Adam Sabra

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Education

Statistics & Machine Learning, B.Sc.

Department of Statistics - University of California, Davis

September 2017 – June 2021 Davis, California

- **Undergraduate Research Project:** Understanding Vocal Source Separation via Machine Learning and Deep Learning
- **Advisor:** Prabir Burman

Experience

Machine Learning Researcher

UC Davis, Department of Statistics

May 2020 - Present Davis, California

Coordinated each phase of a strategic research project from data collection through model development. Currently conducting continuous research on signal processing methodologies and Machine/Deep Learning Models to identify and improve upon performance in the task of vocal isolation and extraction in music.

- Developed U-Net Convolutional Neural Network (CNN) for mask estimation in vocal extraction in TensorFlow. Currently building and comparing performance to Variational Autoencoders.
- Leveraged Librosa to execute signal processing methods within the frequency and time domains including Mel Frequency Cepstrum Coefficients (MFCCs,) log-frequency power/Mel spectrograms, and Fourier Transformations.

Machine Learning Intern

Hindsight Technology Solutions

August 2019 - February 2020 Remote

Collected, parsed, cleaned, and analyzed corpus data to identify and highlight keywords within each document by leveraging regular expressions. Partnered with Chief Data Scientist to expand knowledge of Natural Language Processing techniques.

- Built and connected Streamlit web applications to NLP model streamlining semi-supervised training process by 30%.
- Automated data retrieval through the creation of web scrapers in BeautifulSoup able to simultaneously extract corpus data and identify key words of a minimum of 500 articles at a time, improving overall process by 15%.

Data Science Intern

Penji

January 2019 - August 2019 Remote

Collaborated with Chief Executive Officer to create and evaluate key project indicators related to customer acquisition. Utilized Jupyter notebooks to automate tracking operations across all campuses.

- Enhanced marketing outcomes by 20% after designing and integrating dashboards displaying visualizations regarding application growth.
- Established and elaborated KPIs, uncovering details about application's virality to peers informing marketing actions.

Areas of Interest

- Audio Information Retrieval
- Machine Learning and Deep Learning
- Digital Signal Processing
- Human-Robot Interaction

Projects

Vocal Extractor:
Researched U-Net Convolutional Neural Networks and Variational Autoencoders for their performance relating to vocal isolation in music.

Instrument Classifier:
Utilized Support Vector Machines to identify and classify 10 instruments with a training and testing accuracy of 98%.

Medium Writer:
Author of Data Science/Machine Learning blog averaging 3,000 views a month, creating coding tutorials and blog series such as *Learning from Audio* enabling Data Scientists to break into Audio Machine Learning through Digital Signal Processing techniques and concepts.

Tools and Skills

Machine Learning Algorithms:
Convolutional Neural Networks, Variational Autoencoders, Gaussian Mixture Models, K-Means/Median Clustering, K-Nearest Neighbors, Support Vector Machines, Regression

Digital Signal Processing:
MFCCs, Mel Spectrograms, Log-Frequency Spectrograms, Chromagrams, Fourier Transformations, Zero-Crossing Rate, Amplitude Envelopes, Root-Mean-Square Energy

Python:
TensorFlow, PyTorch, Jupyter Notebooks, Pandas, NumPy, SciPy, Sci-kit Learn, Librosa, FFmpeg, MatPlotLib, BeautifulSoup, Streamlit, Plotly

SQL
Experience with inner, outer, left, and right joins as well as subqueries and aggregate/window functions. Can effectively extract data from relational databases in any flavor of SQL.