

Ashwin Pillay

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RESEARCH INTERESTS

Music Technology (Sound Synthesis & Algorithms, Music Cognition, MIR), Artificial Intelligence, Digital Signal Processing (DSP), Electroacoustics, Embedded Systems, Virtual Reality

EDUCATION

Master of Science, Music & Technology

08/2022–05/2024

Carnegie Mellon University, Pittsburgh, PA

GPA: 4.0/4.0

Schools of Music, Computer Science & Electrical and Computer Engineering (ECE)

Thesis: *A Neural Score Follower for Robust Computer Accompaniment of Polyphonic Musical Instruments*

[PDF]

Advisors: Dr. Richard Stern & Dr. Roger Dannenberg

Bachelor of Engineering, Instrumentation Engineering

08/2016–11/2020

Vivekanand Education Society's Institute of Technology (VESIT), India

GPA: 9.38/10 CGPA

University of Mumbai

Rank: 1/72

KEY COURSEWORK

Graduate: Advanced Digital Signal Processing (18-792), Electroacoustics (18-490), Machine Learning for Signal Processing (11-755), Introduction to Deep Learning (11-785), Deep Reinforcement Learning & Control (10-703), Advanced NLP (11-711), Advanced Multimodal ML (11-877)

Undergraduate: Digital Signal Processing, Expert System, Control System, Analog & Digital Circuits, Signal Conditioning Circuit Design, Applied Mathematics, Operations Research, Computer Organization & Architecture

PUBLICATIONS

Peer-Reviewed

A. Pillay, A. F. Genovese, A. Tung, C. Kim, I. Munoz, G. Davis, 'Assessing the Effectiveness of Head and Torso Simulators (HATS) in Representing Anthropometric Diversity for Inclusive Audio Systems', *2025 AES International Conference on Breaking Barriers in Audio*, Apr. 2025

[PDF]

R. Anchan, A. Pillay, A. Kale, A. Bhadracha, S. P. Ram, 'Optimal Bipolar Lead Placement in Electrooculography (EOG): A Comparative Study with an Emphasis on Prolonged Blinks', *2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT)*, Jul. 2020

[PDF]

Preprints

A. Pillay, S. Betko, A. Liloia, H. Chen, A. Shah, 'Exploring Domain-Specific Enhancements for a Neural Foley Synthesizer', *arXiv:2309.04641 [cs]*, Sep. 2023

[PDF]

A. Pillay, 'An Audio Envelope Generator Derived from Industrial Process Control', *arXiv:2106.13966 [cs, eess]*, Jun. 2021

[PDF]

A. Pillay, 'An Audio Synthesis Framework Derived from Industrial Process Control', *arXiv:2109.10455 [cs, eess]*, Sep. 2021

[PDF]

A. Pillay, A. Kale, R. Anchan, A. Bhadracha, S. P. Ram, 'Real-Time Detection of Drowsiness Among Vehicle Drivers: A Machine Learning Algorithm for Embedded Systems', *arXiv:2111.03177 [eess]*, Nov. 2021

[PDF]

PATENTS

Talker-Specific Tuning of Hearing Assistance Device, US12610203B2, Granted (US)

[Link]

OPEN-SOURCE EFFORTS

Lead Developer, *MIDI Ogre*. On-the-fly MIDI augmentation library.

[GitHub]

Contributor, *PrettyMIDI*. Utility functions for handling MIDI data.

[GitHub]

WORK EXPERIENCE

Multimedia Systems Engineer, *QCT Audio, Qualcomm Technologies Incorporated*, San Diego, CA

06/2024–Present

- Research and development of novel device-agnostic Adaptive Active Noise Cancellation, Wind Noise Reduction and Audio Personalization algorithms using Deep Learning (DL).
- Developed Finite Element Modelling (FEM)-based acoustic simulations for fine-grained personalization of earbuds, resulting in a 2x improvement over existing systems from literature.
- Fine-tuned an audio ML model for the Qualcomm mobile platform showcased at the Mobile World Congress (MWC), Barcelona.
- Conducting extensive acoustic measurements and collecting data on open-ear and closed-ear responses, as well as active and passive noise cancellation effects across various ear geometries.
- Leading efforts in setting up and maintaining the DL infrastructure within the team.

