Amritpal Singh, MD

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Email: asingh880@gatech.edu Location: Atlanta, Georgia, USA

Education

Master in Computer Science, Georgia Institute of Technology, USA Aug 2022 - Apr 2024(Expected)
GPA - 3.82/4.0 BMED4803 Medical devices (Regulatory), BMED6739 Medical robotics, CS6601 AI, CS7631 MultiRobot systems.
Bachelor of Medicine, Bachelor of Surgery(M.B.B.S) [equivalent to MD in USA] Aug 2015 - Mar 2020
Maulana Azad Medical College, Delhi. Clinical rotations in Orthopedics, Surgery, Medicine, Pediatrics, Pathology, and more

Work Experience

Research Assistant, Emory University Aug 2023 - Present
Developing quantitative multimodal (radiomics, pathomics, genomics) biomarkers to predict patient prognosis and outcomes. Clinical research experience with protocol design and clinical data interpretation for imaging processes. Disease area of focus: Colorectal, lung cancer, and Cardiovascular disease
Manager: Anant Madabhushi, PhD at Madabhushi Lab

Program committee member and Research reviewer Jan 2023 - Present
NEURIPS conference 2023: Deep Generative Models for Health workshop
NEURIPS conference 2023: GenBio(Generative AI and Biology) workshop
IEEE COMPSAC conference 2023, Italy

Research Assistant, BioML Lab, Georgia Tech Aug 2022 - May 2023
Multi-modality deep learning: using complementary information from 3D imaging(MRI, PET scans), electronic health records, and genomic data. Improved on the previous SOTA methods on neurodegenerative diseases like Alzheimer's disease prediction. Explore methods to drive algorithmic and designing architectural advances, and implement hyper-parameter optimization. Design deep learning (2D/3D CNNs, NLP) models to improve the previous state of the art.

Clinical Scientist: Qure.ai Sep 2021 - June 2022
Designed clinical protocol and patient selection for clinical trials. Planned and executed clinical studies for 2 FDA approvals for medical imaging AI products. Managed clinical affairs and wrote clinical development plans.
Deep learning and Data analysis: Deep learning AI models for medical images, and analysis of classification/ segmentation models. Benchmarking products & measured patient data shifts to guide new model updates.
Manager: Dr. Pooja Rao, Ph.D. Neuroscience, Co-founder of Qure.ai

Junior Resident: Lok Nayak Hospital Apr 2020 - Apr 2021
Clinical rotation at Lok Nayak Hospital and GB Pant Institute of Postgraduate Medical Education & Research(GIPMER), Delhi

Publications

GraphPrint: Combining Traditional Fingerprint with Graph Neural Networks For Drug Target Prediction: Combining traditional molecular and protein features with 3D features from graph neural network for drug target affinity prediction. Under review
Class-Incremental Continual Learning for General Purpose Healthcare Models: Building medical imaging AI that can learn new diseases without catastrophic forgetting on previous tasks, in different medical modalities, specialties, and hospitals. Under review
Multi-Modal Deep Feature Integration for Alzheimer's Disease Staging: Learning Alzheimer's disease stage classification using multimodal data: MRI, PET, EHR, and Genomics data. Published at IEEE BIBM conference 2023
Autonomous Soft Tissue Retraction Using Demonstration-Guided Reinforcement Learning : Learning to control DaVinci surgical robot for soft tissue manipulation using expert demonstrations. Accepted in MICCAI- AE-CAI workshop 2023
Multi-Modality Deep Learning Methods to Learn Alzheimer's Disease Classification: Paper presentation at Suddath Symposium (Biomedical Informatics and AI for Biodiscovery and Healthcare) Georgia Institute of Technology. Mar 2023
Roadmap to Autonomous Surgery - A framework to Surgical autonomy arXiv:2206.10516v1: Apr - May 2022
In-Silico Repositioning of Drugs for Neurofibromatosis 2 Vestibular Schwannoma using Machine Learning 10.7303/syn25958848 : Mar -Sep 2021, deep learning framework for re-purposing old drugs using drug-target similarity
Personalized brain state targeting via Reinforcement Learning : Sep - Nov 2020, Active sleep induction in insomnia patients using non-invasive brain stimulation and reinforcement learning
Validation of expert system enhanced deep learning algorithm for automated screening for COVID Pneumonia on chest X-rays - Nature Scientific reports 10.1038/s41598-021-02003-w : Apr-Sep 2020. Novel methods to augment deep learning methods with human expert knowledge to predict COVID-19 on chest X-rays with limited data

Projects

Semi-supervised surgical tool detection and localization on endoscopic videos : Using SurgToolLoc data by Intuitive Surgical, Trained ensemble of UNET models on Using video level labels to detect+track surgical instruments in the endoscopic video at the frame level, achieved an average-F1 score of 0.52
Detection and localization of medical catheters on 2D x-ray images: Created ensemble of 5 image classification AI models, with the final model reaching a 0.86 F1 score, with GRADCAM explainable AI for model predictions

Competition and Hackathons

MIT Hack 4 Rare Disease Hackathon: Built AI solution for drug re-purposing for Neurofibromatosis, a rare neurodegenerative disease
Prague Healthcare Hackathon: Built AI solution for live health and visitor monitoring in ICU patients from CCTV video.
OSIC Pulmonary Fibrosis Progression Competition: Top 5% selected teams
Sartorius - Cell Instance Segmentation competition: Top 15% selected teams

Skills Summary

Skills: Bio-statistics | Clinical study design | Medical regulatory | Clinical Affairs | Machine learning
Research Interests: Medical devices| Medical imaging | Cancer informatics
Programming: Python | R | MongoDB | SQL | Git | Pytorch