Henrique Foureaux Lee

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Education

Carnegie Mellon University, School of Computer Science, B.S in Computer Science Pittsburgh, PA

Concentrations in Computer Systems and Computer Graphics | GPA: 3.77/4.0 *Aug. 2022 – Present*

Coursework | Demonstrated Skills

- Parallel Computer Architecture (Ongoing) | C++, CUDA, GPU Architecture, Advanced Parallel Computing
- Visual Computing Systems (Ongoing) | C++, Computer Graphics, GPU Rendering, Ray Tracing, Computer Vision
- Distributed Systems | C, Java, System and Session Semantics, File Systems and Databases, Concurrency Control
- Parallel and Sequential Data Structures and Algorithms | Functional Programming, Parallelism, Algorithm Design

Technical Skills

Programming Languages: C, C++, Javascript, Java, Python, C#, OCAML, Swift, HLSL
Software: Media-Pipe, CUDA, OpenMP, Socket.io, React.js, Firebase, Github/Gitlab, .NET, Unity, Unreal Engine 5
Languages: English (Native), Spanish (Native), Portuguese (Native), Mandarin (Advanced)

Experience

Information Technology and Software Development Intern May. 2024 - Aug. 2024

Johns Hopkins Applied Physics Laboratory *Laurel, MD*

- Worked as a full stack developer contributing approximately 2800 lines of code to production over the course of 10 weeks
- Developed backend infrastructure for network heavy features in a real time multi-client collaborative application
- Led 3 application demonstrations to prospective sponsors and interested parties resulting in 2 new partnerships
- Conducted biweekly code reviews with team members to ensure seamless version control with Github and GitLab

Undergraduate Researcher Jan. 2023 – Present

Carnegie Mellon University, Augmented Perception Lab (APL @ CMU) *Pittsburgh, PA*

- Designed, built, and debugged spatial computing experiences across four research projects, two of which as team lead
- Created mathematical and computational models for emulating natural behavior, body tracking, and model kinematics
- Presented prototypes, posters, and application demos to university faculty, PhD students, and medical professionals

Projects

APEX | *Johns Hopkins Applied Physics Laboratory* May. 2024 - Aug. 2024

- Built an asynchronous data pipeline to propagate user-uploaded files across network with .NET framework and Box API
- Implemented three application workflows for uploading content in real time to multi-user environments with C#
- Integrated messaging protocols enabling real time content interaction from concurrent users with Javascript's Socket.io
- Created an asynchronous query processor to retrieve files from a remote SQL database through a RESTful API
- Created Support for user voice-command driven actions through Whisper and GPT API integrated scripting in C#

Emulating Location-Intelligent Behavior through Vision and Language Models | *APL @ CMU* Aug. 2024 - Ongoing

- Developing research project alongside a PhD student as coauthor and lead software developer
- Leveraging advanced graph theory and Google OR-Tools' Linear Programming to dynamically map between 3D spaces
- Designing dynamic content caching and prefetching protocols on remote machine with Socket.io and Python
- Constructing generalized Python pipeline for querying intelligence models including GPT4, ElevenLabs, and YOLO
- Implementing Behavior-Tree data structure hybridized with LLM to emulate natural, user-reactive agent behavior

Media Pipe to Mesh Hand Tracking Pipeline | *APL @ CMU* Aug. 2023 – Dec. 2023

- Wrote custom UDP Protocols that serialized Python data and passed it locally to Unity on a frame-by-frame basis
- Led bi-weekly meetings with faculty and graduate students discussing mathematical approaches to improving the model
- Employed Numpy and Scikit to vectorize the pipeline and optimize complex angular and matrix calculations

Exploring AR Body Ownership in Acupuncture | *APL @ CMU* Jun. 2023 – Aug. 2023

- Employed inverse kinematics and 3D model rigging in Blender to create a user adaptive human arm model
- Developed 5 simulation prototypes alongside UPMC health professionals on the Unity Game Engine