Danish Tamboli

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OBJECTIVE

As a software engineer, I like to believe I am flexible and often adapt to team and project requirements. I have a key interest in Human-Computer Interaction, Creating User Experiences and Natural User Interactions, along with Machine Learning and Cyber Security and how the intersection of these can work towards making Extended Reality (XR) experiences better and safer for the end user. I want to focus my research on understanding factors that affect user experiences in XR and to improve the overall experience for users in collaborative or group interactions.. Furthermore, I would like to delve into the security aspects of XR, such as user authentication, authorization, data, and object ownership verification and validation.

Additionally, I possess a good grasp of edge computing and microcontrollers, hardware/software interfacing, full-stack web development, UI/UX design and Project Management. I am proficient in Python and C#, and utilize them as my primary programming languages. With a diverse skill set and a strong foundation in software engineering, I am well-equipped to tackle complex projects and contribute to the development of cutting-edge technologies.

RESEARCH INTERESTS

Human Computer Interaction, Human Centered Computing, Natural User Interaction, Cyber Security

EDUCATION

UNIVERSITY OF FLORIDA Gainesville, FL
Master of Science in Computer Science and Engineering **May 2024**
Cumulative GPA: 3.94/4
Relevant Coursework: Algorithms, Advanced Data Structures, Natural Language Processing, Distributed Operating Systems, Computer and Network Security, Natural User Interaction, User Experience Design, Computer Networks.

UNIVERSITY OF PUNE Pune, India
Bachelor of Engineering in Computer Engineering **August 2018 - July 2022**
Cumulative GPA: 8.74/10
Relevant Coursework: Object Oriented Programming, Databases, Project Development and Management, Cloud Computing.

EXPERIENCE

DIMENSIONAL FUND ADVISORS - Angular, Django, Typescript, D3.js, Python Austin, TX
Software Engineering Intern **June 2023 – August 2023**

- Strengthened the internal project management tool by incorporating core attributes like cyber and operational impact, tiers, and a derived score for new and existing projects. Created Scoring guides for the same (Range 1-5).
- Developed a Project-Portfolio page in Forecasting, Alignment & Strategy Tool (FAST), displaying projects with core attributes, and engineered visualizations to improve project visibility and selection for a given quarter.
- Worked on automating the Batch Creation and Updating of Projects by providing Project Managers with Excel Templates, that can be uploaded on FAST, ensured Data Validation on both Excel and Django back-end.

MACNMAN - C++, Java, MQTT, SQL, AWS, HTML, CSS, JS, Arduino, LoRa, Git Pune, India
Software Engineering Intern **March 2021 – May 2022**

- Developed a program in C++ that allowed clients to connect up to 100 devices to one LoRaWAN Gateway using LoRa, MQTT, and Modbus standards for data monitoring, logging, and industrial automation.
- Integrated unique identifiers and hot-swap ability for the range of sensors offered, eliminating the need for manual inputs and reboots. This shaved off 2 minutes from the setup process of each sensor.
- Created test cases and a 5-stage diagnostic check that acted as fail-safe measures, preventing the Gateway from boot loop.

TECHNICAL SKILLS

Programming Languages: Python, Java, R, HTML/CSS, C++, MATLAB, Typescript
Databases: SQL, AWS, dplyr
Tools: Git, Postman, Pandas, Tensorflow, OpenCV, RStudio, Arduino IDE, Figma, RxJS

CERTIFICATIONS & TRAINING

Data Science Specialization, PMI Disciplined Agile (ongoing) , Certified Associate in Project Management (ongoing)

PROJECTS

"The Force" RUIZ HCI LAB - C#, Unity, Magic Leap 2 **September 2023 – Ongoing**

- Worked alongside Dr. Ruiz, focusing on ways people could interact with distant objects in XR without having to move to the location of the objects physically. Came up with a primary mode of interaction that involved the "Big Objects" that were far

away from the user. This method allowed users to select specific objects within a distance range using a gesture resembling a grabbing motion, involving an extension of the hand towards the objects.
- When the correct objects were highlighted, users would close their hand into a fist to confirm their selection, and open it facing up to spawn the chosen objects manifesting as smaller versions on the user's palm or directly in front of them, enabling manipulation of these miniature objects, which in turn affected the corresponding larger objects. While any erroneous choices or changes of mind led to the users opening their fists facing down, which dropped the miniature versions of the chosen objects.

POSE ESTIMATION BASED FITNESS TRAINER - Tensorflow, OpenCV, Mediapipe **January 2023 – May 2023**
- Spearheaded development of a gamified virtual fitness trainer with voice commands, gesture recognition, and posture correction, resulting in a 66% increase in user motivation.
- Iteratively designed the system through user requirements gathering, UI iterations, speech recognition, pose estimation integration, and user evaluations, fostering a natural interaction experience for 77% of participants.
- Identified benefits of voice commands and gamification while addressing areas for improvement, such as system responsiveness and recognition accuracy, resulting in refinements in the second prototype.

