SHIVAN PRASAD

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Summary

Computer Science and Engineering Masters Student at University of Michigan, with experience in software development, data analytics, AI and Machine Learning. Looking for Software Engineer/Research positions (or other opportunities) for 2024

Education

- **University of Michigan, Ann Arbor** **Sep 2023 – Dec 2024**
  - *Masters of Science in Engineering Degree (Computer Science and Engineering)*
  - **Coursework:** Matrix Methods for Signal Processing and Machine Learning, Robotic Kinematics and Dynamics, Adv. Compilers, Randomness and Computation, Quantum Computing and Probability, Microarchitecture, Intro to Operating Systems
  - **GPA:** 3.49
- **University of Michigan College of Engineering, Ann Arbor** **Sep 2019 – Dec 2022**
  - *Bachelor of Science in Engineering Degree (Major: Computer Science)*
  - **Coursework:** Data Structures and Algorithms, Web Systems, Foundations of Computer Science, Programming Languages, Database Management Systems**,** Intro to Computer Organization, Machine Learning**,** Computer Vision**,** Deep Learning in Computer Vision**,** Intro to AI, Intro to Natural Language Processing, Intro to Probability and Statistics, Linear Algebra, Vector Calculus
  - **GPA**: 3.81

Project/Work Experience

- **Software Engineer Intern – Ohai.ai** **May 2024 – Present**
  - Tech Startup providing a new family-oriented AI personal assistant
  - Designing and implementing SEO landing pages to introduce model usage to new users
  - Working on both front-end output and back-end workflows for generating pages appropriately
  - Developed mainly using React, NextJS, TypeScript, Storybook, Strapi, and PostgreSQL
- **Software Development Engineer Intern – Amazon Photos** **June 2022 – Aug 2022**
  - Designed and developed "Text Detection Service" for Amazon Photos
    - On-upload service that extracts text information from images in an album and stores in index to allow users to search for images
    - Created design document for end-to-end service, started and demoed initial development (on-upload API call to extract and store text for photos in a user's album)
    - Developed mainly in Java, utilized core AWS services such as S3, DynamoDB, Rekognition
- **SPQR Undergraduate Research Assistant** **Sep 2021 – Dec 2022**
  - Security and Privacy Research Group at the University of Michigan
    - Works on research problems related to embedded security, focusing on protecting analog sensors from unintended side channels
    - Co-authored security paper, my contribution focused on computer vision application for objective evaluation metric and threat mitigation algorithm (https://arxiv.org/abs/2205.03971)
    - Worked on another project during final semester, creating a model for facial anti-spoofing methods through biometric info extraction
- **Software Development Engineer Intern – Amazon Photos** **June 2021 – Aug 2021**
  - Designed and developed first iteration of "Decluttering Service" for Amazon Photos team
    - Serves as a suggestion tool to filter/clean potentially unwanted images in customer's photo library
    - Uses machine learning to identify images with less sentimental value among all images
    - Created and presented design document and POC demo of the service
    - Developed mainly in Python, utilized core AWS services such as S3, DynamoDB, SageMaker, Lambda
- **Software Engineer (Intern) – Universal System Technologies, Inc.** **May 2020 – Aug 2020**
  - Worked on **MobiShip** project, development of a mobile application for supply chain operations and warehouse management system.

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- Using this app, the Shop floor user can facilitate customer shipment based on delivery number assigned to him/her on the mobile device he/she is carrying. This process will enable the shop floor user to complete the delivery/shipment process on the move
- Ionic/Cordova Angular Framework and Java Web Service, SAP Java Connector Backend

- **Software Engineer (Intern) – Universal System Technologies, Inc. Jun 2019 – Aug 2019**
  - Work on data analytics projects using Python, Visual Studio and SQL Server database
  - Developed predictive model for HR attrition using Machine Learning in R
  - Model used several key factors that influence employee turnover
  - Tested with both k-NN algorithm and Artificial Neural Networks

Other Projects

- **Facial Expression/Emotion Recognition Program**
  - Using OpenCV and Tensorflow in Python, Haar cascade classifier used for frontal face detection
  - Utilizes MobileNet CNN architecture to train model using FER 2013 dataset, accuracy > 60%
- **Network Pen-Testing App**
  - Worked in a group to develop pen-testing app for Mac OS X in Swift
  - Dependencies and Programs: httrack, pageres, arp-scan, expect, dsniff
  - Intended Function: Download required packages, scans LAN for device names and IP, ARP MITM attacks, DNS spoofing, and more
- **Independent Research Project to Model US GDP**
  - Developed model of US GDP using Machine Learning and an Artificial Neural Network
  - Meant to demonstrate effect of various industries' outputs on overall economy
  - Accepted for publication
  - 3rd place Regional Science Fair, Award of Merit from ASA
- **Side-Channel Vulnerability Detection in Microarchitecture using Transformers (Microarchitecture)**
  - Used Intel PCM to create time-series dataset of various benchmarks during benign application execution and applications being affected by side-channel (cache timing) attacks
  - Built LSTM (baseline) and Transformer models to predict outputs for benign application behavior, then executed thresholding function for anomaly detection
- **Clickbait Thumbnail Image Predictor (Deep Learning in Computer Vision)**
  - Collected 100 images of "clickbait" and "non-clickbait" thumbnails for dataset
  - Implemented ResNet50 and RegNetY3.2GF using PyTorch with 3 methods (training from scratch, feature extraction, and fine tuning) resulting in 6 models to determine best architecture
  - Achieved over 92% test accuracy with fine tuning RegNet model
- **Human Pose Estimation in Basketball (Intro to Computer Vision)**
  - Utilized OpenCV and PyTorch to track joint movements of basketball players throughout a match
  - First, created a joint predictor CNN that would output coordinate predictions of 18 different joints based off an input image, which was capable of handling variable image height and width
  - Then, utilized YOLOv3 algorithm to perform a grid search on objects in the broadcast's frame in order to identify player location before applying joint predictor
- **Compiler Branch Probability Predictor (Advanced Compilers)**
  - Use LLVM, LightGBM, and PyTorch to predict branch probabilities in the absence of profiling data to outperform heuristics for compiler optimizations
  - Extract dataflow, control flow, and loop features for each conditional branch instruction
  - Created LLVM pass for feature extraction with integrated ML model to provide real-time predictions for O3 optimization

Skills

- *Software Development:* C++, Python, Java, Swift, R, MATLAB, Julia, HTML, CSS, JavaScript (including Angular, React, and Ionic Frameworks), Flask, SQL, Back-end development, Web systems, AWS integration, LLVM
- *AI/ Machine Learning:* Experience with Artificial Neural Networks and Applications, Computer Vision, Natural Language Processing, Experience with PyTorch, OpenCV, and Tensorflow, Linear Algebra
- *Databases:* MS SQL Server, Access