Ashwin Pillay

apillay@cmu.edu |(412) 909-6251
ashwinpillay.com
github.com/a-pillay |gitlab.com/pab
linkedin.com/ashwin-pillay

Education

Master of Science, *Music & Technology* 2022-2024*
Schools of Electrical and Computer Engineering (ECE), Computer Science & Music **GPA: 4.0/4.0**
Carnegie Mellon University, Pittsburgh, PA
Thesis: A Real-time Musical Score Following System for Polyphonic Analog Instruments.

Bachelor of Engineering, *Instrumentation Engineering* 2016-2020
Vivekanand Education Society's Institute Of Technology (VESIT) **CGPA: 9.38/10**
University of Mumbai, India **Rank: 1/72**

Key Coursework

Graduate: Adv. Digital Signal Processing (18-792), Electroacoustics (18-490), ML for Signal Processing (11-755), Intro. to Deep Learning (11-785), Deep Reinforcement Learning & Control (10-703), Advanced NLP (11-711)
Undergraduate: Digital Signal Processing, Expert System, Control System, Analog & Digital Circuits, Signal Conditioning Circuit Design, Applied Mathematics, Operations Research, Computer Organization & Architecture

Professional Experience

Research Intern, *QCT Multimedia R&D - Audio, Qualcomm Inc., San Diego, CA* 2023
- Conceived & validated a novel CNN-based self-fitting procedure for OTC Hearing Aids that's 10x faster than competitors and can work without any user environment limitations.
- Formulated an RL-based augmentation to the self-fitting system enabling real-time & context-specific personalization for hearing loss compensation, far more granular than existing alternatives. This system is currently in the process of being patented.
- Implemented a Python module to enable direct communication with Qualcomm's audio prototyping SOC.
- Delivered a session on Hyper-parameter Optimization for the Audio R&D team using Optuna and Ray Tune packages.

Graduate Teaching Assistant (Part-time), *Carnegie Mellon University, Pittsburgh, PA* 2023-present
- Courses: Digital Signal Processing (18-691) & Adv. Digital Signal Processing (18-792) under the Department of ECE.
- Conducted weekly office hours & recitations. Collaborated on developing assignments & associated learning material.

Systems Engineer, *Tata Consultancy Services (TCS), Mumbai, India* 2020-2022
- Developed a Spring Batch REST API to migrate 19 million records for a UK credit agency to their new web app, reducing the migration time from 6 months to 2 months through efficient multithreading.
- Managed infrastructure, implemented 5 high-priority patches, and addressed critical vulnerabilities like Log4J in over 15 legacy client applications as part of a global development team.
- Proposed and secured runners-up in an Intra-TCS hackathon with a POC for gamifying DevOps best practices, then led a 6-person team to implement the concept.

Selected Projects

DCASE-23 Challenge: Neural Foley Synthesizer *[Generative AI, Deep Learning, Transformers, VAEs]* 2023
A generative model for movie sound effects that introduces an innovative transformer architecture and training paradigms to enhance the acoustic quality and diversity of the generated sounds. [Details] [Paper]

LibriSpeech Automatic Speech Recognition (ASR) *[Speech Processing, Deep Learning, RNNs, LSTMs]* 2023
Experiments culminating in an attention-enhanced Speech-to-Text processor using a PBLSTM encoder-decoder. [Details]

PID Controllers for Audio: Envelope Generator (PIDEG) & Synthesis Framework (PIDS) 2020-present
[Music Technology, Audio DSP, Control System Engineering, Embedded System]
Hardware & software implementations of innovative audio envelope generation & sound synthesis frameworks derived from PID controllers. [PIDEG: Details] [PIDEG: Paper] [PIDS: Details] [PIDS: Paper]

Drowsiness Detecting Wearable for Vehicle Drivers *[ML, Statistics, Embedded Sys., Data Structures]* 2018-2022
Patented wearable employing Electrooculography and online-ML to detect driver drowsiness, achieving 90%+ accuracy at a product cost under USD 35. [Details] [Patent] [Paper 1] [Paper 2]

Relevant Skills

Programming Languages: Python, C/C++, Java, Shell Scripting, MATLAB, Max/MSP, LaTeX, LabVIEW
Libraries: PyTorch, Ray Tune, OpenAI Gym, SciPy, Scikit-learn, statsmodels, Pandas, PyQT, JUCE (basic)
Cloud: Google Cloud Platform (Ex-certified Associate Cloud Engineer), AWS
Hardware: STM32 family, Tiva C Series TM4C123G, ARM Cortex-M4, Arduino (Uno & Mega), Raspberry Pi Series
Media Production: Cockos REAPER, Ableton Live, FL Studio, Avid Pro Tools, Adobe Suite (PS, AE, PR)

Awards & Honors

Carnegie Mellon School of Music Graduate Fellowship 2022-2023
Mayur Bagade Award for Best Outgoing Student from Instrumentation Engineering, VESIT 2020
International Society of Automation (ISA) Educational Foundation Scholarship 2019