

Esha Singh

✉ esingh@ucsb.edu ☎ 612-469-9506 in esha-singh-582a17116 🌐 esha-singh

EDUCATION

- **University of California, Santa Barbara** Santa Barbara, CA
PhD in Computer Science, *Advisor: Professor Yu-Xiang Wang, GPA: 4.0* Sep. 2022 - Present
 - **Coursework:** High Dimensional Probability & Statistical learning, Machine Learning, Ethics in AI
- **University of Minnesota, Twin Cities** Minneapolis, MN
Masters of Science (MS) in Computer Science, *GPA: 3.81* Sep. 2019 - August 2021
 - **Coursework:** Advanced ML, Big Data Engineering, Computer Vision, Deep Learning
- **Birla Institute of Technology and Science (BITS)** Pilani, India
B.E (Hons.) in Electronics & Communication Aug. 2014 - May 2018
 - **Coursework:** Natural Language Processing, Data Structures and Algorithms, Operating Systems

WORK EXPERIENCE

- **University of California, Santa Barbara** Santa Barbara, CA
Graduate Student Researcher (S2ML Lab) Jan 2023 - Present
 - Research and development of new optimization methods for deep neural networks quantization with a focus on proximal gradient methods.
- **Armorblox Inc.** Cupertino, CA
Machine Learning Engineer (Detection Team) July 2021 - September 2022
 - Designed ML algorithms for detection of IT credential phishing attacks that improved F1 score by 15% in production.
 - Built ML pipeline to predict email account compromise based on large-scale user activity data ($\geq 2M$ user logins).
 - Implemented online training & inference micro-services at scale for detecting phishing incidents in emails.
- **Image Sensing Systems Inc.** Minneapolis, MN
Deep Learning/AI Intern (Visio) July. 2020 - Sept. 2020
 - Developed & optimized deep neural networks for object detection over real-time traffic data using YOLO model variants, resulting in faster inference time ($\uparrow 30\%$) & increased precision of the production model ($\uparrow 2\%$).
- **University of Minnesota** Minneapolis, MN
Student Researcher advised by Professor Ju Sun (GLOVEX Lab) Dec. 2019 - Aug. 2021
 - Conducted research in establishing robustness of Deep Learning (DL) networks and achieving single image denoising using deep image priors. The research work culminated as my Master's thesis dissertation published in *UMN Digital Conservancy, 2021*
- **University of Minnesota** Minneapolis, MN
Graduate Research Assistant (Chatbot & Zhang labs) Jan. 2020 - Aug. 2021
 - Conducted Research in NLU & Conversational agents, developing a Q&A agent for answering user-queries around Dietary supplements. Published three research papers on the work under Prof. Rui Zhang.
 - Designed and built micro-services for an AI Conversational agent in the Media/Radio industry, under Prof. Maria Gini. The implementation won the prestigious *NAB Challenge, 2020* .
- **ValueLabs Inc.** Hyderabad, Telangana
Software Engineer (AI R&D Dept.) Jun. 2018 - Aug. 2019
 - Developed Vision & NLP based offline models, and inference microservices, to extract information from invoice images into structured data.
 - Implemented a Language model for question generation from internal company journals and articles, using RNN encoder-decoder architecture, with Attention mechanism.

SKILLS

- **Languages:** Python, SQL, Golang, C++, Java
- **Frameworks:** PySpark, TensorFlow, Pytorch, Keras, Django, Cassandra, MindMeld, Snorkel, GCP, AWS.

RELEVANT PROJECTS

- **Differentially Private Survival Hazard Models** (*Ongoing research*): Make survival hazard models differentially private with robust privacy guarantees.
- **Fairness in Machine Learning** (*Fall 2020*): Comprehensive analysis of fairness and bias principles in Machine Learning with a focus on methods to make supervised classification algorithms fairer.
- **Thoracic diseases detection via Transfer learning** (*Feb-May '20*): Implemented Transfer Learning for Computer Vision, to beat state-of-art baseline on MIMIC-CXR dataset for the DenseNet-121 model.
- **ML in Vision-aided Robotics** (*Spring 2020*): Developed object detection & segmentation algorithm to identify diver & diver's hand gestures for Autonomous Underwater Vehicles (AUVs), in occluded environment.
- **Stack Exchange Big Data Analysis** (*Fall 2019*): Built a Big Data pipeline for analysis of 174 Domains of Stack Exchange analysis (266.1 GB data) using Spark, S3, AWS Glue and Step Functions.
- **Movie Recommendation System** (*Sep.-Dec. '19*): Developed a Movie recommender system using Collaborative, User-User filtering & Neural Network based predictions on 100k Movie Lens dataset.

RESEARCH & PUBLICATIONS

- **E Singh**, A Bompelli, R Wan, J Bian, S Pakhomov, R Zhang, "A conversational agent system for dietary supplements use", (**Springer Nature, BMC 2022**)
 - **Esha Singh**, A. Bompelli, A.Wang, A.Yang, S. Pakhomov, R. Zhang, "A Prototype Conversational Agent for Dietary Supplements", (**IEEE ICHI 2020**)
 - A. Bompelli, Y.Wang, R.Wan, **Esha Singh**, R.Zhang, et al. "Social Determinants of Health In the Era of Artificial Intelligence with Electronic Health Records: A Systematic Review", (**SPJ, AAAS 2021**)
 - R. FizeL, **Esha Singh**, M. Michalowski, M. Gini, and S.P. Everyday living artificial intelligence hub (**NAACL 2021**)
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