

MADISON VAN HORN

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WORK EXPERIENCE

MANTIUM | Remote, U.S. 02/2022 – Present

A cloud-based AI startup that [raised \\$12.75M in seed funding](#) for working with large language models at scale.

NLP Engineer

- Led the end-to-end integration of advanced NLP features into the Mantium platform, utilizing Python, PyTorch, HuggingFace, and LangChain for optimal performance.
- Designed and implemented a conversational retrieval agent, including a feature to generate fine-grained citations to ensure transparent sourcing of information.
- Engineered Retrieval Augmented Generation (RAG) pipelines including preprocessing, embedding generation, and storage using Redis vector databases. Performed semantic similarity on documents to retrieve top-k documents to be used within RAG pipeline.
- Implemented an evaluation framework for document retrieval, testing and comparing sparse and dense retrievers to optimize for accuracy, indexing speed, and querying speed.
- Improved few-shot text classification performance by 9% for GPT-J by implementing prompting techniques.
- Fine-tuned text and multimodal models (e.g., RoBERTa, Donut, LayoutLMv3) for multi-label classification and question answering tasks.
- Collaborated with cross-functional teams of developers and program managers to ensure cohesive development and deployment of NLP solutions.

CAMBRIDGE SPARK | London, U.K. 11/2021 – 02/2022

An educational technology company providing bootcamps for organizations to learn and apply AI technologies.

Teaching Assistant, Machine Learning

- Assisted non-technical learners on the subjects of Python, data science, and machine learning during comprehensive practical modules through Jupyter Notebook.

NORTHROP GRUMMAN CORPORATION | San Diego, U.S. 06/2019 – 09/2020

Associate Software Engineer

- Developed test scripts and updated the code base for various subsystems of an unmanned aircraft.
- Configured workstations with the latest code developments, including executing software release and installation process while supporting testing and integration.
- Implemented a workflow process for running hardware tests to identify and track issues for resolution.

Software Engineer Intern 06/2018 – 08/2018

- Integrated an internal application to provide situational awareness through synthetic vision to identify and validate any safety and high-risk scenarios for an unmanned aircraft.

Software Engineer Intern and Software Quality Assurance Engineer Intern 05/2017 – 08/2017

- Reviewed source code, provided feedback, and verified documentation for compliance with standards while overseeing the proper execution of software qualification and system tests.
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EDUCATION

MSc, Artificial Intelligence | University of Edinburgh, U.K. 09/2020 – 08/2021

- Awarded Distinction.
- Dissertation: "Understanding How Immune Systems See Disease: Exploring Self-Attention for MHC Class I Presented Sequences with Natural Language Processing Techniques."

BSc, Computer Science | San Diego State University, U.S. 08/2015 – 09/2019

- GPA: 3.69

SELECTED SKILLS

- Areas of Interest: Natural Language Processing, Computer Vision, Computational Cognitive Neuroscience, Bioinformatics, Machine Learning, Reinforcement Learning
- Tools: Amazon Sagemaker, Git, Linux, Slurm Workload Manager
- Packages: LangChain, Haystack, Hugging Face Transformers, Pytorch, Scikit-learn, PIL, Numpy, Pandas, Jupyter Notebook, Matplotlib
- Programming Languages: Python
- Non-Technical: Agile Methodologies, Software Development Life Cycle, Project Management, LaTeX

TALKS

- Patel, D., Nachum, Gili., Van Horn, M., "Train and Deploy Large Language Models on Amazon SageMaker," AWS re:Invent, Las Vegas, Nevada. (November, 2022). https://d1.awsstatic.com/events/Summits/reinvent2022/AIM405_Train-and-deploy-large-language-models-on-Amazon-SageMaker.pdf.

PUBLICATIONS

- Van Horn, M., Barry, D., Ranade, S., Van Horn, G., "Few-Shot Fine-Grained Visual Classification using Coarse-Grained Supervision," 8th Workshop on Fine-Grained Visual Categorization (FGVC8), IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), Nashville, TN, June 2021.
- Van Horn, M. "Using Deep Learning for Visual Decoding and Reconstruction from Brain Activity: A Review." arXiv preprint arXiv:2108.04169, 2021.

AWARDS AND RECOGNITION

- Placed top-6 out of 101 projects in the IBM Machine Learning Project Competition. Project title: "Few-Shot Fine-Grained Visual Classification using Coarse-Grained Supervision."
- Recognized as an Excellent Performer in Northrop Grumman's 2019 yearly review.
- Received a Northrop Grumman Bravo Award for efforts in testing new hardware.
- Earned a Northrop Grumman Bravo eRecognition for final summer presentation.
- Graduated Magna Cum Laude from San Diego State University.
- Earned Dean's List five semesters at San Diego State University.
- Received Women's Club Scholarship three times for academics and community service.
- Received Wonderful Company Scholarship for academic excellence.