Aman Shrivastava

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website | github | linkedin

EDUCATION

Ph.D. Computer Science, University of Virginia — 2020 – *present*

M.S. Data Science, University of Virginia — 2018 – 2019

B.Tech. Mechanical Engineering, Indian Institute of Technology, Roorkee — 2013 – 2017

EXPERIENCE

Research Scientist, University of Virginia, VA — 2019 – 2020
Advisors - Dr. Sana Syed and Prof. Donald E. Brown
- Working on building learning frameworks for the understanding and assisted diagnosis of gastrointestinal diseases.

Analyst, Citi, India — 2017 – 2018
- Built a streamlined visualization platform with data driven insights for the Chief Country Officer.

Data Science Intern, Adwyze, India — Summer 2015
- Developed a predictive model to optimize client advertising expenditure based on historical data. Increased the client's online advertising engagements by about 50%.

RESEARCH

Self-supervised disease localization
- A multi-scale CNN to predict and localize diseased patterns in biopsy Whole Slide Images without annoted segmentation masks.

Correlating disease gene signature with imaging data
- A deep learning framework to identify image features associated with functional gene clusters.

Stain Normalization in Deferentially Stained Biopsy Slides
- A self-attention based generative framework for unpaired domain translation for stain normalization in histopathological images.

Detection and Visual Understanding of Gastrointestinal Diseases, code
- A deep learning framework to classify Celiac and Environmental Enteropathy diseases using high resolution whole slide images from duodenal biopsy slides and numerical biomarkers.

Deep Image Colorization, code
- A self attention generative architecture to automatically colorize black and white images. Designed a UNet based generator with a perceptual loss function to generate more natural and vibrant images.

Data Driven Modelling of Composites, code
- A machine learning framework to aid in the meta-modelling of composites. Developed a system to hypothesize physical properties of novel composites using historic experimentation and simulation data.

SIDE PROJECTS

Connect 4 AI, code, demo
- An AI agent based on Minimax algorithm and Monte Carlo simulations for the game of connect 4. Featured on Hacker News. Released a Google Play Store App based on the project – Rated : 4.7.

Deep Causal Inference on Time-Series Images
- Understanding and interpreting the structural causal relationships extracted from the filter values of the CNN trained on Gramian Angular Field images of time-series data.

Humorous Image Captioning System, code
- A self-attentive encoder-decoder framework to generate humorous captions for images indistinguishable from human generated memes.

News Sentiment Tracker, code

- Automatic scraping and analysis of trends in the sentiment of editorial articles on any selected topic of media discussion. Applied it to parameterize and co-relate social response with economic fluctuations during the demonetization drive by the Government of India in November 2016.

Automated Clustering of Music, code
- An ML algorithm to automatically cluster songs onto playlists based on their intrinsic similarity in terms of music and lyrical features extracted from multiple sources.

Soccer Squad Optimization, code
- Strategic team selection by predicting the best football squad given budget, nationality (and/or club) and playing formation constraints based on self extracted FIFA dataset.

PUBLICATIONS AND PRE-PRINTS

[1] **Self-Attentive Adversarial Stain Normalization**, link
Aman Shrivastava, Will Adorno, Lubaina Ehsan, S. Asad Ali, Sean R. Moore, Beatrice Amadi, Paul Kelly, Sana Syed, Donald Brown.
Under-review

[2] **Deep Learning for Visual Recognition of Environmental Enteropathy and Celiac Disease**, link
Aman Shrivastava, Karan Kant, Saurav Sengupta, Sung-Jun Kang, Marium Naveed Khan, S. Asad Ali, Sean R. Moore, Beatrice Amadi, Paul Kelly, Donald Brown, Sana Syed.
IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI), May 19th, 2019 | Poster presentation

[3] **Artificial Intelligence Applied to Gastrointestinal Diagnostics: A Review**, link
Vatsal Patel, Marium N. Khan, Aman Shrivastava, Kamran Sadiq, S. Asad Ali, Sean R. Moore, Donald E. Brown, Sana Syed.
Journal of Pediatric Gastroenterology and Nutrition, 2019

[4] **Solving the Stain Dilemma: Computational Image Analyses to Address Differential Tissue Staining Color Bias in Duodenal Biopsies**, link
Sana Syed, Aman Shrivastava, Karan Kant, Luke Kang, Saurav Sengupta, Marium Naveed Khan, Najeeha Talat Iqbal, Kamran Sadiq, Christopher A. Moskaluk, Beatrice Amadi, Paul Kelly, Sean Moore, Donald Brown.
Digestive Disease Week (DDW), May 20th, 2019 | Poster presentation

[5] **Deep Learning for Detecting Diseases in Gastrointestinal Biopsy Images**, link
Aman Shrivastava, Karan Kant, Saurav Sengupta, Sung-Jun Kang, Marium Naveed Khan, S. Asad Ali, Sean R. Moore, Beatrice Amadi, Paul Kelly, Donald Brown, Sana Syed.
Systems and Information Engineering Design Symposium, April 26th, 2019 | Invited talk

[6] **Team strategizing using a machine learning approach**, link
Vignesh Rao, Aman Shrivastava
IEEE-International Conference on Inventive Computing and Informatics (ICICI), November 24th, 2017 | Invited talk

INTERESTS AND COMPETENCES

Interests: Computer Vision, Explainable AI, Deep Learning in Healthcare
Languages: Python, R, C++, Ruby, Julia, Javascript, LaTeX
Packages/Tools: PyTorch, Tensorflow, Keras, Git, AWS, GCP, MongoDB, Redis

TEACHING EXPERIENCE / TALKS

Python Instructor, Health Sciences Library, University of Virginia — Spring 2020
Assistant Capstone Advisor, School of Data Science, University of Virginia — Fall 2019
Invited Speaker, Applied Machine Learning Conference, Tom Tom Festival — 2018

EXTRA-CURRICULARS

Editor-in-Chief: Geek Gazette, campus technical magazine, IIT Roorkee.
Project Leader: Information Management Group, an exclusive campus coding society, IIT Roorkee.
Core-member Quizzing Society, IIT Roorkee.