLaMA-2-7B model for system initiative prediction using the MSDialog dataset, QLoRA technique, and Hugging Face libraries; achieved 76.7% accuracy with fine-tuning and 88% with few-shot learning.
- Collaborated with a team of undergraduates, under PhD mentorship, on a classification task, leveraging Google Colab and pandas for data preprocessing and experimentation.
- Presented research findings to the program members and coordinated team communication via Slack.

Responsible Computing Research (CSForAll) Intern (*Honors Thesis Project)* | *Professor Nenna Thota* ***Sep. 2023 - Present***

- Engineered an educational game designed to assess and enhance computational thinking (CT) abilities in K-12 students.
- Supported the design and implementation of CT assessments aiming to validate the effectiveness of instructional materials.
- Contributing to a larger NSF-funded project, recognized with a CSForAll award, emphasizing innovation and inclusion in educational technology for young learners.

Software Engineer Intern | *Institute for Applied Life Sciences m-health lab* ***June 2023 - Aug. 2023***

- Designed a web application focused on improving healthcare data quality in Alzheimer's disease research, utilizing Django.
- Achieved a significant increase 74% in survey response rates by integrating the Twilio API for SMS-based data collection.
- Developed an Android app for controlling Vector, an autonomous robot, leveraging real-time data from the accelerometer and gyroscope sensors via Android's Inertial Measurement Unit (IMU) enabling immediate control over Vector's movements.

Projects

Artificial Sign Language (Best Use of an AI Model Hack(H)er413) |Github demo |*Python, TensorFlow, NumPy, OpenCV, MediaPipe*

- Awarded "Best Use of AI" by travelers.com for developing an American Sign Language translator using DL & computer vision (CV).
- Led the creation of a custom dataset of 1,000+ images using computer vision algorithms to track and capture our hand gestures.
- Generated a supervised learning ML model and then optimized it to classify various signs with over 83% accuracy.

Analysis of ML Algorithms on Diverse Datasets |Github demo|*Jupyter Notebooks, NumPy, Matplotlib, Pandas,* Scikit-learn

- Conducted in-depth performance comparison of various machine learning algorithms including Neural Networks, Random Forests, Decision Trees, and K-Nearest Neighbors across four distinct datasets as part of a semester-long project.
- Enhanced practical machine learning skills through hands-on experience with algorithm selection, tuning, and hyper-parameter optimization, achieving robust model performance tailored to different data characteristics.

Implementation of Multinomial Naive Bayes Classifier |Github demo| *Google Colab, NumPy, Matplotlib, Seaborn*

- Developed a classifier from scratch to categorize movie reviews as positive or negative using the IMDB Large Movie Review dataset.
- Incorporated advanced techniques such as Laplace smoothing to improve model performance and handled zero-frequency issues, demonstrating a deep understanding of probabilistic models.