YU MA

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EDUCATION

Massachusetts Institute of Technology (MIT), Cambridge, MA　　　　　　　　2020-2025(Expected)
Candidate for PhD in Operations Research, GPA: 5.0/5.0
Dissertation Area: Prescriptive Analytics and Machine Learning in Healthcare
Advisor: Dimitris Bertsimas

University of California, Berkeley, Berkeley, CA　　　　　　　　2016 - 2020
Bachelor of Arts in Applied Mathematics, Highest Honor, Phi Beta Kappa

LEADERSHIP

Vice President, MIT INFORMS, oversees and organizes all social events in the Operations Research Center.

Co-Organizer, MIT Operations Research Center Student Seminar, oversees and organizes all seminar events.

Co-Organizer, MIT ORC IAP Seminar 2023, will oversee and organize a one-day annual seminar event.

Head Proctor & Head Logistics, Berkeley Math Tournament, oversees all logistics and proctoring on tournament day

Academic/Professional Chair, Mathematical Undergraduate Student Association

SKILLS

Programming Languages: Python, Julia, Java, Matlab, R, Bash

Developer Tools & Optimization Software: Git, Vim, Remote Clusters, JuMP, Gurobi

RESEARCH PROJECTS

Personalized Breast Cancer Screening Massachusetts Institute of Technology　　　　06/2020-Present
· Propose a novel machine learning and optimization framework to recommend personalized and data-driven screening decisions for at-risk breast cancer patients, as well as a novel evaluation method on delay's impact on patient mortality risk
· Use big insurance claims data (130G) to show the potential of reducing an average of 2-3 months in screening delay.
· Estimate an additional 30% risk reduction using personalized screenings compared to the current national guideline.

Holistic Artificial Intelligence in Medicine Massachusetts Institute of Technology　　　　06/2020-Present
· Lead a team of 8 PhD students to propose and evaluate a framework to facilitate the generation and testing of AI systems that leverage multiple data modalities.
· Construct generalizable pipeline to preprocess EHR, CT scan image and radiology notes data.
· Demonstrate a consistent and robust improvement of model performance by 6-33% across various healthcare tasks
· **Follow up project:** TabText - use BioBERT to construct a generalizable data processing pipeline across hospital systems.

Automated Segmentation with Ensemble Learning Massachusetts Institute of Technology　　　　06/2020-08/2021
· Train six different deep learning auto-segmentation models based on 3D U-Net and Residual 3D U-Net architectures.
· Implement an average ensemble and an optimal weighted average ensemble to improve prediction performance.
· Augmented the streamline and accuracy of treatment planning for sarcoma tumor and its surrounding muscles.

Rapid Response Team Dispatch Massachusetts Institute of Technology　　　　06/2020-Present
· Collaborate with Hartford Hospital to predict the risk of redcap incidents across hospitals for rapid response team dispath
· Use BioBERT as well as SHAP to process and analyze EHR as well as notes data

Stable Regression Massachusetts Institute of Technology　　　　03/2021-Present
· Propose a stability measure to be incorporated in current robust optimization approach to stabilize regression
· Propose new metric to evaluate the stability of solution structure
· Demonstrate that stability measure is especially useful when we have large data perturbation

Artificial Intelligence in Trauma Massachusetts Institute of Technology　　　　09/2021-Present
· Collaborate with Massachusetts General Hospital (MGH) trauma department to make optimal decision on the prescription of REBOA treatments to reduce patient 24-hour mortality after noncompressible torso hemorrhage.
· Collaborate with MGH and predicted patient risk of deep vein thrombosis after endovenous thermal ablation.

Other MIT Projects Massachusetts Institute of Technology　　　　09/2020-Present

- Prescribe optimal radiotherapy treatment for patients with sarcoma tumor using Optimal Policy Trees
- Detect intimate partner violence from radiology scans from hospital admission using BioBERT and deep learning
- Predict risk of complications after TAVR procedure using Optimal Classification Trees
- Detect stamp characteristics and construct language paragraphs to democratize stamp auction

PUBLICATIONS

An Artificial Towards an Optimized Staging System for Pancreatic Ductal Adenocarcinoma: A Clinically Interpretable, Artificial Intelligence-Based Model
Journal of Clinical Oncology Clinical Cancer Informatics 2021

Using Artificial Intelligence to find the optimal margin width in hepatectomy for colorectal cancer liver metastases
JAMA Surgery 2022

Integrated multimodal artificial intelligence framework for healthcare applications
Major Revision at Nature npj Digital Medicine

Automated Segmentation of Sarcoma and Its Surrounding Muscles Using Deep Learning Ensemble
Submitted to International Journal of Radiation Oncology, Biology, Physics

Can Artificial Intelligence Improve the Appropriate Use and Decrease the Misuse of REBOA?
Submitted to Journal of Trauma and Acute Care Surgery

TabText: a Systematic Approach to Aggregate Knowledge Across Tabular Data Structures
Submitted to Arxiv

Prediction of Risk of Post Endovenous Thermal Ablation Complications
Submitted to RSNA annual meeting

Personalized Breast Cancer Screening
Submitted to Health Care Management Science

Prediction of Risk of Post Gastrointestinal Stromal Tumor Surgery Recurrence
In Preparation

Democratize Philately Auction
In Preparation

AWARD

1st Place, First Place for Cognex Prize Award at MIT MIMO Symposium

2nd Place, Operations Research Center's Common Experience Deep Learning Challenge

Cum Laude, 2021 INFORMS Student Chapter Annual Awards