Michael E. Shliselberg

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META DATA

Programming: Python, Java, C++, Fortran 90/95, C, Bash, Matlab, Julia, SQL, MIPS Assembly, Verilog, Arduino
DoD Clearance: Active Top Secret/SCI
Github Blog: mshlis.github.io

INDUSTRY

Systems & Technology Research (STR) – Machine Learning Researcher Spring 2018 – Current
Key Projects:

- **Event Detection – Tensorflow, Keras**
  - Applied computer vision techniques to learn representations of geolocations based on recorded event data
  - Used NLP techniques to draw and extract relevant information from tweets
  - Implemented Graph based deep learning approaches to handle non-uniform quantization of positions
  - **Presented research results to government stakeholders at IARPA Mercury Principal Investigators Meeting: Program Link**

- **Physically Realizable Adversarial Attacks – Tensorflow, Pytorch, Keras**
  - Wrote a pipeline to do Expectation-of-Transformation (EoT) attack experiments
  - Showed Black Box settings can still work in an EoT setup that is physically realizable
  - Created package to do Feature and Model visualizations
  - Fooled both state-of-the-art Object Detectors and Classifiers with a variety of physical attacks
  - **Presented research results to government stakeholders. Program information withheld.**

- **Understanding Dynamics in Groups – Tensorflow**
  - Designed a model to classify stubbornness and suspiciousness from dialogue
  - Wrote a context dependent text-generator using both an mle and adversarial training regime
  - Adjusted GPT2 architecture into an RNN that works on threads and dynamically learns author embeddings
  - **Presented research results to government stakeholders at DARPA Social Sim Principal Investigators Meeting: Program Link**

GITHUB BLOG (*mshlis.github.io*) – Stay tuned, will be adding to it Biweekly :)

Cubic Step Optimizer – Tensorflow November 2019

- I introduce a new optimizer to deal with oscillating weights by fitting and solving a cubic polynomial's roots
- This was more a motivating example to use zeroth order loss information in gradient based optimization

Super Masks – Tensorflow November 2019

- In this post I look into how strong Super Masks can be along with how good they are as initializations
- Results show I could get a mask with accuracy around as good as training, and performed even better fine tuned

Focal Gradient Loss – Tensorflow October 2019

- In this post I question whether Focal Loss defined by RetinaNet accomplishes the authors goal
- In a small experiment my corrected version has slightly weaker results but I give an intuitive suggestion to why

ANNagram – Tensorflow, Keras October 2019

- Trained a pointer network to learn how to rearrange a set of letters into a word
- Used a Transformer Encoder Decoder backbone because by construction it is well suited for embedding sets

Intermediate Loss Sampling – Tensorflow October 2019

- Introduces a new sampling scheme that allows for direct sampling in the forward pass
- Leverages a heuristic intermediate loss function for the back pass
- Experiments and compares with Gumbel-Softmax with positive results

EDUCATION

University of Massachusetts Amherst May 2018

Bachelor of Science: Computer Engineering

Bachelor of Science: Mathematics (Applied Track)

GPA:**3.97** **Summa Cum Laude**

RELEVANT COURSEWORK

Undergraduate: Natural Language Processing, Partial Differential Equations, Software Engineering, Applied Scientific Computing, Data Structures & Algorithms, Signals and Systems, Discrete Structures, Abstract Algebra
Graduate: Bayesian Statistics, Statistical Machine Learning, Coding Theory, Probability & Stochastic Processes

UNDERGRADUATE RESEARCH

Single Cell RNA Sequencing Analysis – under Professor Patrick Flaherty Spring 2018

- Participated in an Independent Study to use Hierarchical Poisson Factorization to learn latent embedding of cells
- Used clustering techniques to classify the weakly labeled data. Simulated in splatter, we evaluated these methods

Deep Learning for Hyperspectral Data Processing Research – under Professor Marco Duarte Summer 2017

- Participated in an REU, learning and implementing Deep learning algorithms in the fields of Computer Vision and Hyperspectral data processing using frameworks such as Tensorflow, Keras, and Caffe
- Studied effects of transfer learning on source and targets to try to analyze what allowed for best results

Numerical Eigensolver FEAST Research – under Professor Eric Polizzi Summer 2016

- Participated in an REU working with the FEAST algorithm, a reduced system Eigensolver
- Learned new numerical iterative and direct techniques in solving eigenvalue problems
- Developed applications for the FEAST user to “tune” a specific interval and get a density of states for the eigenvalues

Hardware Verification and Logic Debugging Research – under Professor Maciej Ciesielski Summer 2015

- Participated in an REU doing hardware verification and logic debugging of arithmetic circuits.
- Transformed Boolean equations into pseudo-algebraic equations to analyze potentially bugged circuits
- Brainstormed new ideas to find the origin of Boolean 0-equivalent residuals