Krishna Somandepalli

PhD Candidate, Electrical & Computer Engineering

SUMMARY

I build robust machine intelligence models by learning from multiple views and modalities in datasets. A few application areas of my research are understanding multimedia content, computational imaging, affective computing and developing inclusive technologies. I enjoy working on open-ended problems that contribute to products with a tangible societal impact.

: **Venice, California, United States**

: **somandep@usc.edu**

: **sail.usc.edu/~somandep**

: **Projects** (https://github.com/usc-sail)

Experience

Aug 2015 – *present*

Research Assistant at **SAIL, Viterbi School of Engineering, USC** (https://sail.usc.edu)

- Led research and collaboration of the Multimedia Intelligence and Content Analysis (MICA) group at SAIL with 10 PhD students
- Created three large-scale open-source datasets for computer vision and speech understanding of multimedia content
- Co-created a patent-pending application to analyze language and characters in screenplays and piloted the tool for over 25 film/TV scripts of 5 production companies including Disney and Universal
- Collaborated with Geena Davis Institute on the SeeJane project to computationally analyze over 600 movies from 2014-2019
- Partnered with J Walter Thompson to analyze portrayal of women in over 9000 ads nominated to Cannes Lions from 2006-2017
- Co-developed an application for tracking female participation for the United Nations ITU conferences analyzing over 120 hours of meetings

May 2020 – Aug 2020

Research Intern at **Google LLC.** (https://research.google/research-areas/machine-intelligence/)

- Demonstrated the use of federated learning (FL) for classifying 42 emotion labels at scale in a privacy-preserving manner
- Benchmarked emotion experience and perception federated models on a dataset of ~1500 users and ~3200 raters
- Proposed an algorithm to model raters and estimate their reliability in a distributed setting with a relative improvement of 3% average precision over the state-of-the-art

May 2019 – Aug 2019

Research Intern at **Google LLC.** (https://research.google/research-areas/machine-intelligence/)

- Developed self-supervised methods to learn robust features of facial movements and audio from ~3M unlabeled videos
- Improved emotion classification system performance by a relative gain of 5% average precision using self-supervised features

Skills

Programming Languages : ★★★

Python | C++ | R

: ★★☆

HTML | Javascript | Julia

Concepts : ★★★

Statistics | Machine Learning | Data Analysis | Optimization

Research Interests

Areas :

- Multiview / Multimodal signal representatiom learning
- Unsupervised / Self-supervised learning
- Explainability in Neural Networks
- Machine learning robustness and fairness

Application domains :

- Computational Media Intelligence
- Computational Imaging
- Computational Social Sciences
- Building inclusive technologies

May 2018 – Aug 2018

Research Software Intern at Google LLC. (https://research.google/research-areas/machine-intelligence/)

- Designed a data collection framework to localize cartoon characters in animated content
- Adopted computer vision models to detect, track & identify characters in video content and evaluated the system for seven animation genres

Oct 2012 – Aug 2015

Jr. Research Scientist at NYU Langone Medical Center (https://nyulangone.org/locations/child-study-center)

- Automated systems for quality control and denoising of functional MRI data reducing data attrition by ~12% over a 6 month period
- Contributed to 5+ journal publications in the field of computational neuroimaging
- Studied test-retest reliability of the fMRI connectome and replicability of the measures in a sample of 120 participants

Education

Aug 2015 – *present*

PhD in Electrical & Computer Engineering from University of Southern California

- Advisor: Prof. Shri Narayanan
- Thesis: Learning Shared Subspaces across Multiple Views and Modalities

Aug 2011 – Sep 2012

M.S. in Electrical & Computer Engg from University of California at Santa Barbara

- Advisor: Prof. Matthew Turk

Aug 2007 – Jun 2011

B.E. in Electronics & Communication Engg from University Visvesvaraya College of Engineering

- Advisor: Prof. Deepa Shenoy

Publications

SUMMARY

I have published in top peer-reviewed journals such as Transactions on Multimedia, Science Advances and conferences such as EMNLP and AAAI. For the full list of my publications, see here.

Invited Talks

Apr 2018 | Global Symposium on Gender in Media, Los Angeles - link

SUMMARY

Automating character representation and gender attribute analysis in Hollywood movies

Sep 2017 | Global Symposium on Gender in Media, New York - link

SUMMARY

Understanding gender portrayals in movies using multimodal analysis