Sriram Balasubramanian

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WORK EXPERIENCE

Research Fellow – Microsoft Research , India
AUGUST 2020 – AUGUST 2021

- **Predicting e-mail arrivals and reads:** Built machine learning models to predict e-mail arrivals and reads from user type and history of arrivals/reads to improve cache hit rates.
- **Simulating network paths using ML:** Built machine learning models to simulate internet paths using static network traces

Research Intern – Comcast, Washington D. C.
JUNE 2022 - AUGUST 2022

- Investigated the effectiveness of transfer learning in deep neural networks in the low resource regime (when the target domain has very limited data). Devised non-neural methods which could outperform both traditional collaborative filtering methods and neural networks in this regime.

RESEARCH AND PUBLICATIONS

Towards Better Input Masking for Convolutional Neural Networks
– *Submitted to ICCV 2023* [Link to paper]

- Devised an input masking technique for CNNs called layer masking, which simulates running the CNN on only the unmasked input, minimally changing the intermediate activations
- Using this masking technique, we were able to significantly improve perturbation-based interpretability techniques like LIME which rely on masking out parts of the image to produce importance scores

Can AI Generated Text be Reliably Detected?
– *Arxiv* [Link to paper]

- Tested the robustness of commonly used AI detectors and showed vulnerability to paraphrasing attacks

Simulating Network Paths with Recurrent Buffering Units
– *AAAI 2023* [Link to paper]

- Introduced a novel grey-box approach to network simulation that embeds semantics of physical network path in a new RNN-style model called Recurrent Buffering Unit (RBU)
- RBUs combine the interpretability of standard network simulator tools with the power of neural models, the efficiency of SGD-based techniques for learning, and yield promising results on synthetic and real-world network traces

What's in a Name? Are BERT Named Entity Representations just as Good for any other Name?
– *RepL4NLP, ACL 2020* [Link to paper]

- Studied and designed training algorithms robust to synonym and named entity replacements on tasks including text classification, grammar correction, co-reference resolution and question answering
- Demonstrated non-robustness of BERT based models on various tasks and developed simple yet effective ensembling algorithm to make models robust to named entity replacements

PROJECTS

- **Deep image priors for vision transformers** Investigated inductive biases in modern vision architectures like Swin transformers by using methods introduced by Ulyanov et al in "Deep Image Priors".
- **Excessive invariance in neural networks** Discovered that many state-of-the-art neural networks can be highly insensitive to significant changes in input; used confidence calibrated models to solve this problem

EDUCATION

Master's in Computer Science – UMD, College Park
AUG 2021 – PRESENT

- **GPA: 4.0/4.0**

Bachelor's in Computer Science with Honors – IIT Bombay, India
AUG 2016 – MAY 2020

- **GPA: 9.56/10.0**

COURSEWORK

Machine Learning, Deep Learning, Linear Algebra, Statistics
Artificial Intelligence, Optimization
NLP, Computer vision, RecSys

TECHNICAL SKILLS

Languages: Python • Matlab • LaTeX• C/C++ • SQL • Java
ML Frameworks: PyTorch • Lightning • Tensorflow • Keras • MXNet

AWARDS AND ACHIEVEMENTS

- Awarded Institute Academic Prize for exceptional academic performance in IIT Bombay [2017]
- Ranked **2nd** in the institute out of about 900 students in the first year at IIT Bombay [2017]
- Ranked **4th** in JEE Mains out of 1.2 million candidates all over India [2017]
- Awarded KVPY Fellowship by the Government of India [2015]
- Awarded NTSE scholarship by N.C.E.R.T [2014]

TEACHING ROLES

Teaching Assistant: Programming Handheld systems •2022 •*UMD College Park*

Teaching Assistant: Probability and Statistics •2021 •*UMD College Park*

Teaching Assistant: Data Interpretation and Analysis •2019 •*IIT Bombay*

Teaching Assistant: Electricity and Magnetism •2018 •*IIT Bombay*