Kutay Macit

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Summary

Software Engineer with 10+ years of experience in graphics, geometry processing, and simulation. Skilled in GPU optimization, real-time rendering, and systems-level design. Proven ability to lead projects from research to production. Authorized to work in the U.S. without sponsorship(Permanent Resident).

Skills

Programming Languages: C, C++, Python, Fortran 77, Fortran 90, JavaScript, Assembly
Platforms: Microsoft Windows, Linux (Ubuntu, Fedora)
Debugging/Profiling: RenderDoc, NSight, WinDbg, VTune, GDB, Valgrind
DCC: Unity3D, Blender, Maya, Ogre3D
Libraries/APIs: OpenGL, Vulkan, WebGL, ThreeJs, MPI, OpenMP, OpenCascade, PETSc, Qt4/5

Experience

Freelance Software Engineer — July 2024 - Present

- Independent consulting during a work-authorization transition (resolved, permanent resident since July 2025).
- Architected and implemented a WebGL (Three.js) frontend for a CAD application that provides real-time 3D visualization and interactive workflows while delegating heavy CAD computation to backend services. Delivered robust client-side interaction, LOD, and streaming of CAD geometry.
- Partnered with a small development team to bridge a technical gap in **embedded graphics**; engineered a memory-efficient path-rendering library for bare-metal hardware, enabling high-quality UI on low-power displays.
- Provided short-term consulting on performance profiling and graphics debugging for small teams.
- Ongoing work on a hobby compute shader-based rasterizer project.

Dassault Systèmes SOLIDWORKS — July 2021 - June 2024

Graphics Software Engineering Manager — *Waltham, MA, USA*

- Architected a real-time GPU memory tracking system that enhanced debugging and performance optimization across the rendering engine by logging all application-side memory operations, detecting leaks, and visualizing fragmentation.
- Optimized GPU memory management by reducing fragmentation and implementing a buffer-pool system for efficient sub-allocation and recycling, improving allocation performance by ~40% and reducing frame time variability by ~20% on large CAD workloads.
- Worked on Vulkan API integration for SOLIDWORKS' next-gen rendering engine, developing and testing core rendering features in a standalone engine prototype to evaluate compatibility, performance and architectural integration.
- Profiled, captured, and fixed memory leaks using Intel VTune Profiler and NSight.
- Resolved CPU and GPU performance bottlenecks, improving system efficiency and documenting optimizations in detailed technical reports to guide future development.
- Developed in-house graphics and benchmark tests, increasing code coverage.
- Improved quality and stability of SOLIDWORKS products through enhanced coding practices, modern C++ techniques, and using nSight Graphics, Clang, Coverity, and in-house tools.

University of Utah — August 2019 - May 2021

Research Assistant — *Salt Lake City, UT, USA*

- Co-authored **Capturing Detailed Deformations of Moving Human Bodies, SIGGRAPH 2021** [Publication Link] | [Demo Link]
  - Introduces a novel motion capture system in a multi-camera setup using a specially designed low-cost suit, enabling the accurate 3D reconstruction of a moving human body.
  - Developed a spatio-temporal interpolation method to reconstruct missing 3D points, ensuring smooth and realistic soft-tissue deformations.
  - Worked on multi-camera calibration framework.
- Worked on research project **Adaptive Time-Stepping with Linearized Force Error Estimation** [Link]
  - Designed and implemented adaptive time-stepping algorithms for implicit simulation, enabling order-of-magnitude larger stable time steps.
  - Implemented and benchmarked the method with several simulation systems including 1D mass-spring, cloth, and peridynamic brittle-fracture systems integrating both Backward Euler and Newmark-beta integrators.
- Teaching Assistant of Introduction to Data Science graduate course, Spring 2021.

Setur **March 2019 - July 2019**

Machine Learning Developer ***Istanbul, Turkey***

- Worked on Personalized Recommendation System.

University of Central Arkansas **June 2018 - January 2019**

Research Assistant ***Conway, AR, USA***

- Worked on a Unity3D plugin for Phantom Omni device for interactive virtual arthroscopic surgery simulation.
- Implemented fast and efficient haptic force rendering of rigid-body interactions ensuring low latency and high frequency force feedback.

EDA Engineering Design & Analysis **October 2015 - May 2018**

Software Engineer ***Ankara, Turkey***

- Actively involved in the core design of engineering simulation and 3D design software CAEeda, including the mesh generation module MESHeda.
- Implemented a boundary layer mesh generator supporting tetrahedral and hexahedral boundary layers, with automatic intersection detection and boundary layer smoothing in model corners.
- Developed streamline plotter with various interpolation methods, integration algorithms, adaptive and fixed step size for both structured and unstructured mesh types.
- Enhanced the Panel Method for airplane body and airfoil by integrating surface discretization with curved panels using bezier curves and splines that can handle sharp edges and corners. Created visualization of the pressure distribution, lift, and drag forces.
- Designed and implemented a lighting GUI, featuring multi-light support, real-time 3D manipulation, and customizable lighting properties.
- Developed and integrated Error Estimation-Based Adaptive Mesh Refinement for a built-in shockwave solver, improving solution accuracy and efficiency.
- Implemented many other 3D geometric modeling algorithms and various performance optimizations. Added unit tests.

Taleworlds Entertainment **July 2014 - February 2015**

Intern - Part Time ***Ankara, Turkey***

- Implemented 3D Model Catalog Creator and viewer, which categorizes 3D models based on various parameters.
- Implemented Blender scripts for 3D model and animation export to game engine formats, as well as mesh coarsening, to enhance workflows for 3D artists in the company.
- Provided programming support.

METU-TAF Modeling and Simulation R&D Center **July 2013 - August 2013**

Intern ***Ankara, Turkey***

- Developed interactive visualizations (neighbor search, velocity fields, force vectors) to enhance debugging and analysis of SPH fluid simulation.

Education

University of Utah| Salt Lake City, UT, USA

- MSc in Computer Science(August 2019 - June 2021)

University of Central Arkansas| Conway, AR, USA

- MSc in Applied Computing (June 2018 - January 2019)

Middle East Technical University | Ankara, Turkey

- B.Sc. in Computer Engineering (Graduated in 2016)