MARC MAILLOUX

Data Analyst | Systems Engineer

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EDUCATION

University of Central Florida

Modeling and Simulation *May 2019*
Masters of Science
Focus: Intelligent Systems, Systems Engineering, Data Science
Overall GPA | 3.6

Mechanical Engineering *May 2017*
Bachelor of Science
Senior Project | Micro UAV Design Competition | Integration of system and subsystem components

TECHNICAL SKILLS

Online Coursework	Linkedin Learning SQL Essential Training, AWS Elements of Data Science, DataCamp Intermediate Python for Data Science, 100 Days of Coding, Codeacademy Learn SQL
Languages	Python, SQL, R, Arduino C
Libraries	Scikit Learn, NumPy, Pandas, TensorFlow, Matplotlib
Additional Skills	AWS, Neural Networks, GitHub, Prediction and Classification Methods, Data Science and Machine Learning Workflow, IoT (Raspberry Pi, ESP32), FPV Drone Pilot
Product Development	Fusion360, SolidWorks, 3D Printing, 3 and 5 axis CNC, PCB Design

RELEVANT COURSEWORK AND PROJECTS

Machine Learning: Classification of Various Datasets

- Built the K Nearest Neighbor Algorithm to analyze the Mnist Dataset. Applied k-fold cross validation and developed a sliding window algorithm to optimize the solution.
- Used an SVM algorithm to analyze the UCI glass dataset and find the optimal hyperparameters. Implemented a one-vs-one and a one-vs-all approach.
- Developed a framework of machine learning foundational concepts from neural networks, deep learning, reinforcement, unsupervised and supervised learning.

Python, NumPy, Pandas, Scikit Learn, Exploratory Analysis, Data Normalization, Cross Validation, SVM Classification, K Nearest Neighbor, Machine Learning

Natural Language Processing: Classification of Cyberbullying

- Modified a binary dataset of over 8,500 tweets to have new labels: non bullying, culture bullying, personal bullying, sexual bullying.
- Labeled, tokenized, and later embedded the input tweets using a combination of n-grams for experimental purposes. A 5 fold cross validation with a 80/20 split of training/testing was used, along with a normalization of the dataset so an equal amount of each label was used in the training and testing.
- Developed an SVM algorithm to compare against the experimental results, using one-vs-one, one-vs-all, and three separate kernels approaches for further experimentation.
- Gathered metrics including: Precision, Recall, and F1 Score. Results for the SVM algorithm proved to be statistically significant where the highest metrics were: 0.855, 0.882, 0.853 for Precision, Recall, and F1 respectively.

Python, SVM, Data Analysis, TensorFlow, n-grams, NumPy, Pandas, Scikit, Tokenization, Cross Validation, Github, Hypothesis Testing

Data Visualization: Exercise Regiments and Real Estate

- Re-visualized published research data using R to better communicate research results. In this case, the results examined the change in physical and psychological measures of students on a 3-month yoga routine versus a 3-month physical exercise regiment.
- Produced graphs from a dataset of real estate rental property information that illustrate net worth, monthly rental income, monthly loan payments, and total loan amount. Developed a Monte-Carlo simulation predicting when the home owner would be debt free based on home values, loans (including interest and payoff strategies), incoming rental values, etc.

R (Caret, GGPlot2), Data Exploration and Analysis, Monte-Carlo Simulation, Client Constraints, Storytelling

Prototyping for Modeling and Simulation: Smart Plant Monitoring System

- Developed and built a system integrated with an ESP32 and Raspberry Pi to capture environmental data (light, temperature, and humidity)
- Utilized Node-Red to create a user-friendly dashboard, programming additional logic for different UI alert types.
- Future work includes storing data onto a database to perform data analysis, and developing a model for the incoming data using AWS.

ESP32, Raspberry Pi, Node-Red, IoT, UI, AWS, Data Analysis, Rapid Prototyping, 3D Printing, CAD Design, C/C++ (Arduino), MQTT

Simulation Techniques: Board Games and Fire Prevention

- Used Python to generate a Monte Carlo simulation of Chutes and Ladders board game, applied Cumulative Density Function (CDF), and created a CDF visual representation.
- Simulated a forest fire with Python Mesa and Pillow Libraries, using different RGB codes and real-world photos from google maps, and applying burn lines to simulate spread prevention and determine the optimal prevention patterns.

Python, Monte Carlo Simulation, CDF, Python Mesa and Pillow Libraries, Real-World Simulations

Intelligent Tutoring System: Pranayama Meditative Breathing

- Researched Pranayama practice and benefits to develop an adaptive learning system using the GIFT framework, capable of measuring and responding to user input by classifying learner attributes.
- Integrated numerous pranayama resource materials into the framework, assigning labels from which the learning system can choose based on the user's previous input. The goal of GIFT is to maximize learning using these labels and attributes of the content and user.

GIFT framework, Adaptive Learning System, Exploratory Research, Scientific Writing

Research Capstone in Modeling and Simulation: Attention Restoration Theory

- Researched the Attention Restoration Theory, (ART) which states that attention can be restored by viewing awe-inspiring nature in person or through photographs.
- Explored the minimal exposure time in regards to ART using Virtual Reality, developing a systematic process for experimentation.
- Conducted a pilot study (since time did not permit obtaining a certification for human studies), determining insufficient participation to form a conclusive argument on trends.

Research Design and Experimentation, Exploratory Research, Peer Reviews, Virtual Reality, Data Analysis, Scientific Writing

RELEVANT WORK EXPERIENCE

Modeling and Simulation (M&S) Graduate Teaching Assistant

August 2018 - May 2019

Perspectives in M&S | Understanding Humans for M&S

University of Central Florida

- Mentored students through the M&S process - including experimentation and research plans, procedures, schedules, and formal presentations - for 20 hrs/wk
- Independently instructed 20+ students/semester and facilitated assignment responses to align with institutional requirements

3D Printing and Manufacturing Engineering Intern

April 2018 - August 2018

Team Solutions Dental Lab

- Pioneered the creation of a 3D printing manual, which defined workflow, manufacturing procedures, general maintenance, and provided systematic education for future staff
- Experimented with new manufacturing ideologies and approaches to achieve a consistent, complete, and unambiguous environment

Product Engineering Intern

June 2017 - October 2017

Artistic Entertainment Solution

- Designed 35+ mechanical stage set drawings for in-house fabrication, verifying material calculations for structural safety
- Collaborated with clients and internal design team to develop cross-disciplinary solutions in a fast-paced environment