Mahmoud Sobier

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EDUCATION

Massachusetts Institute of Technology, Cambridge, MA — *S.B Computer Science and Philosophy*
August 2018 - Present (Expected graduation: May 2022)
GPA: 4.6 / 5.0
Relevant Coursework:

- Fundamentals of Statistics
- Advanced Natural Language Processing
- Elements of Software Construction
- Introduction to Machine Learning
- Probability and Random Variables
- Advanced Multivariable Calculus
- Theory of Computation (Graduate Level)
- Design and Analysis of Algorithms
- Linear Algebra and Optimization
- Philosophy of Language
- Minds and Machines

EXPERIENCE

Mobile Technology Group - *Student Researcher*
January 2021 - Present

- Investigated machine learning approaches to detecting linguistic markers of depression in a dataset of transcribed clinical interviews for eventual integration into smart speaker system
- Constructed a GRU-based hierarchical attention network in Pytorch for combining word-level and sentence-level affective features for boosting classification performance
- Incorporated contextualized pretrained embeddings generated by ELMo to help inject models with understanding of syntax and semantics
- Performed transfer learning on pretrained language models such as RoBERTa (transformer-based model) and DeepMoji (based on an attention mechanism and LSTMs)
- Adjusted loss function weights and used random oversampling to combat class imbalance, as there were significantly more non-depressed patients represented in the dataset than depressed patients

Center for Brains, Minds, and Machines - *Student Researcher*
May 2020 - August 2020

- Performed tests on an experimental neural network architecture for visual recognition tasks to improve ML model interpretability
- Implemented standard image classification models (AlexNet, LeNet) in Pytorch to use as a baseline for testing on benchmark datasets like MNIST
- Built and trained GAN and VAE generative models using Pytorch
- Read papers on various generative models like PixelRNN, VQ-VAE, etc.

Department of Electrical Engineering and Computer Science - *Grader for Automata, Computability, and Complexity (18.400/6.045)*
February 2020 - May 2020

- Graded weekly homework assignments on computability and complexity theory for a class of 52 students
- Provided detailed feedback for student solutions

MIT Kavli Institute for Astrophysics and Space Research - *Student Researcher*
June 2019 - January 2020

- Developed a Python software pipeline to identify potential supernovas and gamma-ray

SKILLS

Python
LaTeX
Pytorch
Matplotlib
Linux
Numpy
Scikit

AWARDS

Waterloo Hypatia Mathematics Contest - Distinction Award

MESAC Academic Games - Gold Overall

MESAC Academic Games - Silver in Round-Robin Tournament

bursts through image subtraction and alignment on a dataset of ~20,000 deep sky images taken by the TESS satellite

- Reduced the error of TESS image alignment by approximately half of its original value
- Designed a Python interface for off-the-shelf astrometrical command-line tools that provided programmatic access to image data
- Devised algorithms to sample images efficiently from a dataset of 20,000 images
- Performed calibration and testing of image alignment by plotting time series data using Matplotlib