Emre Arslan

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EDUCATION

Brown University, *B.S. Computer Science*, 3.9/4.0 GPA   Providence, RI | **Expected Graduation May 2025**
Relevant Courses**:** Data Structures & Algorithms, Deep Learning, Operating Systems, Computer Graphics, Parallel Computing
SAT Overall: 1550
Uskudar American Academy High School, 4.00/4.00 GPA   Istanbul, Turkey | Class of 2021

PERSONAL PROJECTS

Gfx-Main *(link)*   2023
- Designed a high-level real-time graphics library for web development usages using WebGPU API and TypeScript.
- Added API calls to the library that let users create various shape geometry or upload .obj files, create lights, textures, materials, and cameras.
- Added support for three lighting models with three different WGSL shaders, depth buffer and multisample anti-aliasing.

3D UI Website   2023
- Created a website that has a 3D landing page with animated lighting and textures, using React and React Three Fiber.

Luminous Web Application *(link)*   2022
- Developed a web application with JavaScript for a last mile delivery startup composed of thousands of lines of code, and deployed it on Heroku.
- Used React to create a front-end, and Node.js, Express.js and MongoDB schemas to keep track of user and order data.
- Integrated Stripe API to let users save payment methods, and later pay with them with checking out, and OpenAI API to let users ask about the details of common retails items.

ACADEMIC PROJECTS

3D Poisson Equation Solver   2023
- Built a 3D Poisson solver using C++ and high performance computing techniques such as domain decomposition.
- Used MPI, OpenMP, and CUDA to achieve distributed/shared memory and GPU parallelism.

3D Gaussian Splatting Camera Optimization   2023
- Built on the 3D Gaussian Splatting for Real-Time Radiance Field Rendering research paper to do AI camera optimization.
- Trained and rendered scenes on the Brown University datacenter to apply gradient descent on the differentiable renderer.
- Used PyTorch to train a network that moves the camera to an optimal position based on the rendered image's ResMem score.

Logistic Regression, implemented the logistic regression algorithm from scratch with plain Numpy routines   2023
File System, built a virtual file system and an S5FS based file system for a basic operating system.   2023
Raytracer, implemented a raytracer with Phong lighting, general transforms, implicit object intersections, and reflections.   2022
Search Engine, programmed a search engine that parses data, indexes it, and returns best results to the querying user.   2022
Single Cycle CPU Design, designed a single cycle CPU with ARM instruction support using basic digital logic elements.   2022
Accelerometer Reader, wrote low level concurrent software running on an STM microcontroller that acquires XYZ   2022
accelerometer values and displays them as a bubble level.
Interpreter, developed a basic interpreter for the Racket language, using functional programming.   2021

EXPERIENCE

Brown University, *Research Assistant*   May 2023 - Present
- Worked as a research assistant to develop a new Database Management Systems course.
- Worked as a research assistant on a project focused on high performance real-time vector databases and similarity search in the cloud with Apache Flink, Faiss, and Hugging Face transformers.

Brown University, *Teaching Assistant*   January 2023 - Present
- Worked as a teaching assistant for the class Digital Computing Systems.
- Worked as a teaching assistant for the class Database Management Systems.

Luminous, *CTO*   February 2022 - November 2023
- Worked to prepare an international shipping and logistics startup for future launch.
- Developed a web platform product, attended investor meetings, and developed a mobile IOS app for presentation purposes.

SKILLS & INTERESTS

Technical Skills: Python/PyTorch, JavaScript/TypeScript, C/C++, Go, OpenGL, WebGPU, CUDA, Java, SQL, Arm/x86 Assembly
Language: Bilingual proficiency in Turkish and English
Interests: Brown University Table Tennis team member, guitar player and vocalist