

# YANALL BOUTROS

1-530-591-3833 ◇ YanallBoutros@ProtonMail.com

Yanall-Boutros.github.io

Baltimore, MD

## EDUCATION

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**University of California, Santa Cruz [UCSC]**

September 2016 - August 2020

*Bachelor of Science (B.Sc.) Physics, B.Sc. Computer Science*

*Santa Cruz, CA*

- Electives: Advanced Programming, AI, Computational Physics; Department GPA: 3.40/4.00

## TECHNICAL STRENGTHS

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**Languages:** Python, C/C++, C#, Bash, Powershell, Tex, HTML, NodeJS, Haskell, Perl

**Frameworks:** TensorFlow, PyTorch, Scikit-HEP, Bootstrap, JQuery, Numpy, Matplotlib, Pandas

**Infrastructure:** GNU/Linux, Unix, Windows, PostgreSQL, Kafka, Docker, Git, Jira, Trello

**Mathematics:** Scientific Communication, Modeling, Statistics, Artificial Intelligence, Simulations

**Data Science:** Machine Learning, Data Analysis, Data Validation, Research, Testing, Debugging

**InfoSec:** Metasploit, Burp Suite, OWASP Zap, Nmap, Shodan, Maltego, Snyk, Wireshark

## EXPERIENCE

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**DCS Corp**

October 2021 - Present

*Software Engineer*

*Aberdeen, MD*

- Supported Army Research Lab Human Research and Engineering Directorate
- Integrated Computer Vision [CV] algorithm to segment and classify instances in video feed
- Automated data generation for CV classifier by rendering post-processed scenes in Unreal Engine
- Automated detection, mask creation, and augmentation of new target classes to retrain CV model
- Generated plots detailing model performance as function of distance, orientation, terrain
- Orchestrated deployment of docker containers with unit file templates and systemd services
- Made Automatic Speech Recognition [ASR] and Natural Language Processing [NLP] pipeline
- Made Kaldi Vosk and Whisper Speech-To-Text [STT] tool with supervised auto-corrections
- Made tool to accelerate corrections to update large language model [LLM] and lexicon
- Made information retrieval algorithm extract survey answers from transcriptions using word embeddings
- Integrated STT, NLP, and Benchmarking tools in Bootstrap Express NodeJS, Dockerized services
- Made TensorFlow EEG Net binary classifier 70% accurate in associating physio data with firing events
- Integrated Kafka/PostgreSQL Producer/Consumer in Component Health System, ASR/NLP/CV tools

**Bitwork Solutions**

April 2023 - Present

*Partner*

*Remote - Baltimore, MD*

- Integrating APIs to automate generating articles of keywords for target industry and audience
- Made tool to scrape any URL and categorize which business categories are most similar
- Mentored Junior AI Engineer on LLM for physics
- Implemented information retrieval algorithms to determine competitor keywords
- Implemented text generation algorithms to mass-schedule Search Engine Optimized posts
- Assign tasks to subcontractors with Jira, Trello. Review deliverables
- Designed SQL Data Schemas for interface, managed user group / role permissions
- Wrote flask middleware for accessing database and automating database model ORMs

- Consult feasibility of AI integration and modern data science techniques to project goals
- Consult on server architecture, microservice architecture

### **Digital Asset Management Group**

*Manager*

March 2022 - August 2022

*Remote - Baltimore, MD*

- Streamlined conversion from artists rendition to video game asset
- Implemented Neural Radial Fields and ZeroShot. Made transforms matrix from 2D drawings
- Setup dedicated local Jax/Dalle/Imagegen server, researched Text → 2D → 3D generation

### **Independent Contractor**

*Independent Contractor, Software Engineer*

October 2021 - March 2022

*Baltimore MD*

- Made order queue for client interface in a web application for Full Send Network [FSN]
- Made web queue database in PostgreSQL and NodeJS
- Made Decentralized Exchange Volume Liquidity trade bot for FSN
- Made accelerated mask creation tool with click carving ResNext FPN AI application for FSN
- Setup server with 10x1080TI GPUs to bruteforce recover a private key for client
- Determined computational feasibility from combinatorics and recovered client information
- Setup local home security system and review dashboard for client

### **Independent Contractor**

*Open Source Investigator*

September 2022 - Present

*Remote - Baltimore, MD*

- Found missing person's full name, social media, and contact information given only an online username
- Found locations, owned organizations, social networks, and private information on behalf of tenant
- Recorded incriminating evidence in domestic violence case
- Frequent fraud checks for clients on solicitors

### **Santa Cruz Institute for Particle Physics [SCIPP]**

*Undergraduate Research Assistant Intern*

August 2018 - August 2020

*Santa Cruz, CA*

- Attended meetings with scientists from SCIPP and CERN
- Simulated interactions in the Large Hadron Collider. Trained neural networks in TensorFlow
- Streamlined, benchmarked, and dockerized Python workflow and modules for simulating particle physics
- Achieved 80% accuracy, 5% bias in Confusion Matrix in classification of parent particles
- Taught new research assistants how to use the framework, docker, and python
- Made histograms to identify expected values for Higgs boson

### **UCSC**

*Teachers Assistant*

March 2019 - June 2019

*Santa Cruz, CA*

- TA for Physics Class on Pressure, Buoyancy, basic fluid mechanics
- Graded Papers, Reviewed common mistakes, reported and updated quiz curriculum

### **UCSC, Learning Support Services [LSS]**

*Tutor*

August 2018 - August 2020

*Santa Cruz, CA*

- Taught Introduction to Data Structures, Electromagnetism, Mechanics, and Thermodynamics
- Mentored in individual and group settings

### **Private Tutor**

*Self Employed*

August 2018 - August 2020

*Santa Cruz, CA*

- Taught Precalculus, Physics, and Piano

- Assigned learning targets, supervised children

## PROJECTS

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### **Rocket League Visualization**

December 2022 - Present

- Bought Unreal Engine 5 Rocket League Remake assets, rendered custom shapes and visualizations
- Uses differential geometry to calculate set of all possible intersection points
- Intersection points do not depend on initial impulse, allowing predictions to be made before impulse
- Draws parabolas with increasing conal radiuses to predict possible ball locations after an initial impulse
- Visualizes positioning as map of play positions, velocities, and momentum centered around ball

### **Text To Speech [TTS] Voice Cloning**

April 2023 - July 2023

- Conducted literature review on Tortoise TTS to further study architecture of modern AI networks
- Researched Vector Quantized Variational Auto Encoders [VQ-VAE], Autoregressive Decoders, Contrastive Language-Voice Pretrained Transformer [CLVP], Denoising Diffusion Probability Models [DDPM], Tokenizers, and Vocoders
- Setup bash pipeline to preprocess audio files to clone voices

### **Botler - Personal Discord Bot**

February 2023 - Present

- Made discord bot to play audio files over discord
- Setup AWS server, then self hosted botler instance
- Integrating Text Generation and TTS AI services

### **IP Camera Hacking**

November 2022 - December 2022

- Assisted in anonymous operation to monitor war crimes in Russian occupied Ukraine, to report to International Criminal Court
- Used shodan to determine what type of a device an ip address was in Russian occupied Ukraine
- Generated list of IP Addresses of vulnerable IP Cameras