



# DAN BILLMANN

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## Education

### Stony Brook University

*M.S. in Computer Science*

**Aug. 2021 – May. 2023**

*Stony Brook, NY*

### University of Cincinnati

*B.B.A in Management Information Systems*

**Aug. 2012 – Apr. 2017**

*Cincinnati, OH*

## Experience

### VideaHealth

*Machine Learning Intern*

**May 2022 – Aug. 2022**

*Boston, MA*

- Wrote training framework for segmentation model evaluating dental X-Rays using PyTorch and OpenCV.
- Researched cluster-based hyperparameter search on AWS EC2 instances to better control model training.
- Compared validation performance between 3 lightweight CNN encoders to study total runtime.
- Introduced the ML team to configuration-driven code to improve code re-usability.

### Bloomberg LP

*Data Engineer*

**Jun. 2017 – Jun. 2021**

*Princeton, NJ*

- Authored and maintained proprietary Python package that identified millions of potentially missing data points.
- Trained an NLP classifier using a bag-of-words encoder on 5 document types to save \$250,000 / year on headcount.
- Controlled storage and access of 50,000 documents on a Hadoop cluster using Spark
- Redesigned a pipeline to use the Factory pattern which reduced runtime from 12 to 2 hours, doubled its product applicability, and reduced maintenance by half.

## Thesis

### Non-Rigid Registration with Deep Learning and Conformal Harmonic Maps

**Fall 2022 - Spring 2023**

*C++, Python, Bash, Windows Batch*

*Stony Brook, NY*

Created a new method of 3D facial registration using a combination of techniques from computer vision and discrete differential geometry. Used a facial detection model to identify the boundary of the face. Used a conformal harmonic map to optimize the edges between face vertices, a Möbius transformation to align the faces, and a KNN with  $k = 1$  to compute the non-rigid mapping between faces.

## Projects

### Pylateral Facial Symmetry | Python, MediaPipe, Numpy

**Fall 2022**

Implanted a  $\mathbb{R}^2$  plane into a  $\mathbb{R}^3$  face manifold to predict bilateral facial symmetry. Trained the model on the left half ( $L$ ) of the face and used the right half ( $R$ ) as the validation set. I used gradient descent with momentum to optimize the objective cost function as the difference between  $L_i$  and  $R_i$ .

### Machine Learning Algorithm Analysis | Python, Scikit-Learn

**Fall 2021**

Analyzed the differences between machine learning algorithms (Logistic Regression, Decision Tree, and LinearSVM) by running each algorithm on a single dataset. Then ran the same set of algorithms on additional datasets to discover additional differences and tradeoffs between algorithms.

## Technical Skills

**Languages:** Python, C++, BASH, Julia, SQL

**Developer Tools:** VS Code, JIRA, AWS, vim, Docker

**Technologies/Frameworks:** GitHub, MeshLab, Spark, Hadoop, Splunk, OpenCV, PyTorch, Numpy, Pandas, Scikit-Learn

## Relevant Coursework

- Machine Learning
- Discrete Differential Geometry
- Big Data Analysis
- Computer Vision
- Data Structures & Algorithms
- Probability & Statistics

## Leadership / Extracurricular

### Bloomberg LP

**Nov. 2017 – Jun. 2021**

*Training Leader*

- Trained incoming teammates, analysts from other departments, and management on topics ranging from process analysis to quality check design. Awarded department Trainer of the Year in 2018.
- Mentored a co-op student for 6 months and prepared him to interview for and accept a full-time role with the team.