Tilak Sharma

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Education

State University of New York (SUNY) — Buffalo, NY
Master of Science in Engineering Sciences - Artificial Intelligence & Robotics. ***GPA : 3.5*** — *2022 – 2024*

Jain University - School of Technology & Engineering — Bangalore, India
Bachelor of Technology in Computer Science and Engineering. — *2016 – 2020*

Technical Skills

Languages: Python, Java, Kotlin, C/C++, Dart, SQL, JavaScript. | **Frameworks**: Pytorch, Tensorflow, Keras, Android, iOS, Flutter, Docker. | **Libraries**: Pandas, Scikit-learn, ROS, OpenCV, OpenAI-Gym, MLFlow. | **Others**: Git, REST API, GraphQL, Huggingface, MVVM, Dependency-Injection, Coroutines, MongoDB, Firebase, Azure, AWS.

Experience

Machine Learning Research Assistant — Dec 2022 – Present
State University of New York (SUNY) — *Buffalo, NY*

- Implemented ML algorithms and deep architectures for privacy-sensitive applications using Fully Homomorphic Encryption (FHE).
- Adapted FHE-based computations by using polynomial and neural network-based approximations and experimented with parallel-processing to reduce the computational overhead.
- Worked on biometric fusion, quantile transform-based ensemble learning, and State-of-the-Art (SOTA) CNN architectures, including UNETs, for encrypted data applications.

Software Development Engineer II/I (Mobile-Android) — Jul 2020 – Mar 2022
Practo Technologies — *Bangalore, India*

- Revamped the Payments SDK for seamless integration, increasing the payment success rate by **3.5%**.
- Built a comprehensive app-based prescription tool, offering a user-friendly post-consult experience.
- Developed an app-based insurance point-of-sale system, leading to upselling on consultation plans by **6%**.
- Implemented contextual consult feedback, resulting in a **4%** consult conversion rate.

Publications/Research

- FHE Operators for Score and Decision Fusion in Biometric Identification [**Published**] — **IEEE**
- Smart Hydroponics integrating IoT and Machine Learning [**Published**] — **IEEE**
- Confidential and Protected Disease Classifier using FHE [**Accepted**]
- Privacy-Preserving Ensemble Learning using FHE [**In Review**]
- Secure Sleep Apnea Detection with FHE and Deep Learning on ECG Signals [**In Review**]

Projects

Harmonizing Pixels and Sounds: Video-Conditioned Diffusion Model for Music Generation

- Executed a thesis project on generating video-specific background music using latent diffusion techniques. Extracted video features and integrated them with a 3D UNET to generate longer sequences, producing music that aligns with the visual and emotional narratives of videos.
- Curated and structured a video-music dataset to facilitate research in the area of AI and multimedia. Developed a thorough understanding of image processing and audio signal processing/digital signal processing (DSP), with a focus on Audio Machine Learning.

Reinforcement Learning-Based Walking Skill Acquisition for Humanoid Robot (NAO)

- Implemented and trained various reinforcement learning algorithms, including Deep Q-Network (DQN), Double DQN (DDQN), Deep Deterministic Policy Gradient (DDPG), Twin Delayed DDPG (TD3), and imitation learning, for walking skill acquisition for a humanoid robot

Text to Image (Generative AI)

- Developed a text-to-image generation model, utilizing a simplified diffusion variant on a flower dataset to produce images based on text labels. Acquired proficiency in Generative AI concepts, such as U-Net, Multi-Headed Self-Attention, and Transformers.