

NACHIKETA GARGI

STUDENT, DEVELOPER, MUSICIAN

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UNIVERSITY OF MICHIGAN

2018 – 2022

B.S.E. Computer Science

ORGANIZATIONS

- Project Music (Software Team Manager)
- WolverineSec Computer Security CTF Team
- Alternate Reality Initiative
- StartUM
- UM::Autonomy

AWARDS

- Dean's List
- 1st @ StartUM Pitch Competition
- 1st @ Music Makeathon
- 1st @ Michigan Hackers CTF Computer Security Challenge

THE NUEVA SCHOOL

2014 – 2018

PROGRAMMING

- JavaScript (Node.js, Express, Loopback, Vue, Angular)
- Python (NumPy, OpenCV, Keras, Tensorflow)
- C/C++ (OpenCV, JUCE, Arduino, PCL, UE4)
- C# (Unity, .NET)
- Verilog
- Go
- Java

CREATIVE

- Ableton Live & Max/MSP
- Adobe Creative Suite
- Blender
- Logic Pro X
- Unity 3D
- Unreal Engine 4

TOOLS

- Ghidra
- Wireshark
- Quartus

WORK EXPERIENCE

UNIVERSITY OF MICHIGAN (Ann Arbor, MI) 2018 – 2019
research assistant

Developed novel OCR techniques for digitizing scanned music corpus with OpenCV and Keras

- Research assistant for the Michigan Institute for Data Science project "A Computational Study of Patterned Melodic Structures Across Musical Cultures," a collaborative research project between EECS, Math, and Music faculty
- Developed novel method of optical mark recognition to detect and process Devanagari script and additional markings to produce a computer-readable archive of Indian music compositions documented in 1860.
- Corpus will be used for data analysis to find musicological connections with other musical traditions including Irish folk music and Baroque music.

YOUSOUND (Sunnyvale, CA) 2017 – 2018
full stack developer

Full stack web development with Node.js and Vue deployed on AWS

- Singlehandedly developed a scalable backend for an artist chat platform using Node.js and socket.io, deployed at production scale using AWS.
- Implemented a web-scale video live-streaming platform (like twitch.tv) using AWS Elemental MediaLive, MediaPackage, and CloudFront.
- Worked directly with founder and designers to implement and integrate Vue.js front-end for the chat platform using existing and new APIs while rapidly adapting to and using a consistent code style.
- Realized functional new web components from designs

PRIMITY BIO (Fremont, CA) 2016
software engineering intern

Realtime data visualization frontend with AngularJS

- Worked on a web-based real-time, collaborative data analysis platform for clients using test-based development with Node, Angular, and MongoDB.
- This work was presented at an FDA conference in Washington, D.C.

COURSEWORK

- Data Structures and Algorithms (EECS 281)
- Intro to Logic Design (EECS 270)
- C++ Programming and Introductory Data Structures (EECS 280)
- Discrete Math (EECS 203)
- Applied Linear Algebra (MATH 214)
- Computational Linguistics (LING 441)
- Intro to Linguistic Analysis (LING 210)
- Intro Engineering – Quadcopter Section (ENGR 100)
- Physics (Mechanics & EM)

PROJECTS AND PUBLICATIONS

INVISIO (Ann Arbor, MI) Fall 2019 - Present

ARKit, ARCore, Unity

Augmented reality spatial audio authoring tool

- Working with Professor Anil Çamcı on porting his WebGL-based Inviso spatial audio authoring tool to AR platforms including ARKit and ARCore. Prototyping AR interactions for an audio-focused application.

MUSIC MAKEATHON 2018 (Ann Arbor, MI) Fall 2018

C++, JUCE, Max

Realtime Sound-controlled Audio and Video Resampling

- Built a live, real-time audio processor with C++ and JUCE that uses an FFT comparison heuristic to replace input audio with audio from existing songs, producing a unique "remixing" effect. In addition, used Max to control video playback based on frequency and amplitude of input audio. The entire project was completed within 18 hours. **Won first place** in the U-M Project Music 2018 Makeathon.
- [Featured in U-M Engineering Newsletter.](#)

ISMIR 2018 (Paris, France) Summer 2018

Python, Keras

Abstract on deep neural music generation with reinforcement learning

- "Adversarial Reinforcement Learning for Music Generation" using a generative adversarial network with music theory constraints. Accepted to [ISMIR 2018, Late Breaking Session.](#)

FRC TEAM 4904 (San Mateo, CA) Spring 2018

C++, OpenCV, Darknet

Robot and object localization with 2D LiDAR and CNN sensor fusion

- As part of FRC team, trained a custom model for an object detection framework (YOLOv3) on game pieces. Used a novel method for sensor fusion to maintain a field model using optical flow in conjunction with YOLOv3, onboard LiDAR, and IMU to estimate pose of robot and game pieces on the field. Model was used for an autonomous routine to manipulate the nearest game piece.

MUSIC PRODUCTION Fall 2016 - Present

Ableton Live

Electronic music production under the alias "Kanooli"

- Regularly produce electronic compositions under the alias Kanooli. Developed branding strategy and accompanying [website](#), and have accumulated over 300k plays through releases on several indie music labels with large audiences.

AUTOMUSE Fall 2015 – Spring 2016

Python, Keras, Flask

Automated computer music composition

- Used Markov chains and LSTM neural networks to generate music from a dataset of scraped MIDI files. Created a website where users could listen to "infinite radio" generated in real-time by the model with an accompanying piano roll visualizer.