

# RAFAEL VALLE

MACHINE LEARNING DATA ANALYSIS MUSIC INFORMATION RETRIEVAL  
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## Profile

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

## PROFESSIONAL EXPERIENCE

- RESEARCH INTERN** @ GRACENOTE 2016 SEP - DEC  
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
- SOFTWARE ENGINEER** @ IRIUS TECNOLOGIA BRAZIL 2012 JAN-DEC  
Design and implement systems for event scheduling, synchronization and visualization

## 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, exp. August 2017  
MH-Stuttgart, Germany — Master in Computer Music, 2011  
ECU, USA — Master in Computer Music, 2010  
UFRJ, Brazil — Bachelor in Orchestral Conducting, 2009

## PUBLICATIONS

<b>Attacking Speaker Recognition with Generative Models</b> Anish Doshi, Wilson Cai, <a href="#">RAFAEL VALLE</a>	under review
<b>Intriguing properties of GAN samples</b> <a href="#">RAFAEL VALLE</a> , Wilson Cai, Anish Doshi	under review
<b>Sequence generation with Generative Adversarial Networks</b> <a href="#">RAFAEL VALLE</a>	under review
<b>ABROA : Audio-Based Room-Occupancy Analysis using Gaussian Mixtures and Hidden Markov Models</b> <a href="#">RAFAEL VALLE</a>	FTC'16 DCASE'16
<b>Learning and Visualizing Music Specifications Using Pattern Graphs</b> <a href="#">RAFAEL VALLE</a> , Alexandre Donz�, Daniel Fremont, Ilge Akkaya, Sanjit Seshia, Adrian Freed	ISMIR'16
<b>Missing Data Imputation for Supervised Classification</b> <a href="#">RAFAEL VALLE</a> and Jason Poulos	ARXIVX'16
<b>Specification Mining for Machine Improvisation with Formal Specification</b> <a href="#">RAFAEL VALLE</a> , Alexandre Donz�, Daniel Fremont, Ilge Akkaya, Sanjit Keshia, Adrian Freed	CIE'16
<b>Control Improvisation with Probabilistic Temporal Specifications</b> Ilge Akkaya, Daniel Fremont, <a href="#">RAFAEL VALLE</a> , Edward Lee, Sanjit Seshia	IoTDI'15
<b>NP-MUS : Symbolic Music Similarity using Neuronal Periodicity and Dynamic Programming</b> <a href="#">RAFAEL VALLE</a>	MCM'15
<b>Machine Improvisation with Formal Specifications</b> Alexandre Donz�, <a href="#">RAFAEL VALLE</a> , Ilge Akkaya, Sophie Libkind, Sanjit Seshia, David Wessel	ICMC'15
<b>Gradual Control of Harmonicity in the context of Frequency Modulation</b> <a href="#">RAFAEL VALLE</a>	ICMC'14
<b>Towards a Dynamic, Inclusive and Equalitarian Augmented Activity Space</b> <a href="#">RAFAEL VALLE</a>	ICMC'14

## SKILLS

### DEEP LEARNING

GAN, CNN, RNN, Feedforward, Bayesian Hyperparameter Optimization

### MACHINE LEARNING

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

### LIBRARIES

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

### PROGRAMMING AND SCRIPTING LANGUAGES

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

## RELEVANT COURSE WORK

Special Topics in Deep Learning	Computer Vision	Introduction to Machine Learning
Statistical Models: Theory and Application	Audio Signal Processing in Humans and Machines	Applications of Parallel Computers