LSTM & TRANSFORMER BASED NEWS RECOMMENDATION SYSTEMS - Tensorflow **January 2023 – May 2023**
- Formulated a personalized news recommendation system harnessing deep learning models (LSTM and Transformers) to elevate user experience and engagement.
- Conducted a comprehensive analysis of LSTM and Transformer models on the Microsoft News Dataset, assessing their proficiency in capturing long-term dependencies and managing extended data sequences.
- Improved recommendation accuracy, diversity, and relevance by integrating user interests, preferences, and multi-view learning techniques. Uncovered insights into user behavior patterns and identified areas for future enhancement.

AUDIO DEEPFAKE DETECTION USING BREATH - Python/Tensorflow **October 2022 – December 2022**
- Engineered a breath detection algorithm that utilizes Mel spectrograms and phonetics, resulting in classification of deepfake audio, with an F1-score of 0.89. Achieved an accuracy of 95% for breaths detected, with only 1 in 20 events mislabeled.
- Constructed a 40 hr dataset of authentic and deepfake audio by scraping solo speaker audio from podcasts and news articles.
- Developed and deployed a script to efficiently aggregate breath annotations within 100ms, identify outliers, and address discrepancies. Equipped annotators with tools to streamline the annotation process and ensure a thorough review.

FILE ENCRYPTION AND DECRYPTION OVER TCP USING OPENSSL - C++ **September 2022 – October 2022**
- Securely sent files over TCP using OpenSSL to implement SHA-256, AES and PBKDF2 in C++.
- Implemented a check to see whether the encrypted file had been tampered with when sent over the network.

DISTRIBUTED HASH MINER ON ERLANG - Erlang/OTP **August 2022 – September 2022**
- Designed and implemented a system to mine hashes with a designated number of leading 0s.
- Implemented distributed computation that enabled workers over the network to request jobs to mine for a solution. Reduced computation time by 7x compared to a single process run time (CPU time vs. Real-time).

STEERING WHEEL OPTIMISATION - C++, Arduino **January 2022 – May 2022**
- Worked on optimizing the grips of a Formula SAE Racecar, using molds of the hands of users. Customized hot swappable grips for each driver.
- Measured the improvement of these custom design molds vs stock grips using load cells to measure grip and steering effort, alongside lap time performances of each driver.
- Incorporated a display to provide the driver with crucial race data such as lap times, sector times, tire temperature, coolant temperature and fuel economy.

TIRE DATA ANALYSIS & TIRE MODELING - MATLAB, Simulink, IPG **November 2019 – February 2021**
- Analyzed and performed EDA on Calspan & Milliken's data to enable a better understanding of tire behavior such as wear, temperature delta, and other KPIs. Simplified the design process and enabled users to undergo an additional 2 to 3 revisions.
- Introduced the team to Pacejka's magic formula '94 specification and applied MATLAB to produce empirical representations and interpolations of pre-measured tire force and moment curves, reducing development cycle time by 15%.

NATURAL DIALOGUE CHATBOT - Python, Tensorflow, SQL, Jupyter Notebook **August 2020 – December 2020**
- Formulated and developed a chatbot utilizing scraped subreddit posts containing 13M comments, implementing natural language dialogue with users. Wrote advanced SQL queries for data imports, filtering, and relational management of chats.
- Trained the model on processed comments from the Reddit API, monthly data dumps via SQLite, and open-source machine learning libraries such as TensorFlow 1.x's Sequence to Sequence (Seq-to-Seq).
- Increased accuracy by 30% by implementing a tokenization and scoring system that penalized the model for utilizing broken sentences or abusive language while rewarding coherent and complete sentences in conversation.

PUBLICATIONS/PRESENTATIONS

MODULAR DATA ACQUISITION SYSTEMS FOR COMBUSTION AND ELECTRIC VEHICLES Pune, India

Society of Automotive Engineers (SAE) **2022**

- The paper focused on the project lifecycle and selection process of designing a Data Acquisition System that was modular, rugged, easily expandable,and user friendly.
- Winner of Student Convention 2021, SAE India, Western Section.

CROWDFUNDED ASSASSINATIONS AND PROPAGANDA BY DARKWEB CYBERCRIMINALS Pune, India

IGI Global **2021**

- A look at the psychological aspect of internet hate speech and propaganda and how Machine learning can be deployed to detect and curb its spread. Delves deeper into the bad and less discussed good side of the Dark web with the help of case studies to constitute a well-educated opinion.

ACTIVITIES

FORMULA SOCIETY OF AUTOMOTIVE ENGINEERS - R, dplyr, Arduino, MQTT, Figma, Framer Pune, India

Head of Electronics **August 2018 – May 2021**

- Spearheaded Data acquisition systems (DAQ) development. Incorporated external sensors and CAN protocol to obtain ECU vitals; sped up the development process by 2 months.
- Drafted and deployed bug fixes, and calibration measures at boot. Provisioned redundancy of crucial data by onboard data logging along with live telemetry, capable of non-line of sight transmission (NLOS) of up to 1km (0.6mi).

COMMUNITY SERVICE

- During my Undergraduate studies I was an active member during the holidays of a local organization, which operated in Pune, India teaching underprivileged children the fundamentals of computers.
- Presently, an active member of Project Downtown, Gainesville to help serve warm meals directly to the underserved population.

ACADEMIC/PROFESSIONAL MEMBERSHIPS

IEEE| SAE International| SAE India