Emanuel Azcona

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PROFILE

Ph.D. candidate at Northwestern University with a research background in deep learning, signal processing, and mesh manifold analysis. Seeking internship and collaborative research opportunities to apply my skills in several artificial intelligence applications.

EDUCATION

Northwestern University

- **Ph.D. Electrical Engineering, expected June 2022**
  Dissertation Focus: Generative Deep Learning Models for Structural Brain Atrophy in Association to Alzheimer's Disease
- **M.S. Electrical Engineering, June 2019**

New York University

- **B.S. Electrical Engineering, May 2017, *cum laude***
  Thesis: Analysis of Supervised Learning Algorithms for Predicting NBA Playoff Contention Using Individual Player Features

TECHNICAL SKILLS

Scripting Languages: Python, MATLAB, C++, LaTeX, Bash, SQL, LabVIEW

Tools/Libraries: Tensorflow, Keras, PyTorch, Matplotlib, NumPy/SciPy, Pandas, Scikit-learn, Git, Freesurfer

INDUSTRY / RESEARCH EXPERIENCE

PhD Candidate & Research Assistant *September 2017 – Present*

Katsaggelos Image & Video Processing Lab, Northwestern University *Evanston, IL*

- Developed novel residual neural network that utilizes mesh renderings of the human brain to classify dementia of the Alzheimer's type apart from healthy controls with an accuracy of 96.35%
- Produced Bash scripts for parallel processing of Freesurfer jobs to NU's high-performance computing cluster to aid in mesh extraction process for the cortex and subcortical structures from structural magnetic resonance imaging (MRI) scan
- Currently developing neural network models for generating future states of a subject's brain given prior age and scan instances

Artificial Intelligence Intern II *June – August 2019*

Stats Perform *Chicago, IL*

- Replicated my research findings from the previous summer's work in compressing & reconstructing player tracking data on a new set of games from the France Ligue 1 using GCNs for proof of concept
- Produced GCN libraries in Python and pushed them into production for use in other company products & research projects
- Integrated self-produced GCNs for research project predicting links between players in non-consecutive frames of a video

Artificial Intelligence Intern *June – August 2018*

Stats Perform *Chicago, IL*

- Created queries for accessing and filtering multi-agent soccer tracking data from Amazon Web Services (AWS) database
- Worked in an Agile, collaborative environment surveying machine learning solutions for multi-agent location prediction
- Designed GCN to compress human tracking data and converge to an average reconstruction error of 0.001m
- Assembled barebones template for the start of project using temporal-graph convolutional network on player tracking data

Research Assistant *May – August 2016*

New York University Department of Electrical & Computer Engineering *New York, NY*

- Analyzed Optical Coherence Tomography scans to correlate retinal thickness in patients with(out) Parkinson's Disease (PD)
- Formulated real-time Python implementation of digital sound synthesis using the Function Transformation Method (FTM) to model string and drum instruments described by partial differential equations

PUBLICATIONS / WRITTEN WORK

- **E. Azcona** *et al.* "Interpretation of Brain Morphology in Association to Alzheimer's Disease Dementia Classification Using Graph Convolutional Networks on Triangulated Meshes." International Workshop on Shape in Medical Imaging (ShapeMI) at Medical Image Computing and Computer Assisted Interventions (MICCAI) Conference 2020. **Submitted for peer review.**