SHYAMOLI SANGHI
Tel: (650) 353-0164; Email: shyamoli@stanford.edu

EDUCATION

Stanford University: Masters, Computer Science: Artifical Intelligence 2021-2022
- **Cumulative GPA:** 3.825
- **Relevant Computer Science Coursework:** Machine Learning, Natural Language Processing, Deep Learning, Convolutional Neural Networks for Visual Recognition, Deep Multitask and Meta-Learning, Decision-Making Under Uncertainty
- **ML and Data Science Tools Learned:** PyTorch, Hugging Face, NLTK, Tf-idf, T-sne, Pandas, NumPy, SciPy, PyPlot, Seaborn, Scikit-Learn

Stanford University: Bachelor of Arts and Science, Double Major in Mathematics, Philosophy 2016-2021
- **Cumulative GPA:** 3.774
- **Relevant Computer Science Coursework:** Programming Abstractions in C++, Computer Organization and Systems, Introduction to Probability for Computer Scientists, Design and Analysis of Algorithms, Mathematical Foundations of Computing
- **Programming Languages Learned:** Python, Java, C++, C, Assembly language

RESEARCH PROJECTS IN MACHINE LEARNING FOR EDUCATION

Meta-Learning for Deep Knowledge Tracingof Student Coding Performance 2021
- Employed a meta-learning approach to predict whether a student will be able to solve future coding problems given past performance
- Implemented a two-layer MANN model with handcrafted coding submission features and conctentated coding submission history from an LSTM to manual submission features and problem prompt features, and achived an accuracy of 90.5 percent and F1 score of 90.9
- Added CodeBERT embeddings for code submission representation as well as GloVE embeddings of problem prompt text to the model

Stanford Pathways Lab - CARTA Course Evaluations NLP Project 2021-22
- Worked at the Stanford Pathways Lab on an NLP project to identify the most indicative features of student course evaluation responses
- Used a combination of the Tf-idf matrix and Sentence BERT embeddings of course reviews as input to perform K-means clustering
- Identifying semantically similar reviews by employing LDA models and novel Transformer architectures to capture topic semantics

Stanford NLP Group - Teacher Remedation Score Prediction Project 2022
- Working with the Stanford NLP group under Prof. Dan Jurafsky on a project to predict teacher remediation scores for teacher-student transcripts using supervised regression with different Transformer architectures
- Using a weighted log odds ratio approach to compare difference in word usage between high and low remediation score transcripts

Finding Optimal Policies to Minimize Student Dropout (Class: Decision Making Under Uncertainty) 2021
- Modelled the problem of planning pedagogical actions of an automated teacher as an MDP, with the goal of minimizing student dropout
- Used offline methods sich as Gauss Seidel Value Iteration and explored online methods such as Q-learning to solve the MDP
- Obtained an optimal policy that significantly reduces student dropout rate in simulated trails (by 10x) compared to a hand-crafted policy

Analysing the Robustness of Math Word Problem (MWP)-Solving Transformers (Class: Machine Learning) 2021
- Analyzed the ability of several MWP-solving NLP models to learn structure of mathematical equations from the SVAMP dataset
- Showed that Tree-based decoder models are more robust than Seq2Seq models for math equations with varying structure

DATA SCIENCE WORK EXPERIENCE AND OTHER PROJECTS IN COMPUTER SCIENCE

Nference AI, Internship: COVID-19 Mutation Machine Learning and Data Science Project 2021
- Designed and implemented algorithms using complex data structures to compare protein mutation rates in epitope residues
- Employed a rule-based method and a Hierarchical Transformer Encoder to convert COVID-19 mutation data to human-readable text
- Used data visualization tools such as heat maps, scatterplots and frequency histograms to demonstrate results about mutations

Convex Optimization for Greedy Layerwise Learning 2021
- Extended techniques that train nonconvex duals of convex optimization problems to deeper networks using greedy layer-wise learning
- Increased test accuracy on the multi-class classification task on CIFAR-10 and Fashion MNIST by employing column normalization after having explored different initializations, pooling functions, batch normalization and adding layers to improve the model's text accuracy

Research Project in Algorithmic Game Theory (Tata Institute of Fundamental Research, Mumbai) 2020-21
- Worked with Arkadev Chattopadhyay, Associate Professor at Tata Institute of Fundamental Research to analyze the proof that a certain approximation for truthful combinatorial auctions requires exponential communication
- Brainstormed and explored similar results relating to submodular valuation functions in place of XOS valuations

Research Study in Algorithmic Fairness (Class: The Practice of Theory Research) 2021
- Modelled minmax fairness objectives and fairness-increasing interventions for pipelines that allows strategic actions
- Established bounds on these minmax objectives and formulate algorithms for fairness-related interventions

TEACHING EXPERIENCE AND WORK EXPERIENCE IN EDUCATION

TA for Stanford's Linear Algebra and Multivariable Course (Math 51) 2022
- Teaching weekly discussion sections with over 50 students in the main Linear Algebra and Multivariable Calculus course at Stanford
- Conducting office hours every week to clarify students' doubts and and assisting with grading quizzes and exams

Intern at Teach For India (TFI) 2020
- Worked with TFI's National Human Resources team with the aims of concretely understanding the existing millennial ecosystem in this organization and helping solidify its hiring philosophy
- Conducted a research survey on interests and influences of millennials outside TFI and interviewed several staff members within TFI

EDUC 129 and the East Palo Alto Tennis and Tutoring (EPATT) program 2021
- Employed strategies learned in the class EDUC 129 to tutor an 8th grade EPATT student in Mathematics twice a week
- Presented a case study involving the ways in which my tutoring the student made her more college and career ready

Tutor at Ayukta – Education Non-Profit Organization 2020-21
- Taught a 3rd grade student Mathematics and English daily through Ayukta: an organization designed to tutor underprivileged children of household helpers who lack access to education during India's nationwide lockdown during the pandemic