ABHISHEK MANDAL

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SUMMARY

I am a SFI funded PhD researcher at the Insight Centre for Data Analytics, supervised by Dr Suzanne Little of Dublin City University and Dr Susan Leavy at University College Dublin. My research focuses on auditing bias and imbalance in deep neural networks used in computer vision applications. The main focus of my research includes Generative Artificial Intelligence, especially Text-to-Image Diffusion Models (e.g. DALL-E and Stable Diffusion) and Multimodal Visual-Linguistic models such as Contrastive Language Image Pretraining (CLIP). My areas of interest include Convolutional Neural Networks, Generative Adversarial Networks, Deep Learning, Computer Vision, Multimedia Analytics and Ethics and Bias in AI.

EDUCATION

Doctor of Philosophy, Artificial Intelligence — Oct 2020 – Mar 2024
Dublin City University
Title: Auditing imbalance and bias in deep neural networks for multimedia content analytics

Master of Science, Data Science (**1st Class Honours**) — Sep 2019 – Aug 2020
Institute of Technology, Carlow, Ireland

Bachelor of Technology, Mechanical Engineering, (**CGPA 7.92/10**) — July 2012 – May 2016
Sikkim Manipal Institute of Technology, Sikkim, India

TECHNICAL SKILLS

Programming languages: Java, Python, R, PL/SQL, HTML 5

Artificial Intelligence Technologies: TensorFlow, PyTorch, Keras, OpenCV, Pandas, Numpy, Sklearn, Scipy, Nvidia CUDA, Spyder, Jupyter, R Studio,

Visualisation: Ggplot, Matplotlib, Plotly, RShiny, Altair

Databases: Oracle 11, MySQL 8, MongoDB

Frameworks: SpringBoot, Spring MVC

Cloud technologies: Pivotal Cloud Foundry, Amazon Web Service, Google Cloud Platform

Tools: Spring Tool Suite, Jenkins, Jira, Git, UDeploy, SoapUI, Sonarqube, Maven, BitBucket

Operating Systems: Windows 7, 10, Linux

WORK EXPERIENCE

Adjunct Faculty – Dundalk Institute of Technology — Sep 2023- Present
• Delivered online lectures for the modules: Programming Principles and Real-Time Data Analytics in Python and R respectively.
• Developed and delivered the module Study Design.
• Developed module guidelines and descriptors for an upcoming course: PG Diploma in Applied Data Science.
Supervising MSc students in Data Analytics

Occasional Lecturer – University College Dublin — Jan 2023 – Aug 2023
• Delivered in-person lectures in a classroom setting for the modules: Artificial Intelligence and AI Ethics.
• Graded assignments.

Tutor – Dublin City University — Sep 2022 – Dec 2022
• Lab assistant and tutor for the module Data Management & Visualisation.
• Graded assignments.

Technology Fellow - <A+> Alliance for Inclusive Algorithms — Jan 2021 – June 2021
In collaboration with ThoughtWorks
• Collaborated on a project to develop an NLP-based application to gain insights into United Nations conferences.
• Collected text data from conference proceedings transcripts for model training.
•Created a pipeline to convert speech to text using AWS Transcribe.
•Trained and evaluated deep learning models.

•Deployed models to Google Cloud Platform (GCP) and monitored performance.
•Created dashboards to display insights.
•Worked as a part of a diverse and multinational team.
• Conveyed research findings to the general public by means of blog posts.

Data Scientist - Design+ Technology Gateway (Contract) Sep 2020 – Nov 2020

Industry based research project under IT Carlow.
• Generated business insights from data for an insurance industry client.
• Created dashboards using Plotly, RShiny and Flexdashboard.
• Deployed the dashboards using Shinyapps.

Software Engineer – Backend Java Developer (Cloud) - Capgemini India Pvt Ltd Dec 2016 - May 2019

Client: Synchrony Financial USA

Project: SYF-ECOM-SyPI May 2017 – May 2019

- Developed cloud based backend technologies to migrate existing struts based banking application to microservice based architecture.
- Developed backend microservices and RESTful APIs using SpringBoot, wrote JUnit test cases using Mockito and deployed the microservices using Jenkins to PCF .
- Attended project related calls such as daily stand-up calls, technical calls, scrum calls etc. as per Agile–Scrum methodology.

PUBLICATIONS

Conferences

- Abhishek Mandal, Susan Leavy, and Suzanne Little. 2021. Dataset Diversity: Measuring and Mitigating Geographical Bias in Image Search and Retrieval. In Proceedings of the 1st Int'l Workshop on Trustworthy AI for Multimedia Computing (Trustworth AI '21), Oct. 24, 2021, co-located with ACM Multimedia, Virtual Event, China. ACM, New York, NY, USA, 7 pages. https://doi.org/10.1145/3475731.3484956
- Mandal, A., Leavy, S., Little, S. (2023). Measuring Bias in Multimodal Models: Multimodal Composite Association Score. In: Boratto, L., Faralli, S., Marras, M., Stilo, G. (eds) Advances in Bias and Fairness in Information Retrieval. BIAS 2023. Communications in Computer and Information Science, vol 1840. Springer, Cham. https://doi.org/10.1007/978-3-031-37249-0_2
- Mandal, A., Little, S., Leavy, S. (2023). Gender Bias in Multimodal Models: A Transnational Feminist Approach Considering Geographical Region and Culture. Proceedings of the 1st Workshop on Fairness and Bias in AI co-located with the 26th European Conference on Artificial Intelligence (ECAI 2023) Kraków, Poland, October 1st, 2023. https://ceur-ws.org/Vol-3523/paper8.pdf
- Abhishek Mandal, Suzanne Little, and Susan Leavy. 2023. Multimodal Bias: Assessing Gender Bias in Computer Vision Models with NLP Techniques. In Proceedings of the 25th International Conference on Multimodal Interaction (ICMI '23). Association for Computing Machinery, New York, NY, USA, 416–424. https://doi.org/10.1145/3577190.3614156
- Mandal, A., Little, S., Leavy, S. (2023). Biased Attention: Do Vision Transformers Amplify Gender Bias More than Convolutional Neural Networks? Published at the 34th British Machine Vision Conference (BMVC), 2023. https://papers.bmvc2023.org/0629.pdf

Book Chapter

- Mandal, A. (2021). The Algorithmic Origins of Bias. Feminist AI. Retrieved from https://feministai.pubpub.org/pub/the-algorithmic-origins-of-bias

CERTIFICATIONS

- Oracle Certified Associate Java Programmer(OCAJP) Java 7
- Scrum Fundamentals Certified

AWARDS AND ACHIEVEMENTS

- Awarded full PhD scholarship by Science Foundation Ireland worth € 120000.
- Awarded President's Research Fellowship worth €10000 by Institute of Technology, Carlow.
- Awarded <A+> Alliance for Inclusive Algorithms Technology Fellowship worth CHF 12000.

REFEREES

• Dr Suzanne Little

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- Dr Susan Leavy
  Assistant Professor, School of Information and Communications Studies, University College Dublin
  E-mail: susan.leavy@ucd.ie