Research Intern, *QCT Multimedia R&D - Audio, Qualcomm Technologies Incorporated*, San Diego, CA

05/2023–08/2023

- Conceived & validated a novel CNN-based self-fitting procedure for over-the-counter (OTC) hearing aids that can work without any user environment limitations.
- Formulated an RL-based augmentation to the self-fitting system enabling fine-grained personalization for hearing loss compensation. This system is currently in the process of being patented.
- Implemented a Python module to enable direct communication with the Qualcomm QCC5181 audio platform.
- Delivered an internal knowledge-sharing session on hyper-parameter optimization using Optuna and Ray Tune packages.

Graduate Teaching Assistant (Part-time), Carnegie Mellon University, Pittsburgh, PA **01/2023–12/2023**

- Courses: Digital Signal Processing (18-691) & Advanced 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 **08/2020–05/2022**

- 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 CVE-2021-44228 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.
- Conceived & executed a value-added service for the client that cut-down deployment & QA testing time in development & UAT environments by more than 80%.
- Obtained the Google Cloud Platform (GCP) Associate Cloud Engineer certification during this tenure.
- Achieved performance ratings of 4.5/5 for FY20-21 and FY21-22.

AWARDS & HONORS

Carnegie Mellon School of Music Graduate Fellowship **2022-2024**

Awarded a merit-based fellowship of USD 41,000 by CMU's School of Music alongside an admission to the Music & Technology masters program.

Best Outgoing Student from Instrumentation Engineering **2020**

Awarded the Mayur Bagade Memorial Award for the Best Outgoing Student from Instrumentation Engineering in VESIT.

ISA Educational Foundation Scholarship **2019**

Among the fourteen undergraduate students worldwide to be awarded a USD 2,000 scholarship by the International Society of Automation (ISA).

Winner, India Innovation Challenge Design Contest **2019**

Led a six-member team that won the two-year-long startup incubation competition sponsored by Texas Instruments and the Department of Science, Government of India.

MISC. ACTIVITIES

Content Creation & Video Editing, TEDxVESIT **2018**

Edited videos have crossed more than 600k views on YouTube. [\[Details\]](#)

Senior Photo Editor, VESIT PhotoCircle **2018–2020**

Managed a four-member team to carry out routine photo enhancement & content-creation tasks.

VFX Artist & Video Editing, Freelancing **2018–2019**

Clientele includes an educator & an AI hackathon proprietor. [\[Details\]](#)

Volunteer, Kshamata (via weCHANGE) NGO **2018–2019**

- Conducted sessions on playing the synthesizer. Courses spanned from music theory foundations to playing the snippet of a popular Bollywood song.
- Compiled English language lesson modules for high school beneficiaries.
- Coordinated inventory & account management tasks.

RELEVANT SKILLS

Programming Languages: Python, MATLAB, C/C++, Java, Shell Scripting, Max/MSP, LaTeX, LabVIEW

Libraries: PyTorch, Ray Tune, OpenAI Gym, SciPy, Scikit-learn, statsmodels, Pandas, PyQt, JUCE (basic)

Advanced Software: COMSOL, SolidWorks, FreeCAD, Head Acoustics ACQUA, Audio Precision APx

Database Management: Oracle, Progress OpenEdge, MySQL, PostgreSQL

Operating System: GNU/Linux (Arch & Debian based, ALSA, JACK, systemd), Windows

Development Tools

Cloud: Google Cloud Platform (GCP)

Source Code Management: Git, Github, Gitlab

Project Management: JIRA, Confluence, Markdown

CI/CD: Jenkins, GoCD, Github Actions, Gitlab CI/CD

Configuration: TOML, JSON, XML

Hardware: STM32 family, Tiva C Series TM4C123G, ARM Cortex-M4, Arduino (Uno & Mega), Raspberry Pi Series, Intel 8051

CERTIFICATIONS

Associate Cloud Engineer, Google Cloud Platform **2021-2023**

LabVIEW Core 1 & 2, VESIT - National Instruments Academy **2018+**

Grade 1, Trinity College London **2010+**