

RAFAEL VALLE

MACHINE LEARNING DATA ANALYSIS MUSIC INFORMATION RETRIEVAL

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Profile

6+ years of experience developing high performance machine learning algorithms for data/audio analysis and machine improvisation with formal specifications.

PROFESSIONAL EXPERIENCE

SENIOR RESEARCH SCIENTIST @ NVIDIA

2017 SEP -

Develop models for audio and computer vision
– Neural Networks DSP

RESEARCH INTERN @ GRACENOTE

Develop models for style classification and algorithms for music structure segmentation
– Neural Networks Bayesian Hyperparameter Optimization DSP

SCIENTIST INTERN @ PANDORA

2016 JUN-AUG

Investigate segments and scores that describe novelty seeking behavior in Pandora listeners
– Random Forest GLM

VISITING RESEARCHER @ LABROSA AT COLUMBIA UNIVERSITY

2015 JUL-SEP

Develop algorithms for beat extraction, local key estimation and chord transcription
– MIR HMM

DATA SCIENTIST @ PERCOLATA

2014-2015 NOV-JAN

Occupancy prediction from sensor fusion occupancy estimates
– Time series analysis EDA ARIMA STL

AUDIO ANALYST & DATA SCIENTIST @ BAY SENSORS

2014 MAY-AUG

Design a machine listening engine to estimate room occupancy and activity from audio
Increase estimation accuracy by designing a sensor fusion (audio, video, wifi) algorithm
– GLM GMM HMM Python Sklearn Stats-models Matplotlib

CURRENT PROJECTS

PHD RESEARCH

Implementation of a framework for music specification mining in the symbolic and audio domains
Development of generative adversarial models for machine listening and improvisation
Audio segmentation and visualization
– RNN GAN Stochastic Variational Inference Hierarchical Dirichlet Processes

TERRASWARM RESEARCH CENTER

Privacy Aware Keyword Spotting
Design and implement formal specifications for control improvisation systems
Provide Music Information Retrieval resources and frameworks
– Neural Networks HMMs Factor Oracles Formal Methods

EDUCATION

UC Berkeley — GPA 3.96 Interdisciplinary PhD in Machine Listening and Improvisation, 2018

MH-Stuttgart, Germany — Master in Computer Music, 2011

ECU, USA — Master in Computer Music, 2010

UFRJ, Brazil — Bachelor in Orchestral Conducting, 2009

PUBLICATIONS

| | |
|---|--------------------|
| Flowtron: an Autoregressive Flow-based Generative Network for Text-to-Speech Synthesis <u>RAFAEL VALLE</u> , KEVIN SHIH, RYAN PRENGER, BRYAN CATANZARO | arXiv 2020 |
| Mellotron: Multispeaker Expressive Voice Synthesis by Conditioning on Rhythm, Pitch and Global Style Tokens <u>RAFAEL VALLE</u> , JASON LI, RYAN PRENGER, BRYAN CATANZARO | ICASSP 2020 |
| Waveglow: A Flow-based Generative Network for Speech Synthesis RYAN PRENGER, <u>RAFAEL VALLE</u> , BRYAN CATANZARO | ICASSP 2019 |
| Hands-On Generative Adversarial Networks with Keras (book) <u>RAFAEL VALLE</u> | Packt 2019 |
| Attacking Speaker Recognition with Generative Models Anish Doshi, Wilson Cai, <u>RAFAEL VALLE</u> | arXiv 2018 |
| Intriguing properties of GAN samples <u>RAFAEL VALLE</u> , Wilson Cai, Anish Doshi | arXiv 2017 |
| Attention Networks for image-to-text Jason Poulos and <u>RAFAEL VALLE</u> | arXiv 2017 |
| ABROA : Audio-Based Room-Occupancy Analysis using Gaussian Mixtures and Hidden Markov Models <u>RAFAEL VALLE</u> | FTC'16 DCASE'16 |
| Learning and Visualizing Music Specifications Using Pattern Graphs <u>RAFAEL VALLE</u> , Alexandre Donz , Daniel Fremont, Ilge Akkaya, Sanjit Seshia, Adrian Freed | ISMIR'16 |
| Missing Data Imputation for Supervised Classification Jason Poulos and <u>RAFAEL VALLE</u> | AAI'18 |
| Specification Mining for Machine Improvisation with Formal Specification <u>RAFAEL VALLE</u> , Alexandre Donz , Daniel Fremont, Ilge Akkaya, Sanjit Keshia, Adrian Freed | CIE'16 |
| Control Improvisation with Probabilistic Temporal Specifications Ilge Akkaya, Daniel Fremont, <u>RAFAEL VALLE</u> , Edward Lee, Sanjit Seshia | IoTDI'15 |
| NP-MUS : Symbolic Music Similarity using Neuronal Periodicity and Dynamic Programming <u>RAFAEL VALLE</u> | MCM'15 |
| Machine Improvisation with Formal Specifications Alexandre Donz , <u>RAFAEL VALLE</u> , Ilge Akkaya, Sophie Libkind, Sanjit Seshia, David Wessel | ICMC'15 |
| Gradual Control of Harmonicity in the context of Frequency Modulation <u>RAFAEL VALLE</u> | ICMC'14 |
| Towards a Dynamic, Inclusive and Equalitarian Augmented Activity Space <u>RAFAEL VALLE</u> | ICMC'14 |

SKILLS

DEEP LEARNING

Normalizing Flows, GAN, CNN, RNN, Seq2Seq, Feedforward, Bayesian Hyperparameter Optimization

MACHINE LEARNING

Classification, Clustering, Regression, Dimensionality reduction, Data visualization, Feature selection, etc

LIBRARIES

PyTorch, Theano, TensorFlow, Lasagne, Scikit-Learn, Statsmodels, Pandas, Matplotlib

PROGRAMMING AND SCRIPTING LANGUAGES

Python, R, Matlab, Java, C, Lua, SQL, Hadoop Hive